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The
Macrolepidoptera
of the World

== A systematic description ==
of the known Macrolepidoptera

edited with the collaboration of well-known specialists

by

Dr. Adalbert Seitz, Professor.



STUTTGART

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==== I. SECTION: =====

The Macrolepidoptera
of the
Palearctic Region

1. Volume: The Palearctic Butterflies.

With 89 coloured plates (3470 figures.)

Translated into English

by

Dr. K. Jordan.



Preface.

The idea of a work for the identification of all the known Macrolepidoptera originated during an excursion which the editor made in Australia in the company of the late WILLIAM MC LEAY. The suggestion put forward by this naturalist found further support in the following year in a consultation with EMILIO A. GOELDI, the then director of the Zoological Museum at Rio de Janeiro, which induced me to enter into communication with DR. O. STAUDINGER in order to confer with him about the feasibility of an extension, suiting the requirements of all collectors in foreign countries, of his work on Exotic Lepidoptera, which was in the course of publication. But the imperfect technique and the absence of certain indispensable preliminary studies appeared to render it impossible at the time to carry out the plan. Nevertheless I commenced to work with a view towards a future realization of the idea. It seemed to me above all necessary to visit every faunistic region and subregion, as far as it might be possible, and consequently, after leaving Australia in November 1887 and having collected in South America, especially Brazil (1888—89), I went to India and China (1890), visited Japan (1891—92) and Anterior India (1892) and finally collected on several tours in Africa. I paid also special attention to the fauna of islands and made collections on the Cape Verde Islands, the Canaries, Madeira, Kangaroo Island, and various islands of the Indian and Chinese seas.

During these travels, which extended over a period of nearly 20 years, the technique in the production of coloured plates had been so much improved that it now appeared possible, in spite of the necessarily low price of a work for general use, to publish such a large number of sufficiently accurate and useful figures that the main object of the work, to serve as a book of reference, might be attained. Moreover, the appearance of numerous auxiliary works encouraged us to decide definitely on the beginning of the great undertaking. There was above all KIRBY's Catalogue which could serve as a most essential basis, and, besides, STAUDINGER-REBEL's Catalogue of Palearctic Lepidoptera. Without these two works the present one could hardly have been attempted, and I seize the opportunity of pointing to the great merit of these laborious and difficult publications, which save so much time and labour and have become indispensable aids to all Lepidopterists. There appeared further in quick succession the fundamental works of HAMPSON, JORDAN, ROTHSCCHILD and many other authors, which rendered it possible to unite in an abridged form in one large publication the faunistic and descriptive, small and large papers by BUTLER, DRUCE, ELWES, FRUHSTORFER, GODMAN, PAGENSTECHER, STAUDINGER, WARREN, etc. etc. — the nearly hundred names of especially active entomologists which might be enumerated here will be found among the authors, names mentioned in this work.

When in 1906 the publisher asked me to undertake the editorship, an agreement was soon arrived at in connection with some technical firms (the lithographic works of WERNER & WINTER at Frankfurt a. M., and the art reproduction works of EMIL HOCHDANZ at Stuttgart), and I proceeded to enter into correspondence with specialists in the various groups of Lepidoptera. It gives me very great pleasure to express also in this place my grateful thanks to my collaborators for so kindly and readily accepting our propositions.

Apart from a certain external uniformity, a strict unity of treatment was only insisted upon in so far as it appeared absolutely necessary for attaining the purpose of the work. The individual authors were otherwise at liberty to follow their own methods, the task of collaboration thus being rendered as agreeable as possible. The chief aim of the entire work was to create for the collector as well as the scientific entomologist a very concise book which would enable him so find readily with the help of the text supplemented by the plates all the more essential points of what is known about the Lepidoptera he may have received. It was intended to publish a handbook which could be had at a low price and might conveniently be taken on travels.

This ground-plan explains the characteristic features of the whole work. A total of about 40 000 illustrations permits the descriptions to be as short as possible, which is absolutely necessary, if conciseness, the most important point in a book of reference, is to be attained. It further appeared to be of great assistance in this respect that the specific and varietal names were repeated at the margin and

the names of the genera and that of the collaborator at the head of the pages. As the arrangement of the text is very clear, I considered it permissible to restrict to the utmost the nomenclature on the plates and therefore placed beneath each figure only the specific or varietal name. We have thus avoided the inconvenient method of numbering every figure, which might have proved a calamity in our case, considering the large number of figures on a plate, some plates containing no less than 70—80 figures. Moreover, the figures are nearly always arranged in rows and, as far as technical reasons did not prevent it, in the same order as the text. This mechanical arrangement, in connection with the numerous half-figures, renders the whole rather inartistic and very monotonous; but it seemed to us advisable to adopt this plan, because we aimed in our work at lucidity and handiness rather than at beauty and elegance and had no intention of blinding the public by an artistic make up of the plates to the detriment of usefulness.

The same point of view has been paramount in the reproduction of the figures. Our purpose was to issue the most completely illustrated work which has ever been published, and to offer it at such an unprecedentedly low price that it would be in the reach of everybody notwithstanding its considerable size. If nevertheless in several independent reviews many figures have been called the most accurate ones hitherto produced, this success is due on the one hand to the perfection of modern technique, and on the other to the efficiency of the firms to which the reproduction of the plates was entrusted, and to whom the best thanks of the editor are here expressed for the great pains they have bestowed on the work.

Next to cheapness, rapidity of publication appeared to us the most important point. All similar serial works and even many of lesser size have hitherto been issued with increasing delay, or their publication has been interrupted or altogether discontinued. We decided on the contrary to issue the numbers at first slowly and later at shorter intervals, and to fix definitely the end of 1912 as the time for the completion of the entire work. The first number appeared in October 1906 and to-day, after a lapse of hardly 30 months, the first volume is in the hands of the public, 100 numbers having been issued, about 130 being ready for publication and many more approaching completion.

It was only possible to attain this result with the kind and willing assistance, either asked for or volunteered, of a large number of Lepidopterists. Not until the most important collectors of the world, foremost among them the Hon. L. W. ROTHSCHILD, of Tring, permitted their valuable treasures to be used as originals for the plates, was the publication of the work at all feasible. The types in the British Museum, especially those of HEWITSON, and many from other important collections in England, have most faithfully been copied by Mr. HORACE KNIGHT; those in the Paris Museum by Monsieur POULADE. Through the courtesy of Messrs. JORDAN and WARREN we have received many specimens from Tring; Monsieur SERGEI ALPHÉRAKY, of St. Petersburg, and Herr CHR. AURIVILLIUS, of Stockholm, had the kindness to send contributions. We are indebted to Mr. W. F. KIRBY, of London, for much important information, and to SIR GEORGE HAMPSON for so very kindly showing me round in the enormous collection of the British Museum. I inspected collections in South America under the able guidance of Messrs. CARLOS BERG and EMILIO A. GOELDI, and Professor VON JHERING, with great amiability, even entrusted some of the treasures of the Museu Paulista to a voyage across the Atlantic. In Asia I was especially assisted by Messrs. GREEN and MACKWOOD in Ceylon, SKERTCHLEY at Hongkong, WATSON, FRITZE and SCHEDEL in Japan. Messrs. WM. MCLEAY, SYDNEY OLLIFF and MASTERS gave me many facilities when inspecting Australian Museums, and Messrs. PACKARD and ELLISON SMYTH as well as RADCLIFFE GROTE presented me with notes on important observations and with specimens from North America.

German and Swiss Museums also have taken much interest in the undertaking. In the first place my thanks must be addressed to the Königl. Museum in Berlin, whose director, Professor A. BRAUER allowed me to make as much use of the collection as the rules permitted, and where Herren F. KARSCH and GRÜNBERG kindly assisted me in selecting the specimens. The Senckenberg Museum at Frankfurt a. M. and the Federal Entomological Museum at Zürich also supported me, the latter through the courteous office of Herr MAX STANDFUSS. Moreover, valuable assistance has been rendered by a great many private collectors, whom we have not room enough to enumerate. First of all we have to mention Herren BANG-HAAS sen. and jun., who were of invaluable help to me with their abundance of material, unique on the Continent. This firm, whose influence with regard to the role which Germany plays at the present time in Lepidopterology cannot be too highly appreciated, has sacrificed unselfishly time, labour and specimens in order to render the work more complete, a large proportion of the new forms proposed in this work being provided from its inexhaustible store by this firm of world-wide name. Also Herren BURGEFF, of Geisenheim, JACOBS of Wiesbaden, GLEST, of Freiburg i. B., NASSAUER, of Frankfurt, NEY and PÜNGELER, of Aachen, and COURVOISIER, of Bâle, entrusted me from their special collections with rare or unique specimens for figuring, and the two last-named gentlemen undertook, moreover, the trouble of revising part of the manuscript. Herr W. LEONHARDT, of Frankfurt a. M., with great liberality, put at my entire disposal a collection of notes on *Lycænidæ* which it had taken decades to collect. However, it

would fill several pages if I enumerated all who, often unasked, have sent or offered me rarities and uniques from their collections, and I must abstain from mentioning every one who has helped. It is to these and to the collaborators — not to the editor — that the thanks are due of all those who had to abstain hitherto from publishing contributions to the systematics of Lepidoptera or bionomical observations on account of the great obstacles constantly encountered in procuring the necessary literature, which is often very difficult of access. We grieve to say that many of those whom we should have liked to thank in this place have already passed from among us.

May a kind reception be accorded to the work. As it is meant to be only an elementary manual, supplying a generally felt want, and has no higher pretensions, we may hope that critics will not be too severe. In consequence of the knowledge and industry of some of our collaborators many manuscripts, instead of being the short sketches asked for, were monographs of as high a scientific value as anything that had been published on the subject. We trust that what we give more in these instances than was promised will be regarded as compensating for the mistakes, omissions and other inaccuracies which may be found in other parts of the work. The many imperfections will be considered, I trust, as an anticipated and inevitable though regrettable consequence of our endeavour to attain the objects which we had in view as the most important in our undertaking: Comprehensiveness, rapidity of publication, and cheapness.

El-Kantara, 10th of June 1909.

Dr. Adalbert Seitz,
Darmstadt.

===== TOME I: =====

DIURNALS



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Diurna, Diurnals or Butterflies.

As the name implies, the members of this group fly almost exclusively in day-time, only the Brassolids, those Brazilian giants, and many Satyrids become lively at dusk, and certain Hesperids fly only at night. All Diurnals have well developed mouth-parts, suitable for taking food, but the forelegs are frequently reduced. The caterpillars are smooth, spiked, or short-hairy, being sometimes provided with horns or anal spine-like processes. The chrysalids are mostly quite naked or are lying in a very loose cocoon. The Butterflies delight in sun-shine, and suck at flowers, fruit, sap of trees, having also a predilection for moist places on roads and for rivulets, where they gather sometimes in large numbers, especially in hot climates. They are divisible into two natural groups: the true Butterflies (*Rhopalocera*) and the Skippers (*Grypocera*).

A. *Rhopalocera*, true Butterflies.

Differing from the *Grypocera* in the head being relatively small, the body hardly of medium size, being often very slender, and in the wings being large and broad. About 20000 different forms have been described, the number increasing enormously from year to year. The locality containing the largest number of species on a relatively small area are the southern slopes of the Himalayas, while New Zealand is the country poorest in Diurnals, in comparison with the size of the country, the mild climate and the rich vegetation. In the Palaearctic Region the greatest number and largest forms occur in the South-East (China, Japan), whereas the north-western countries are the poorest (Ireland, Iceland). The *Rhopalocera* are divided into three large groups: *Papilionina*, *Nymphalina* and *Lycaenina*.

1. Section: *Papilionina*.

Mostly large Butterflies with broad wings, usually of bright or conspicuously variegated colours, having a strong tongue, clubbed antennae, and in both sexes 6 well-developed legs suitable for walking. The caterpillars have no horns on the head, nor pointed or branching spines. The chrysalis is never suspended by the tail, but is either fastened by a girth round the body, head upwards, or lies on the ground. The butterflies are lively day-fliers delighting in sun-shine, and are busy visiting flowers or sucking up the moisture on roads. The group is composed of the two families *Papilionidae* and *Pieridae*.

1. Family: *Papilionidae*, Swallowtails. *

Mostly large or very large and beautiful Butterflies, of bright and often imposing colours, with broad and entire forewings and rounded or elongate, often dentate or tailed hindwings. The tongue strong; the antennae gradually incrassate or strongly clubbed; the legs rather long and thin; the whole body slender

in proportion to the often enormous wings. The caterpillars possess behind the head a retractile fleshy fork (scent-organ, osmateria), and live mostly uncovered on the foodplant.

According to the usual classification there are about 16 genera differentiated. While some authors unite over a thousand different forms in a single genus *Papilio*, others have split up this genus into numerous groups which they regard as valid genera. We shall accept here generally the simplifying method of classification, but only in so far as by doing this the clearness of the classification is not obscured.

1. Genus: **Papilio**, Swallowtails.

Three large sections appear to be sharply separated from one another, distinguished by HAASE as *Pharmacophagus*, as *Papilio* or true Swallowtails, and as *Cosmodesmus*. From the first section a further section has been separated as Birdwinged Swallowtails (*Ornithoptera*, *Troides*), with which we begin, the distinguishing characters being, however, quite superficial.

Subgenus: **Ornithoptera** *Boisd.*

Very large Butterflies, with enormous triangular forewings and much smaller and rounded hindwings. The latter are in ♂♂ nearly always magnificently coloured and of a satin-like gloss; the ♂♂ have at the hindmargin in the anal fold modified scaling (scent-organ), the scales being hair-like, woolly, or awl-shaped. The antennae are long and become gradually thicker towards the apex, which is slightly curved. The head is anteriorly obtuse, the frons being broad and sometimes tufted, and occasionally metallic; the palpi are short and not projecting. The thorax is very elastic, soft, densely hairy, spotted with scarlet-red at the sides. The legs are long and thin, the abdomen is elongate, often variegated above. — The caterpillar is stout, cylindrical, black or dark brown, each segment heaving stout fleshy processes. They live free on species of *Aristolochia*, being often gregarious when young. The retractile fork behind the head has a very strong smell resembling that of the food-plant. The chrysalis with strongly projecting lateral carina, conical frontal tubercles and two rows of warts on the back. The Butterflies fly often at a considerable height above the ground in sun-shine; they visit the flowers of bushes and trees, incessantly fanning with their wings while sucking the honey. In comparison with the size of the wings the flight is awkward, rather heavy, and straight on. Some species are very common, and are easily caught in large numbers in certain localities they haunt; not a single species appears to be rare, except near the boundary of the range. This group, which is otherwise entirely Indo-Australian, extends with a single species into the south-eastern districts of the Palaearctic Region.

aeacus. **P. (Ornithoptera) aeacus** *Feld.* (= *rhadamantus* *Boisd.*) (♀ 1a, ♂ 1b). This species inhabits the Himalayas, Burma, South-, Central- and West-China, and Tibet; but the Palaearctic specimens differ from the Indian individuals rather obviously in the light-coloured stripes of the forewing being more grey (instead of yellowish as in India), and in the abdomen being spotted with black beneath. The insect is similar to the Phillipine *P. rhadamantus* *Lucas*, with which it has formerly been confounded.

Subgenus: **Pharmacophagus** *Haase*. *Aristolochia*-Swallowtails.

The species of *Pharmacophagus* are separable only by the smaller size and less stout form of the body from *Ornithoptera*, which they resemble in the habits of the imago as well as in the chrysalis and caterpillar. The hindwings are mostly not so much inferior in size to the forewings, being often tailed, which is the case only in *Ornithoptera paradisica* and its allies, and here only in the male sex. The body of these insects is black, the sides being spotted with red; it is soft, having an abundance of a yellow liquid which, on pressing the thorax, penetrates from all the sutures, even from the tip of the antennae; the insects are at the same time very tenacious of life. The flight is very awkward, mostly low and straight on; the ♀♀ of many species can be picked up with the fingers from the grass. In copulation the sexes are accordingly in many cases united for hours. Everything points to these insects being well protected against their enemies, which explains perhaps the often great abundance of specimens in certain localities. The first stages of the caterpillars, which have the appearance of bird-droppings, resemble to a certain extent the caterpillars of the true Swallowtails and of the allies of the European Scarce Swallowtail; later on they become stout, soft and black, bearing on each segment 4—6 fleshy tubercles or tentacles, which are often red. They live on *Aristolochia*, the juice of which renders them poisonous. The Butterflies occur in forests and gardens; they likewise are fanning with the wings when sucking at flowers.

ravana. **P. ravana** *Moore* (1b), black, hindwing spotted with white, a red spot at the apex of the spatulate tail. Anal fold of hindwing brown interiorly. — In the North-Western Himalayas (Kashmir), said to occur as far as Sikkim.

nevillei. **P. nevillei** *Wood-Mason* (= *chentsong* *Oberth.*) (1c), very similar; tail of hindwing without red spot; Anal fold of hindwing dirty white interiorly. — South-West China (upper course of the Yang-tse-Kiang), and the adjacent portions of Northern India.

lama. **P. lama** *Oberth.* (2a), above almost uniformly black, only near costal margin of hindwing a dirty white, sometimes obsolescent, spot. — This form is the Palaearctic representative of the Indian *P. philoxenus*; it occurs in Central- and West-China, probably also in Tibet, especially in hilly country, and is very common, like most *Aristolochia*-Papilios in certain localities (LEECH).

P. alcinous *Klug* is a black, geographically variable, Papilio which inhabits the Pacific district of the Palaearctic Region, bearing a row of red or buffish submarginal spots on the hindwing. The first described form is **alcinous** *Klug* (*spathatus* *Butl.*; *haematostictus* *Butl.*) (2a). ♂ above entirely black, frons also black, only the body beneath and the underside of the hindwing spotted with red; the latter bears small red submarginal halfmoons. In the ♀ the ground-colour is dust-grey, and in place of the halfmoons there are grey band-like spots: the July specimens are the smallest (2b). Japan. — **confusus** *Rothsch.* (2c) is the form from the Continent; it is distributed from Shantung southwards to Yunnan; it has a red spot on the frons or at least a few red hairs and its ♀♀ are dark brown: the submarginal halfmoons are moreover in the ♀ narrower and bright red. — **plutonius** *Oberth.* (2c), from the interior of China and Tibet, is stouter in appearance, has more rounded tails and paler underside to the hindwing. — **daemonius** *Alphér.* (= *fatuus* *Rothsch.*) are names given by ALPHÉRAKY and ROTHCHILD to specimens from Tibet and Ta-tsien-lu with less dentate hindwings and whitish scent-wool in the anal fold of the hindwing. — **loochooanus** *Rothsch.* (2d) is the island-form from Liu-Kiu, in which the frons has not only a red spot but is entirely red, and in which the ♀♀ are not dark brown as in *confusus*, but dust-grey as in *alcinous*. — **impediens** *Rothsch.* (3a), from Ta-tsien-lu, likewise an entirely red head, differs, however, in the hindwing being very narrow. — **mencius** *Feld.* (2b) is a Chinese insect resembling *confusus*, but is paler and the wool in the anal fold of the hindwing is greyish white, not blackish brown. — All the forms of the *alcinous*-group are in their habits the same. The sluggish ♀♀ sit in the grass; they appear to take very little food and do not fly much. Much more numerous are the ♂♂, which flutter about searching in their slow tumbling flight for the ♀, with which they enter into copulation, often sitting like Nocturnals on the ground. The caterpillars have almost the appearance of a mulberry twig, with red tubercles on a black ground; they live especially on *Cocculus thunbergi*, appearing in the warmer districts of their range in at least two generations; the butterflies are extremely common, frequent however certain special stations. The species is almost exclusively Palaearctic, only a few forms entering the most northern districts of the Oriental Region.

Subgenus: **Papilio s. s.** Swallowtails.

HAASE calls this group "Rinnenfalter" i. e. fluted Swallowtails. The anal area of the hindwing being very narrow in these insects, in a number of species even almost entirely reduced, the abdominal margin of the hindwing appears longitudinally fluted or grooved, especially on the underside. But this character is only superficial. In reality we are dealing here with insects totally different from those of the preceding subgenus. We do not find here the gummy and oily substance of the body of the *Aristolochia*-Swallowtails, and there is no approach to the tenacity of life of those insects. If one squeezes a Swallowtail of the present group between the fingers, the brittle thorax cracks and the insect is dead or at least dying, even if the pressure was rather slight, the individual not being able to recover, whereas an *Aristolochia*-Papilio, if not too strongly squeezed, flies briskly away as soon as one releases it. The caterpillars of this group have never the fleshy tubercles of the previous subgenus, but are always smooth, green or variegated, when adult. The chrysalids moreover are not widened out so as to assume the shape of a shell, but are almost cylindrical, having about the shape of the chrysalis of *Vanessa*, with two obtuse frontal processes. The Butterflies are partly common, partly rare; they are easy and fast fliers. The caterpillars do not live on poisonous plants, but mostly on fruit-trees, also on Umbelliferae. While the *Aristolochia*-Papilios are totally absent from Europe as well as Africa, the true Swallowtails are found in all Regions.

P. janaka *Moore* (tc). The first described form of this insect, which is black in both sexes, having white-spotted hindwings, inhabits North India, where it is hardly possible to distinguish it on the wing from one of the *Aristolochia*-Papilios of that district, *P. aristolochiae*. In the Palaearctic Region, however, where the poisonous *P. aristolochiae* does not occur, the likewise poisonous *P. mencius* being found instead, our *P. janaka* bears like this model a uniformly black upperside, the red submarginal halfmoons of the hindwing being vestigial and the large white spots absent. This very rare Butterfly has been named by ROTHCHILD **P. janaka dealbatus** (3a). Though the body itself is less red than in *P. mencius*, the breast also not being spotted with red, the red colour is found instead on the portion of the wings nearest the body, forming on the underside at the base of the forewing and along the abdominal margin of the hindwing variously shaped stripes or spots. — The type-specimen (from which our figure has been taken) is in the Tring-Museum; the habitat seems to be exclusively Se-tschuen.

P. nigricans *Rothsch.* (3a) stands in the same relation to the Indian *P. byotes* *Westw.* as *P. dealbatus* *nigricans*. does to *P. janaka*. Black above, with a few red lunules at the anal angle; forewing spotted with red at base beneath. As in the preceding the ♀ is unknown, the ♂♂ appearing also to be rare. — Se-tschuen, possibly also Tibet.

P. elwesi *Leech* (5a). This very rare Butterfly, which differs from all other Papilios of the globe in the tail of the hindwing being so dilated that two veins are necessary to support it, inhabits the Interior of China. I received the specimen figured from Captain Jankowski with the information that the insect is extremely rare at J-tchang on the Yang-tse-Kiang. The species is also mentioned from Kiukiang (ROTHCHILD). Its occurrence is presumably restricted to the Palaearctic Region.

protenor. **P. protenor** *Cram.* (σ^7 = memnon *Fabr.*, η = laomedon *Fabr.*) (3b). Tailless: black: hindwing above with red anal ocellus and in σ^7 with white costal area: underside grey on forewing, black on hindwing, anal and apical area of the latter spotted with red. The sexes similar. — A fast flying insect; very common in Central and West-China, extending southward to Formosa and North India. Indian specimens have a stronger metallic gloss on the upperside. — Larva green; four transverse bands and head and anal segment clay-colour, the thoracical bands being partly black. It is found on *Xanthoxylum alatum*. The chrysalis is green or wood-brown.

rhетенor. **P. rhетенor** *Westw.* (= alcmenor *Feld.*, η = icarius *Westw.*) (3b, c). σ^7 similar to the preceding on the upperside, tailless; on the underside the red colour extends from the base to the anal ocellus (3b). The η (3e) is very different from the σ^7 : hindwing broadly tailed, with white central patch, which is very large in southern specimens, being occasionally obsolescent in northern ones. Central, South and West China, and North India; much rarer than the preceding, especially the η . The caterpillar is not known.

demetrius. **P. demetrius** *Cram.* (= carpenteri *Butl.*) (σ^7 3e, η 4a). Similar to *P. protenor*, but both sexes with short, broad, rounded tail. Caterpillar similar to that of *P. xuthus*, green, with dark transverse bands and white side-spots, in June and again in the autumn on Citrus and *Aegle sepiaria*. The imago from April till October, in China and Japan, also on Formosa, the Liu Kiu Islands and in North India, nowhere a rarity, being especially common in the hills.

macilentus. **P. macilentus** *Jans.* (= scaevola *Oberth.*) (4a). Black-brown: hindwing above with submarginal halfmoons, which are sometimes obsolete: recognizable by the prolonged hindwing, which measures sometimes as much as 8 cm from the base of the wing to the tip of the tail (= tractipennis *Butl.*). This insect imitates *P. alcinous*, being much rarer than the model, and also than *demetrius*, with which it occurs together. Japan, China; from May till September; the spring specimens are very much smaller than the summer form here figured.

P. bianor is a black species dusted with metallic green scales on the upperside. It varies according to season and locality and inhabits the whole of eastern Asia from East Siberia to South China. In the σ^7 there are posteriorly on the disc a number of hairy streaks situated on the veins. — The first described form, **bianor** *Cram.* (4e), is the summer form from East and Central China, which is very common in certain localities, for instance at Kwang-Tung on the island of Hongkong, occurring here from July till October. — The corresponding spring form ab. **majalis** *nör.* (3e) is smaller and more densely dusted with green. This form is less common than the summer form. — **dehaani** *Feld.* (= lorquini *Reak.*) (4c), which is common everywhere in Southern Japan, is similar to the summer form of *bianor*, but the greyish white streaks on the underside of the forewing are much shorter and less prominent, and there is on the disc of the hindwing usually a narrow pale band. — In ab. **japonica** *Butl.*, which is the spring form of *dehaani*, the wings bear usually on the upperside a bright green or golden green discal band, the green scaling being also denser than in the summer form. — **maacki** *Ménét.* (= tutanus *Fent.*) (5a) is the northern summer form from Yezo, Corea and Amurland. — ab. **raddei** *Brem.* (4b) is the corresponding spring form, the smallest of all *bianor*-forms, appearing in May. Some of the pupae of the summer brood, instead of emerging in July, lie occasionally over till the following year; the imagines from such pupae have, according to GRAESER, the size of *maacki* but the colour of *raddei*. — The name **dialis** *Lerch* is based on a σ^7 of the next form from West China with narrow hairstreaks. — **syfanius** *Oberth.* is the West Chinese form, having probably only one brood, owing to the altitude of the country. Many specimens bear a white patch on the disc of the hindwing. The insect flies in June.

The caterpillar of *P. bianor* exhibits considerable variability. It is on the whole similar to that of *P. demetrius*, being green and bearing two transverse bands. It occurs, like that of *P. demetrius*, on Aurantiaceae, Phellodendron, and *Aegle sepiaria*, of which consist the hedges around the gardens of the natives. The butterflies appear in spring and in greater numbers again from July till October. They are busy visiting flowering trees and bushes, being very partial to the flowers of *Lanthana hybrida*.

P. polycctor *Boisd.* (5b) comes nearest to *P. bianor*. It bears on the upperside a broad metallic band running from the costal margin of the forewing to the anal angle of the hindwing, being golden green on the forewing, brilliant blue on the hindwing, the insect connecting in colour *bianor* with *paris*. The area inhabited by *P. polycctor* borders on that of *P. bianor*, the species occurring from West China to Kashmir and Afghanistan, being represented further east in North India by *gamesa*. *P. polycctor* is common in the southern portions of its district, especially in that portion of India which lies near the borders of the Palaearctic Region. It occurs in two seasonal forms, **polycctor** *Boisd.* being the summer form, while the smaller spring form has received the name ab. **peeroza** *Moore*, being distinguished from *polycctor*, besides size, by the more distinct submarginal halfmoons on the upperside of the hindwing. The sexes are similar.

P. paris L. While Eastern China, for instance Hongkong, is inhabited by the typical *paris*-form, *paris*, the blue patch of which is nearly oval, there occurs in Western China and probably also in Tibet a *paris*-form in which the blue patch is much reduced. This is **chinensis** Rothsch. (= *paris* Leech). The blue patch *chinensis* is deeper blue, less bright, and is reduced from the hinder side, having the shape of a large halfmoon. The metallic band which extends from the blue patch to the anal angle is interrupted or obsolete. There are all intergradations between this form and *paris*, the areas inhabited being continuous.

P. arcturus Westw. (5c). In this insect the blue patch of the hindwing is even more reduced than *arcturus* in *chinensis*, being a narrow halfmoon with acute horns, the apex of the wing being deep blue. Central and West China and North India.

The last two Swallowtails are emigrants from India, where are found instead of *P. paris chinensis* two other forms, *P. paris paris* in North India and *P. paris tamilana* in South India, *P. arcturus* being commonly met with in the Himalayan countries. The flight is so fast that one notices the blue patch only when the butterfly stops to suck at a flower. The insects are very partial to the flowers of *Lanthana* and *Hybiscus rosasinensis*. They do not occur in two separate broods like the preceding Papilios, but are found all the summer from April to October, their frequency being practically the same throughout the warm months. The green caterpillar feeds on Aurantiaceae.

P. nicconicolens Butl. (5c) is a form of the widely distributed *P. helenus*. Very large, black-brown, *nicconicolens*, the hindwing bearing a white patch. The first described form *helenus* L., which is very common in South China, for instance at Hongkong, does not reach the Palaearctic Region. *Nicconicolens* flies on the Liu Kiu Islands, but its occurrence in Southern Japan (Kiushiu) has recently also been placed beyond doubt. Its name is derived from Nikko in the central island of Japan, but the occurrence there of the insect requires confirmation. The caterpillar and pupa are green; the former bears several transverse bands, of which those on the third and ninth segments are pale, while those on the fifth, seventh and eighth segments are black, somewhat dotted with grey; the underside is grey. On Aurantiaceae. — The butterfly appears in May and June and has a light and fast flight, being more partial to damp places on roads than to flowers, on which they rest lightly with their very long legs when sucking. Whereas the insect is very common in India and also not rare on the Liu Kiu Islands it occurs only sparingly in the extreme South-East of the Palaearctic Region.

P. polytes L. is represented in the Palaearctic Region by a geographical race named by Felder *borealis*. **borealis** (5c). Black; forewing with creamy white marginal spots; hindwing with a discal band of spots of the same colour, more or less parallel to the distal margin. North-Eastern China, southward to Shanghai; Liu Kiu Islands. The ♀♀ are usually similar to the ♂♂, but there occurs also a second, very different, form, in which the forewing are brown with blackish streaks, while the hindwing bears a large white discal patch. — In ab. **thibetanus** Oberth. the spots of the hindwing are partly absent or very small. — ab. **mandane** *thibetanus*. Rothsch. is a ♀-form with reduced white patch on hindwing. All these forms are north-eastern representatives of *P. polytes*, which is distributed in a great number of geographical forms over the whole Indo-Malayan Subregion. Here *polytes* is tailed or tailless; in the ♂♂ and the ♂-like ♀♀ the white spots of the hindwing are usually so large that they form a continuous band traversed by the black veins. The ♀♀ are usually different from the ♂♂, imitating generally the poisonous forms of *Pharmacophagus* which occur in the district, being similar in South India to *Pharmacophagus hector* and in North India and Burma to *Ph. aristolochiae*, and appearing in Borneo in the guise of *Ph. antiphus*; etc. — The caterpillar is green, bearing black, white-marked, transverse bands on the third, fifth, seventh to ninth, and on the twelfth segments. On Aurantiaceae. The pupa is strongly bent backwards, bearing strong frontal and thoracical tubercles; green, whitish at the shoulders. — The butterflies, which are extremely common in India, are much rarer in the Palaearctic Region; they occur throughout the summer, not forming distinctly different seasonal forms. They have a preference for the flowers of *Lanthana*.

P. xuthus L. (= *xanthus* L.) (6a) resembles somewhat *P. machaon*, but the yellow colour is more *xuthus*, restricted: there are three black longitudinal streaks in the cell of the forewing. — ab. **xuthulus** Brem. (6a) *xuthulus*, is the spring form: smaller, with narrower black vein-streaks than the summer form, ocellus without pupil. Common in Eastern China, except the south, not reaching Hongkong. Extremely common in Corea, Japan, the Liu Kiu and neighbouring Islands, and Formosa. Less numerous in Amurland; in the northern districts in some years and in certain localities even rare, having here only one brood (GRAESER). — The caterpillar is very similar to that of *P. bianor*; bright green; a grey, white-marked, transverse band on the third, fifth and twelfth somites, a similar oblique band over the seventh and eighth segments; above the prolegs large, rounded, white spots. From June to November on *Aegle sepiaria* and various fruit-trees. The chrysalis is green, rarely brown; the anterior abdominal segments laterally somewhat swollen and carinate: caputal

processes strongly developed, an obtuse, somewhat thorn-like process on thorax. — The butterflies have a more heavy flight than *P. machaon*; *xuthus* appearing in May, frequenting flowering willows, while *xuthus* begins to fly in June. They are more common in the gardens of the towns than in the open country, probably on account of the habit of the Japanese and many Chinese to surround the gardens with hedges of *Aegle sepiaria*, where one observes the ♀♀ flying incessantly up and down.*) The differences between the spring and summer forms are most prominent in Siberia, while in the southern districts of the area inhabited the broods are more similar to one another. The main time of appearance are July and August, when *xuthus* is one of the commonest butterflies, for instance in the gardens of Tokio.

P. machaon L. Yellow; forewing above with the base, two cell-bars, the veins and two bands black; hindwing with orange anal ocellus. Inhabits the northern districts of the Old World from Lapland, Northern Siberia and Kamtschatka southwards to the Oases of the Sahara, to North India and Japan, from Lisbon in the west of the Palaearctic Region to Yokohama in the east. The species does not occur on the Canaries, Madeira and the Azores, nor in Tripolis and Egypt. The caterpillar is bluish green, banded with black, dotted with red in the bands: sometimes black, with yellow spots. In June and again in the autumn on *Phellodendron* (GRAESER) and *Umbelliferae*. Chrysalis green or brown, with rather broad frontal tubercles.

machaon. — The original **machaon L.** (6e) flies in Europe and Western Asia, being deeper yellow in the South, paler in the North. The specimens of the first brood, emerging from hibernated pupae, are as a rule smaller than the summer individuals. — As ab. **sphyrus** certain dealers sell specimens in which the black band of the hindwing nearly touches the cell. However, the name *sphyrus* was given by HÜBNER to a figure (without description) of which we reproduce here upper- and underside (6d). Since the figure of *sphyrus* is only in general appearance a little darker than average European specimens, and since, further, the band of the hindwing approaches the cell hardly more than in most individuals from southern Germany, it is advisable to drop the name *sphyrus* altogether and to refer to those so-called *sphyrus* under their proper name.

asiatica. ab. **asiatica Ménér.** This individual form (6b), which appears singly everywhere in the central and northern districts, is the predominant form in Morocco, Algiers and Tunis, and flies also in Syria and Persia. — In

pallida. ab. **pallida Tutt** the ground-colour is unusually pale. — ab. **aurantiaca Speyer**, which occurs among the

aurantiaca. summer specimens, mostly in special localities, has a deep yellow ground-colour.**)

niger. — ab. **niger Heyne** is a

saharae. melanotic form, being completely or almost entirely black. — ab. **saharae Oberth.** is a small, pale summer form occurring at Laghouat in Southern Algiers, while at Biskra (Eastern Algiers) there fly normal-sized specimens of the form *asiatica Ménér.* These have been named **hospitonides** by Oberthür, on account of the caterpillar being similar to that of *P. hospiton*. — ab. **centralis Staud.** is a large form from Turkestan, in which the black markings, especially the base of the forewing, are strongly dusted over with yellow; similar specimens occur also in Europe. — ab. **drusus Fuchs** and ab. **burdigalensis Trim.** are transitional specimens between the usual type and ab. *aurantiaca*; ab. **marginalis Robbe** with reduced black bands, oblong submarginal spots on forewing and pale underside, as well as ab. **nigrofasciata Rothke** with reduced submarginal spots and reduced orange red anal spot, are unimportant individual aberrations: ab. **watzkai Garb., suffusa Spengel, tenuivittata Spengel, evittata Spengel** (deeper yellow, without black submarginal band), **elunata Spengel** (yellow submarginal spots merged together to a narrow band) are mostrosities: in ab. **bipunctata Eimer** there is a black dot behind the subcostal fork. This dot is present in many individuals — especially often in British specimens —, and it was hardly necessary to give a separate name to such individuals. Nor do those specimens deserve a special name we think which have an orange-yellow spot at the apex of the hindwing or reddish orange clouds on the underside. — **kamtschadalus Alphér.** (6b) is a small, bright yellow geographical form with narrow black bands from Kamtschatka, where *machaon* has only one brood: *kamtschadalus* is not identical with the American *machaon*-form, *alaska Scudd.* — In **sikkimensis Moore** (= *asiatica Nicér.*) the blue crescent of the anal ocellus is separated from the orange spot by a black crescent; Sikkim and adjacent districts of Tibet. — **montanus Alphér.** from the Koko-Nor comes very close to it. — Chinese specimens of *machaon* form a transition to the Japanese **hippocrates Feld.** (= *mikado Pagenst.*), of which the summer form is very large, the black bands being much widened, especially in the ♀ (6b); the spring specimens are much smaller, resembling European *machaon*, differing however in the black band of the underside of the hindwing being much narrower in front of the tail. — **ladakensis Moore** (6e) is a short-tailed form from North Kashmir. — **britannicus Spengel in litt.** (6d) is a broad-banded form which occurs in England, where *machaon* is now restricted to the Fen districts of Cambridgeshire and Norfolk, being formerly more widely distributed.***)

*) GRAESER obtained intermediate specimens from autumn pupae which emerged during very warm weather before the winter set in; I obtained similar intergradations from *xuthus* pupae which I took with me to Hongkong, where they emerged in November. — The specimens of the two seasonal forms are slightly but almost constantly different in the genitalia of the ♂♂, this being the only known case of seasonal forms showing any difference in these organs (Jordan).

**) We draw attention to the fact that old specimens in collections often assume a deep yellow tint and therefore resemble ab. *aurantiaca*.

***) The exotic forms of *P. machaon* will be dealt with in Parts II. and III.

P. machaon is most frequent in Central Europe, for instance South Germany, France, Northern Italy, and Austria. Its frequency diminishes towards the North, South, and East, the insect being in the Southern districts rarer than *P. podalirius*, and in the east less frequent than *P. vulthus*. It visits the flowers in meadows and fields, showing a preference for Echium, Trefoil, Lychnis, etc. The sexes meet on forest clearings and on the summits of bare hills and mountains. The flight is fluttering, but fast.

P. hospiton *Gén.* (6a). Similar to *machaon*, but the wings more rounded, and the hindwing provided with a short tooth instead of a tail. The black colour more extended and more densely powdered with yellow than in *machaon*. In the mountains of Sardinia and Corsica, in May and June. — Caterpillar green, striped with black and dotted with small yellowish red punctures, the black colour being more extended than in the larva of *machaon*. On Ferula and Ruta corsica, during the summer and autumn. Chrysalis green, the abdominal tubercles more prominent than in *machaon*. — The butterfly occurs occasionally together with *machaon* at the same time in the same locality. The insect is sometimes common in certain places. *hospiton.*

P. alexanor *Esp.* (7a). Likewise similar to *machaon*; however, the basal third of the forewing is not entirely black, but bordered basally and distally by a broad black band. The bands are continued across the hindwing, bordering also here the yellow basal area. From May till July at the north- and the east-coasts of the Mediterranean Sea, but absent from many districts, occurring eastwards as far as Eastern Persia and Turkestan. — Larva similar to that of *P. machaon*, more variegated, the red dots larger and brighter; during the summer on Seseli and Ferula; it is easy to find, since the stalks of the plants on which it feeds become white, the epidermis being gnawed off. Pupa stone-grey, very flat, with carinate sides and uneven surface; fastened on stones and resembling a small stone-splinter. — Three geographical forms of this species are known: **alexanor** *Esp.* (= *polidamas* *Prun.*, *polychaon* *Deloche*) (7a) is the form inhabiting Southern *alexanor.* Europe. — **maccabaeus** *Stgr.* (= *judaus* *Stgr.*) (7a) has broader black bands, especially in the basal area: *maccabaeus.* from Greece, Syria, and Palestine. — **orientalis** *Rom.* (7a) is larger than the European form and has on *orientalis.* the whole narrower black bands, only the submarginal band of the hindwing being broadly blue. — *P. alexanor* is of more graceful and elegant built than *P. machaon*. The insect appears to have everywhere one brood only, being however a long time on the wing. The butterfly is restricted to certain stations, but is locally not rare; it visits the flowers of low plants, being especially often met with sucking at flowers on steep inclines exposed to the direct rays of the sun.

P. domoleus *L.* (= *erithonius* *Cr.*, *epius* *Fbr.*) (6d). Likewise yellow and black, as the preceding *domoleus.* species, but without tail. The black basal area of the forewing bears rows of yellow dots and the hindwing has, besides the anal ocellus, a second, darker, ocellus, situated near the apex. In the Palaearctic Region only in Persia and Kashmir; otherwise widely distributed, being very common from South India to Southern China, occurring also in a large part of Australia and being represented in Africa south of the Sahara by allied forms. — Caterpillar dark green, light green beneath; on the 3. and 5. somites transverse variegated bands partly consisting of dots, a similarly coloured oblique band on each side from the 8. to 10. segments; on fruit-trees, especially orange, being occasionally destructive. Pupa rather strongly bent backwards, light green, with brown caputal processes and thick thoracical tubercle. — The butterfly occurs in the tropics throughout the year, but there is probably only one brood in the Palaearctic Region. In flight and habits closely resembling *P. machaon*.

P. agestor *Gray.* This butterfly was first described from India; it occurs in the Palaearctic Region in two local races which resemble each other rather closely, namely **govindra** *Moore* (7b) from Kashmir, *govindra.* in which the anal half of the upperside of the hindwing is dark brown, and **restrictus** *Leech* (7b) from *restrictus.* Central and Western China, in which the anal area of the hindwing is more brightly red-brown. The forewing of both forms is, above, semitransparent, greenish grey, the veins being black; the hindwing is bright red-brown on the underside, the cell being striped with grey. — These tailless Swallowtails are very remarkable forms, being imitations of *Danaus tytia*, which occurs in the same districts. In order to render the similarity more effective, not only the external features, such as outline and colour, but also the habits of the butterfly have become modified. Although the insect is of strong built, the flight is nevertheless weak, uncertain, fluttering; moreover, while the insect is sucking at flowers, the wings are not in fan-like motion, but are usually kept closed above the back, as is the case also in the models, being rarely expanded flat.

P. horatius *Blanch.* (7b) is a species similar to the preceding, but smaller, bearing on both sides *horatius.* of the hindwing an almost circular, yellow, anal spot; West China.

P. clytia *L.* (7a) is a larger species, with grey-yellow upperside, the veins being black; it is very *clytia.* common all over India and in Southern China, reaching the Palaearctic Region only in Kashmir, remaining in Southern China south of the Palaearctic boundary. — The beautiful caterpillar is black, with broad sulphur-yellow saddle-spot and red tubercles; on Aurantiaceae, especially on young plants. Chrysalis grey-brown. — The butterfly mimicks in North India various common species of Danaids, its flight being clumsy, ungainly and fluttering.

Subgenus: **Cosmodesmus** Haase, Kite-Swallowtails.

Slightly built, graceful insects, of skilled flight. Forewing usually pointed; hindwing sometimes long-tailed, sometimes rounded, the abdominal margin being curved upwards, the male bearing as a rule in this fold a scent-organ which consists of modified scales and long bristle-like hairs. There is usually a distinct tuft of hair-scales on the frons. The caterpillars are somewhat hump-backed, strongly tapering backwards, often ending in two points; sometimes also the 3. and 5. segments bearing dorsally on each side a small thorn-like tubercle. They feed especially on Anonaceae. Pupa rather stout, the caputal tubercles short, often rudimentary, but the thorax hump-backed, the process being usually long and pointed. — The butterflies are quick and wary insects. They visit flowers of various kinds, and the males settle often in large numbers at puddles on roads. These insects inhabit all faunistic regions, occurring however only in lower latitudes, not being found in the Nord-West (England) and North-East (Amurland) of the Palaearctic Region.

P. podalirius L. (7cd). Wings pale yellow: a number of black bands running parallel to the distal margin, some being abbreviated: hindwing long-tailed. — The first-described form is **podalirius** L. (7c), in which the abdomen bears a broad black dorsal stripe. In southern latitudes, from about the 50. degree southward, there occurs a second generation in which the abdomen is pale yellow, being black at the base and bearing sometimes also a narrow black dorsal line. In contradistinction to the spring-form, for which alone the name *P. podalirius* L. is nowadays employed, the summer-form is usually known as ab. **zancleus** Zell., although this name applies really only to South European specimens, which are distinguished from Central European individuals, besides the white abdomen, by more pointed and more transparent wings and thinner tail. — ab. **miegi** Mieg, the second brood from the Upper Garonne, is intermediate between *podalirius* from Germany and France and *feisthameli* from Spain; in some specimens the anal spot shows a tendency towards becoming smaller. — **feisthameli** Dup. is the local form inhabiting Spain and North Africa: this race is more sparsely scaled, the ground-colour is paler, the black bands are broader, and the orange anal spot is of even width: the spring-brood of this Iberian and Mauretanian Kite-Swallowtail (7d) comes closer to Central European *podalirius* than does the summer-brood; the latter is ab. **latteri** Aust. (7d*), its forewing is very pointed and narrow, the ground-colour being whitish, the black bands broad and sharply marked, and the tail very long. — **smyrnensis** Eimer is the summer-form from Asia Minor, somewhat resembling *latteri*, but bearing narrower black bands: the spring-form from Asia Minor is hardly different from Central European specimens. — **podalirinus** Oberth. (7d), from Tibet, occurring also in Se-tehuen, though as a rarity, has not only broad bands, but the ground-colour is dusted over with black. — **virgatus** Butl. (7d) is a small summer-form from Damascus, with narrow marginal band and on the hindwing a faint discal band, the reddish yellow anal spot not being larger than in Central European examples; this form is hardly worth a separate name. — Likewise, ab. **undecimlineatus** Eimer (7e) does not deserve a name of its own; it is an accidental aberration in which one of the bands is divided into two bands by its centre assuming the pale tint of the ground-colour, a rudimentary shadow appearing often distally of this double band. — A partially melanotic specimen has been described by BATHE as ab. **schultzi**. — *P. podalirius* extends from France and Portugal throughout Europe, except the northern districts, and Western and Central Asia, occurring eastwards as far as the Altai and West China. In Africa it is found far southward in the oases of the Sahara, where *podalirius* is even one of the commonest butterflies. — Larva green, smooth, without tentacles, short, anteriorly incrassate; in June and in the autumn, especially on Amygdalaceae. Pupa reddish ochreous, more rarely transparent-green, the thoracical tubercle being acute. — The butterfly, which has an elegant, sailing flight, is fond of mountainous localities, and visits in the spring and summer flowers and the blossoms of trees and shrubs, for instance Lilac. The ♂♂ meet the ♀♀ at the time of pairing on the highest summits of the hills. Apart from the districts near the northern and eastern boundary of its area, the species is always common where it occurs at all, but is local, apparently being completely absent from large districts. In many places in Germany a decrease in the numbers of this butterfly is becoming more and more evident in consequence of the gradual destruction of the blackthorn.

P. alebion Gray (8a). This insect is similar to *podalirius*, but the cell of the forewing is traversed by one more band, and the band situated on the cross-veins is not continued to the hind angle as in *podalirius*. On the hindwing the black portion of the anal ocellus is reduced to a minute line, while the yellow colour forms a large spot. Rare; in Eastern China. — ab. **mariesi** Butl. is based on a specimen in which the black bands are strongly narrowed; from Kiu-Kiang.

P. tamerlanus Oberth. (= *alebion* Eimer, parus Nicér.) (8a) reminds one likewise of *podalirius*. The black band at the apex of the cell of the forewing reaches only to the median vein, not extending beyond it to the hind angle, being exactly as in *alebion*; but in contradistinction to this insect the orange anal spot on the hindwing of *tamerlanus* is reduced to two small obscure dots. At the Upper Yang-tse-kiang, probably also in Tibet, extremely common.

*) Since *podalirius* flies in North Africa almost throughout the warm season, the various broods overlap; *feisthameli* occurs there from April till the end of June, and *latteri* from early June till August. For instance, I obtained *latteri* already on the 30. May at Philippeville (province of Constantine) and found *feisthameli* still in June at Lambessa, which is situated at a higher elevation.

P. eurous *Leech* (= *panopaea Nicér.*) (8a). All the bands are narrowed, being only blackish stripes *eurous*. on a pale yellow transparent ground, the anal area of the hindwing being alone more strongly coloured, bearing a honey-yellow anal spot which is somewhat constricted in the middle; behind this spot there is a blue-centred dot, which represents the anal ocellus. Chang-Yang, Central China.

P. mandarinus *Oberth.* (♂ 8a, ♀ 8b) is transparent dull white, with narrow greyish black bands; *mandarinus*. easily recognized by a central marking on the hindwing resembling a pair of spectacles, being especially distinct on the underside; this marking consists of two rings which are connected with one another by a streak (situated on the radial vein), the upper ring standing near the middle of the costal margin, the other at the apex of the cell. West China. — **cashmirensis** *Rothsch.* (8b) is very close to it, but the upperside *cashmirensis*. of the hindwing is entirely white, except two small stripes near the base, the black markings of the underside moreover shining through. Kashmir, southwards extending into the Punjab, where it is not rare.

P. eurypylus is represented in the Palaearctic Region by **mikado** *Leech* (= *albidus Wilem.*) (8c). *mikado*. Black, with many dull white spots, which have a silvery gloss on the under surface: below there is moreover, from the middle of the costal margin, a yellow border along the median band of spots. Sometimes the white spots are merged together, occupying nearly the whole surface of the wings. On Kiushiu.

P. leechi *Rothsch.* (= *bathycles Leech*) is a similar form obtained at Chang-Yang in Central China; *leechi*. very close to the Indian *bathycles*; here the spots are green on the upper side. Hindwing likewise tailless.

P. cloanthus is represented in China by **clymenus** *Leech* (8c). Hindwing with long tail. Black; *clymenus*. a broad, transparent, green band extends from the apex of the forewing almost to the anal angle of the hindwing. Moreover, the forewing bears two green spots in the cell, while there are green submarginal halfmoons on the hindwing. Central and West China, not common: difficult to catch, being a rapid tier. This form is connected with Indian *cloanthus* by all intergradations.

P. sarpedon *L.* (8c). Likewise black with a green macular band running obliquely over both wings; *sarpedon*. but there is no tail, and the cell of the forewing is without green spots. Extremely common, occurring in two broods in South and Central China as well as in Japan, the northern districts excepted. In the specimens of the summer brood the spots of the green band are separated by the broadly black veins; sometimes the band of the hindwing is more or less obliterated, this being the case in **semifasciatus** *Houw.*, *semifasciatus*. from China. — Larva green, with two pointed tubercles anteriorly and at the anus, bearing also two small points on each side of the 3. and 5. segments, on Aurantiaceae. Dorsal thoracical projection of pupa strongly acuminate. — The butterflies are very fast fliers, having an almost rattling flight, resting generally only for a few seconds on the flowers which they suck. They occur in Japan often profusely at flowering hedges, flying about them in large numbers. The ♀♀ are far rarer than the ♂♂.

P. hercules *Blanch.* (8b). Black-brown above, with an ochreous discal band which is dusted with black, *hercules*. the subapical and submarginal spots being of the same colour. Underside very peculiar; the sharply limited basal half of both wings coffee-brown; an ovate dark ocellus beyond the apex of the cell on both wings. A very fast flying inhabitant of the mountains; allied to *P. gyas*, which has a similar underside, but is above almost all brown (♂) or bears a whitish discal band (♀). — The caterpillar of *hercules* is not known. West China, the insect being rather rare.*)

2. Genus: **Luehdorfia** *Crüger.*

Medium-sized butterflies; body densely covered with soft hairs. Antenna rather short, and palpus rough with long stiff hairs. Forewing rounded at the apex, yellow, with broad black bands, which are partly abbreviated. Hindwing short-tailed, with a blue-centred anal ocellus, above which there is a deep red band. The ♀ entirely resembles the ♂, but bears after copulation a pouch on the underside of the abdomen, as in *Parnassius*, with which the present genus is closely allied. — Larva rather short and thick, clothed with single stiff hairs; on *Aristolochia*, in day-time concealed under stones near the foot-plant. — The butterfly occurs in the early spring, sometimes while there is still snow on the mountain-sides: they suck at flowers and are not rare. Three closely related forms are known, all from Eastern Asia.

L. puziloi *Ersch.* (8d). The smallest form, from Amurland. The tail very short, especially in ♂; *puziloi*. a row of yellow submarginal spots on the hindwing. — **japonica** *Leech* (8d) is larger, bearing broader black *japonica*. bands and red submarginal spots; from Japan. — **chinensis** *Leech* from Chang-Yang in Central China stands *chinensis*. midway between the two; pouch of ♀ similar to that of *japonica*, but the submarginal spots of the hindwing not red, but yellow, as in *puziloi*. — Larva black, the segmental incisions bluish white; from May to July, on *Asarum*. — Pupa less slender than in *Thais*, swollen at the wing-cases (VERITY). — The butterflies occur

*) The genera *Teinopalpus* (with *imperialis*) and *Leptocircus* (with *curius*) approach near Chang-Yang the boundary of the Palaearctic Region. However, as their area extends from here southwards only, the genera will be dealt with in the volume containing the Indian fauna.

from mid April till July; they frequent at Wladiwostock the gardens of the town, being common, and show a predilection for a yellow kind of violet, on which they often settle (GRAESER). The flight is feeble and slow, the insect being easy to catch.

3. Genus: **Armandia** Blanch.

Large black-brown butterflies, with thin yellow bands and three tails. Antenna rather short; palpus long, strongly projecting; abdomen dorsally spotted with yellow. The hindwing bears a conspicuous red subanal band, beyond which there are blue spots on a black ground. Two species are known, one inhabiting the South-East of the Palaearctic Region, the other being found in North India. — The butterflies appear to produce only one brood in a season, at least in the Palaearctic Region; they fly in summer, the flight being slow and undulating; as they let themselves be carried by the wind, they "resemble more a falling leaf than a live insect" (DOHERTY). However, they are not easy to catch, since they fly generally about the tops of trees. — The larva, which is not known, lives doubtless on *Aristolochia*, probably on climbing species, judging from the high flight of the insect.

thaidina.

A. thaidina Blanch. (Sd). Forewing rather acutely triangular; the long tails of the hindwing spatulate. — At the upper Yang-tse-kiang, in Se-tchuen, common in many localities, for instance at Ta-tchien-lu, Huang-mu-tehang, Tchia-ku-ho, etc., in June and July.

4. Genus: **Sericinus** Westw.

Rather large butterflies, with long slender bodies, very short antennae which are apically only slightly incrassate, and long, strongly projecting palpi. The hindwing bears a long, curved, sabre-shaped tail. The colours are chiefly yellow and black, there being on the hindwing a submarginal carmine band, which is especially conspicuous in the ♀. Only one species is known, which is exclusively Palaearctic, being so variable according to season and locality that there are 7 or 8 well distinguished forms. — Larva of the same shape and nearly the same size as the Thais-larvae, the first segment bearing on each side two conical projections, which are covered with rather long hairs. On the back there are rows of fleshy tubercles, which are prolonged on the thoracical segments, all bearing tufts of stiff hairs. Behind the head there is the reversible fleshy fork (osmateria). — Pupa slender, with two short projection on the head; some rows of pointed, thorn-like tubercles on the back. The pupa is very lively (STAUBINGER), being fastened by the sharply truncate cremaster and by a thread about the middle of the body. — The butterflies occur in spring, and again, as a larger form, in July. They do not fly fast; they visit flowers, and are extremely common in places where the foodplants (*Aristolochia*) occur.

telamon.

S. telamon Don. (♀ = *fasciatus* Brem. & Grey) (♂ 9a, ♀ 9b). This is the palest of all forms. The ♂ has only sparse and small shadowy spots, while in the ♀ the yellow and black colours are about evenly balanced. In both sexes there is a distinct red spot on a dark ground on the hindwing beyond the middle of the costa. This is the summer-form as it occurs in July in Pe-tehili, especially near Peking. In the northern districts of the area inhabited, namely in Shantung and the district south of the Amur, the summer-form is very similar to DONOVAN's *telamon*, but the costal spot of the hindwing has no red centre

amurensis.

montela.

in the ♂, and the ♀ is altogether darker; this form is named **amurensis** Stgr. (♂ 9a, ♀ 9b). — **montela** Gray (♂ 9a, ♀ 9b), from the mouth of the Yang-tse-kiang, is in the ♂ much more extended black, this colour forming an irregular, hardly interrupted band which runs from the costal margin of the forewing to the anal angle of the hindwing, here including the carmine ornamental band; the ♀ is especially remarkable for the much enlarged and almost circular cell-patch. — In the ♂ of **koreana** Firs. (♂ 9a, ♀ 9b) there are in various places additional grey shades in between the black spots; in the ♀ the much reduced yellow ground-colour is dusted with brown-black, especially on the disc of the forewing; in Korea. — The spring-forms

koreana.

telemachus.

which belong to these summer-forms are much smaller and have shorter tails; **telemachus** Stgr. (9c) belongs to *amurensis*, occurring from the southside of the Amur to Peking, the red colour being restricted to a subapical spot on the forewing and to the rather narrow band of the hindwing. This form intergrades completely with the spring-form **telmona** Gray (= *greyi* Brem. & Grey) (9c) which extends from Peking southwards, being the first brood of the true *telamon*. — The spring-form from Korea, which, like the summer-brood *koreana* from the same country, shows a more pronounced brown shading on the yellow ground, has also received a name, being called **fixeni** Stgr. (= *greyi* Firs.) (9c), while the spring-specimens from Shanghai (belonging to the summer-form *montela*) have no name of their own. — Larva black, spotted with brown; on *Aristolochia*. Pupa yellowish brown, with dark stripes.

telmona.

fixeni.

All forms of *Sericinus* are restricted to certain stations. They are generally caught in numbers on account of their slow flight. The entire area extends from a little south of Wladiwostock southward beyond Shanghai, reaching westward as far as Se-tchuen. The insect is common at the Yang-tse-kiang.

5. Genus: **Thais** Fabr.

Rather stouter than the preceding insects, otherwise closely allied to *Sericinus*; likewise yellow and black, somewhat variegated with red. The hindwing, however, is never long-tailed, but evenly scalloped, or at the highest provided with a few pointed prominent teeth. The antenna is short, as in *Sericinus*; the palpus is long; the abdomen laterally particoloured. — The larva is short and thick, bearing a short fleshy fork behind the head, there being some rows of small setiferous tubercles on the back. In summer on *Aristolochia*. The pupa is long and slender, being posteriorly pointed; it is fastened with silk by the head and cremaster, there being only occasionally a thread around the centre of the body. — The insects inhabit the Mediterranean countries from Portugal to Persia; they occur in one brood only and fly in the sunshine of the first spring-days. Their flight is stronger than in *Sericinus*. They are not rare and are fond of sucking at yellow Compositae.

T. cerisyi God. (9d). Closely resembling in colour and pattern the ♂ of *Sericinus*, being like this *cerisyi*. spotted with black on a pale yellow ground, the hindwing bearing traces of red near the middle of the costal margin and at the anal angle. Hindwing with only one strongly prominent tooth. Balcan States, Greece and Asia Minor; not so common as *polyxena*, occurring from April till early June, being still earlier in the southern districts. — The ♀ varies very much; specimens which are very strongly spotted with black are sold by dealers as ab. **obscurior** (9d), in **albidior** (9e) the ground-colour is white, in **ochracea** (9e) *obscurior*. bright yellow, and in **pallidior** (9d) fallow; in ab. **flavomaculata** *Verity* the carmine dots are replaced by dots of *albidior*. honey-colour; all these aberrations occur together with ordinary *cerisyi*. — **caucasica** Led. (9e) has in both *ochracea*. sexes very large, broad, black costal spots on the forewing, the hindwing being slightly and almost evenly *pallidior*. scalloped, the middle tooth hardly projecting; in Armenia. — **deyrollei** Oberth. (9d) has the three teeth *flavomaculata*. before the anal angle of the hindwing prolonged into short tails; in the coast districts of the Black Sea, *caucasica*. in the whole of Asia Minor, southward to Syria; extremely common, in some places appearing in enormous *deyrollei*. numbers. — **cretica** Reb. (9e) occurs on Crete and some Greek islands; a sparsely marked form in which *cretica*. the three teeth of the hindwing mentioned above are indicated only by black curved lines, the edge of the wing not being distinctly excised. Not so common as the preceding. — Larva yellow, brown or reddish, the tubercles being red; from May till July, on *Aristolochia*. Pupa dust-colour or yellowish grey, variegated with thin black dashes, especially on the head. — The butterflies are on the wing on the first warm days of the year at rocky places and the edges of woods.

T. polyxena Schiff. & Den. (= *hypermnestra* Scop.? *hypsipyle* Fabr.). Light yellow, with spots and *polyxena*. dentate lines, the hindwing bearing red submarginal spots. South Europe, from Southern France to the Black Sea, and Asia Minor. — In ab. **rumina** Esp. the black costal spots of the forewing bear red centres, *rumina*. also on the upperside, while usually such red dots are found only in some places of the underside. This form is not rare in some localities, for instance in the West of the Balcan Peninsula. — Specimens in which the black colour is extended are known as ab. **cassandra** Hb. (= *demnosia* Err., *creusa* Meig.) (9f); the *cassandra*. proportional extent of black is, however, individually very variable. Such melanotic specimens occur everywhere singly as aberrations, but are found as the only form in some localities, for instance Dalmatia. — ab. **ochracea** Stgr. (= *polymnia* Mill.) (9f) is the name of individuals in which the light yellow colour is *ochracea*. replaced by a magnificent dark yellow. Also this form occurs everywhere among the ordinary form, but is in certain places especially plentiful. — ab. **meta** Meig. (= *flavomaculata* Schilde, *rufescens* Oberth., *rumina* *meta*. *alba* Esp.) (9f), however, is everywhere a rare aberration, the red colour of the purple spots being replaced by dark yellow. — In ab. **bella** Neub. the third costal spot is reduced. — The full-grown larva reddish yellow *bella*. or black-brown, with pointed setiferous tubercles; in May and June on *Aristolochia*, especially in moist and warm localities. The statement that the larva feeds also on *Quercus ilex* is doubtless occasioned by an error of identification. The pupa is very slender, being yellowish grey, marked with brown.

T. rumina L. (10a). At once distinguished from *polyxena* by the totally different underside of the *rumina*. hindwing, which bears whitish yellow spots at the base. Nearly all the costal spots of the forewing are marked with red. The 3 or 4 black parallel cell-bars of *polyxena* are in *rumina* enlarged, being separated by thin yellow bands. In Spain and Portugal, also in Morocco and Algiers, but occurring here only in the coast districts in a slightly different form (10a). — In ab. **canteneri** Stgr. (10a), which occurs singly among *canteneri*. ordinary *rumina* in South Spain and Morocco, the ground-colour is dark yellow, almost orange, the transparent apical spot being therefore very prominent, appearing bright silvery. — ab. **honnorati** Boisd. (10a) *honnorati*. is the name of a form in which the red colour is very much extended, the spots of the hindwing merging together to an often broad purple-band. This form occurs in South France, especially in the neighbourhood of Digne, but only very sparingly, the ordinary form of South France being **medesicaste** Ill. (10a), *medesicaste*. in which the black spots of the forewing are mostly centred with red, while the red spots of the hindwing remain separate. — Also of these forms melanotic aberrations have been found, that of the Spanish *rumina* *tristis*. being named **tristis** Oberth., while the black form of the French *medesicaste* is **hartmanni** Std/ss. — In *hartmanni*.

paucipunctata. ab. **paucipunctata** *Neub.* all the red spots of the forewing are reduced, while in ab. **alicea** *Neub.* the third (reduced) black costal spot has no red centre. — Transitions from typical *rumina* to *medesicaste* are named by RÜHL ab. **castiliana**, from Castilia. — Larva yellow, red, or blackish, with short pale stripes and yellowish red tubercles bearing black hairs; early summer, on Aristolochia. Pupa grey-brown, variegated with black. — The butterflies are on the wing in spring, in the South already in February, in North Spain late in March; they are found on sunny slopes and in vineyards, settling especially often on Asphodelus.

6. Genus: **Hypermnestra** *Mén.*

This genus, which, by the pattern, reminds one already strongly of *Parnassius*, contains only a single, pale yellow, species, occurring in Western Asia. The antenna, though short, has a relatively thick and sharply defined club; palpus less long and projecting; wings very broad. — Larva short and thick, bearing raised setiferous punctures, and changing in the ground into a short, thick, obtuse pupa. There is only one brood. — The butterflies are on the wing in spring, being found on sunny slopes, where they suck at flowers.

helios. **H. helios** *Nick.* (= ismene *H. S.*) (10b), light straw-yellow. Forewing marked with black in cell and at apex, bearing a red, black-bordered, transverse patch beyond apex of cell. Hindwing below with yellowish grey bands, which shine through on the upper side. Turkestan and the neighbouring districts of Persia; not rare. — *maxima.* **maxima** *Grum-Gr.* (10b) is a much larger form from Buchara and Ferghana; ab. *ochraceo-* **maculata** *Grum-Gr.* is an individual aberration found among the preceding at Guzar, the red spots being replaced by bright ochreous ones. — *ochraceo-* ab. **persica** *Neub.* is based on specimens without red on the upperside, occurring among ordinary *helios* in North Persia. — Larva green, banded, full grown in May, on *Zygophyllum turcomanicum*. Pupa grey-green or brownish, in a loose cocoon in the ground. — The butterfly, which is found in April on steep slopes, has a rather lazy flight, reminding one of *Parnassius*.

7. Genus: **Doritis** *Fabr.**)

Medium-sized insects with rather strong neuration; in structure and pattern a natural transition from *Thais* to *Parnassius*. Forewing triangular, nearly rectangular; hindwing irregularly rhombiform, the corners being rounded off; no anal fold. Antenna short, distal incrassation spindle-shaped and slightly curved. Head small, rough-hairy. Eye large. Palpus small. Abdomen stout, without so-called pouch at the apex in the ♀, thereby differing inter alia from *Parnassius*; the ♂ bearing at the anus a brush of black hairs which can be spread out. Wings sparsely scaled; forewing greyish transparent, transversely pencilled, with black spots; hindwing whitish, with black distal border bearing blue spots marked with red. — Inhabits the plains and mountains of Western Asia; the insect is on the wing already on the first warm days of spring (February-March in the low land, March-April in the mountains), there being only one brood; hibernates as chrysalis. The flight is slow and awkward. The insect is to be found on roads, meadows and pastures, sucking flowers. — The larva is cylindrical, dull black, bearing large red spots and whitish dots, and being evenly covered with hairs, as in *Parnassius*: in spring on *Aristolochia hastata*. The chrysalis is stout, the abdominal segments being deeply telescoped into one another and quite immovable; dull dark brown, lying in a loose cocoon in the ground. — Only one species known, which is strongly variable.**)

apollinus. **D. apollinus** *Hbst.* (= *pythius* *Esp.*, *thia* *Hüb.*) (10c) is on the forewing rather densely pencilled transversely on a grey ground, the ♂ being occasionally marked with a little red; hindwing chalky-white in fresh specimens, yellowish in worn ones, the dark border bearing reddish spots centred with blue. ♀ darker, stouter, pencilled also on the hindwing, here and there irrorated with red. Western and south-western districts of Asia Minor, transitional forms also in Syria and Mesopotamia. Among the ordinary form there occurs, especially in southern districts (Aintab), the ♀-ab. **rubra** *Stgr.* (10d), which has the hind-
krystallina. wing strongly marked with red, the red colour being concentrated into spots at the base: ab. **krystallina** *Schilde* (10b) is on the contrary distinguished by sparsely scaled transparent wings bearing few markings, such individuals occurring everywhere among the ordinary form. — An especially strongly coloured form in which the dark submarginal costal marking of the forewing is intensified, forming a spot, and in which the

*) The name *Doritis* *F.* (1807) should really be sunk as a synonym of *Parnassius* *Latr.* (1805), since the only two species mentioned when the name was introduced are *apollo* and *mnemosyne*, which belong to the previously described genus *Parnassius*, it not being permissible to transfer the generic name afterwards to another species. The name *Archon* *Hüb.* (1822) should take its place (Art. 30 of the International Rules of Nomencl., Paris 1905). As *Doritis* is generally employed, we abstain here from introducing a change of name.

**) In the Miocene near Pisa Gabber has found a closely allied species, on which a new genus of fossil has been based: *Doritites* *Reb.*, the species being described as *Doritites bosniaskii* *Reb.* (Sitzungsberichte der Kaiserl. Akademie der Wissensch. Wien, Vol. 104, 1899, p. 734).

marginal band of the hindwing is broad, being much shaded with blue and red, is known as **bellargus** *Stgr. bellargus*. (10c), the base of the hindwing being non-pencilled in the ♀ and never flushed with red. Syria (Kessab) and in an almost identical form in Palestine, in the Cilician Taurus a form transitional to the first described one being found. — **amasina** *Stgr.* (10d) is less intensely marked, being recognizable especially by the hindwing bearing a black hook-spot at the apex of the cell; Pontus (Amasia) and East Kurdistan. — In the North-East of Asia Minor, Goman Olti (Pontus, at an altitude of about 1500 m), and in Armenia a usually smaller, pale and in both sexes sparsely marked mountain-form occurs, which is moreover characterized by a reduced marginal band of the hindwing; this is **apollinaris** *Stgr.* (= *pallidior Spuler*) (10d); a dwarfed form of the ♀ which is very deeply coloured in contrast to the ordinary form of the ♀ of this subspecies may be called ♀-ab. **mardina** (*Stgr. i. l.*), under which name it is already known in collections.

8. Genus: **Parnassius** Latr.*)

Mostly larger insects with broad rounded wings; general outline of forewing a rectangular triangle, while the hindwing is almost ovate, its abdominal margin being concave; no anal fold. Antenna short, more or less club-shaped, the shaft being often ringed with white and black. Head small, frons rough-hairy. Eye large. Palpus short, acute, not projecting above the head. Thorax normal, densely hairy. Abdomen strongly hairy in ♂, sparsely covered with hairs or almost without hairs in the ♀; on the underside at the apex there is in the ♀ a horny appendix, the so-called pouch, which originates from a quickly hardening substance discharged by the ♂ during copulation, the differences in the shape of this pouch being of great help in distinguishing the species or at least in characterizing the groups of species. Wings white, whitish, rarely yellow; distally with black spots and grey or blackish bands; hindwing often bearing red-spotted ocelli. In colour and pattern very variable, it being often rather difficult to decide which forms belong together and which are specifically separate. Many of the known forms have apparently not yet reached that stage of development where they are sufficiently constant to be considered species in the usual sense, and therefore the assumption that there obtains habitual hybridisation between specifically different forms of *Parnassius* must be regarded with great caution. Although copulation between such distinct species has been observed several times, we have no proof of a successful fecundation of one species by another, but only the assumption that this does occur.**)

The occurrence of *Parnassius* is restricted especially to mountainous districts. These insects inhabit medium and high altitudes in Europe (except Great Britain) and Asia, certain species ascending as high as 6000 m (20000 ft.) in the gigantic mountain-chains of Inner Asia. The flight is generally clumsy and fluttering, during the hot hours unsteady, hurrying, never so easy and elegant as in true Swallowtails. Only when the first warm rays of the sun invite the butterfly to leave its hiding-place and to float from the high ground down into the valley, or when the ♂ flies up and down the sunny pastures and rocky mountain-sides, searching for a mate or playing, his conduct betrays the noble kinship. The *Parnassii* are visitors of flowers; they sit on the blossom with the wings expanded and are not difficult to catch while sucking the honey, being occasionally, when the weather is unfavorable, or towards evening, so benumbed that they are easily caught with the fingers or even taken off the flowers with the killing-bottle.***) The butterflies are very tenacious of life and recover soon so far, even from a strong pressure of the thorax with the fingers, that they are able to fly again. If one does not really kill the captured specimens by poison (injection), one may hear for hours or even days a lively scratching with the legs on the sides of the paper-envelopes. — The larvae of the *Parnassii* are cylindrical, exceptionally tapering at both ends, diversely developed, but mostly of black colour and variously ornamented; the head is small, almost globular, in the neck a

*) The genus has lately been divided into 5 separate genera by F. MOORE (*Lepidopt. Indica* vol. 5, 1902), namely *Parnassius* (type *P. apollo*), *Tadumia* (type *T. acco*), *Kailasius* (type *K. charltonius*), *Koraminus* (type *K. delphius*), *Doritis* (type *D. mnemosyne*). The differential characters of these genera, apart from slight differences in aspect, refer especially to the position and arrangement (fusion) of the subcostals (system II of Spuler), and in tertiary peculiarities (pouch of ♀). We abstain from adopting this division, because we do not deem it expedient to split up the well defined and easily recognized collective genus *Parnassius*, and because the characters in nervation relied upon show rather considerable variability, not only within the subdivisions, but also within one and the same species.

**) GRUM-GRSHIMAILO, who at that time explored entomologically the mountains of Central Asia for His Imp. Highness the Grand-Duke Nicolai Michailowitsch of Russia, states in "Mémoires sur les Lépidoptères" (Romanoff), vol. 4, 1890, that in the Altai mountains he found several times *P. charltonius* and *P. delphius* in copula, but did not consider this fact to be of special importance, since he never saw a specimen whose characters proved it to be a hybrid of these two so very different species. — The cause of the copulation may here have been a similar unnatural venereal desire as that which causes the successive copulation of a ♀ with several ♂♂, or the attempt of a copula between two ♂♂ of the same species. That these phenomena do occur is proved by the fact that Gr.-Gr. met with a *charltonius* ♀ having two pouches (one of them being normal, the other being placed in front of it transversely), and found ♂♂ of the same species bearing an abnormal or incompletely developed pouch (conf. figures, l. c. t. A. fig. 3—5). — Also the well-known Lepidopterist ALPHERAKI maintains to have observed, in the Tian-shan mountains, a copulation between *P. discobolus* and *P. hesebolus* (which was presumably *sibiricus*).

***) By the way, it is not advisable to leave the specimens of *Parnassius* too long in the Cyanide bottle, as the white colour of the wings is said to assume therein a yellowish tint.

reversible fleshy fork; the body is covered with short-hairy warts; apparently living gregariously when young: some species show a great liking for sunshine, while others are concealed in daytime. They pupate in a cocoon in the ground; the chrysalis is obtuse, thick, without conspicuous colours, being light brown or dark, hoary. There is mostly only one brood, two broods having been observed only in the North-Western Himalayas.

1. Mnemosyne-Group.

mnemosyne. **P. mnemosyne** L. (10e). Wings white; the veins thinly black, fringes blackish; forewing with 2 black cell-spots, distal margin in ♂ from the apex to about middle, in ♀ further down and also more broadly, transparent-grey; hindwing dusted with black from the abdominal margin to the cell and at the apex of the cell, more densely in ♀ than in ♂. Antenna and legs black, likewise the abdomen, the last being covered with whitish hairs in the ♂, while in the ♀ it is nearly naked, glossy, bearing a whitish bladder-like pouch which occupies nearly two-thirds of the underside. — Central Germany (Harz, Vogelsberg), Silesia, Alps of Switzerland and Austria, South France, Pyrenees, in nearly all the crown-lands of Austria-Hungary, the Bukovina, the Baltic provinces of Russia, Scandinavia, the Apennines, Sicily. Prefers mountainous districts of an altitude from 300 to 1200 m, occurring rarely up to 1600 m, but being met with also in the low lands on hills of only 180 m (Czernowitz); at the higher altitudes found till July, at lower elevations in southern localities already at the end of April. The most northern localities mentioned in literature where the insect has been found are Sundsvall and Hernösand (Sweden, about 62 to 63° n. lat.). — Varies generally little. A rare aberration in which the cell-spots of the forewing are connected by a black streak has received the name ab. **halteres** *Musch.*, and as ab. **melaina** *Hour.* (10f) a form has been introduced which is darkened by dense black dusting (occurring especially often in the ♀) and which is found everywhere among the ordinary form, being particularly often met with in Carinthia, Carniola, in the neighborhood of Vienna, in Wallis, Transsylvania, and Austrian Silesia. In Carinthia, the environs of Friesach, at an elevation of from 630 to 750 m, there occurs a conspicuously small local form, **minor** *Reb. & Rog.*, in which the black spots of the forewing are reduced, the expanse being only 52 mm. In Bavaria and Salzkammergut (Berchtesgaden), at an altitude of about 1000 m (June—July), the species has developed into a constant melanotic form, **hartmanni** *Stgr.*, the ♂♂ of which bear an additional grey costal spot in between the apical cell-spot and the widened and dull blackish transparent marginal band, having moreover the abdominal border of the hindwing broader and more densely dusted with black; the ♀♀ of this form are developed in the same direction as ab. **melaina**, but are usually less dark in tint, have a very broad transparent border to the forewing, sometimes a grey S-shaped shadowy transverse band which emanates from the costal spot above mentioned in the ♂, and possess on the hindwing a more intensely coloured band-like marking behind the cell, extending from the abdominal border forward, and 1 or 2 costal spots. — **athene** *Stich.* is the form inhabiting Greece (Chelmos, Olenos); it bears a row of 4 or 5 whitish spots in the moderately broad, posteriorly sharply tapering transparent border of the forewing, otherwise agreeing rather well with ordinary *mnemosyne*, but being somewhat more strongly marked, therefore standing midway between the former and the following form. — **nubilosus** *Christ.* (10f) is the name of the race from Northern Persia and the Caucasus; the white spots in the widened marginal border are more distinctly developed, forming usually a submarginal band consisting of 7 or 8 wedge-shaped or luniform spots; the black markings are intensified and extended, and in the ♀ there appears on the forewing a grey abbreviated band between the apical cell-spot and the transparent border, the forewing bearing further a grey spot at the hind margin and the hindwing bearing an extended dusting of black beyond the cell, forming a kind of band. An enlarged edition of this form from Central Asia (Kuldja, Alai), with the black markings still more intensified and the transparent border more widened, is known as **gigantea** *Stgr.* (10f); specimens of this race in which the ground-colour has assumed a slightly yellowish tint are called ab. **ochracea** *Aust.* — The egg of the species is conical, whitish. Larva cylindrical, tapering at both ends, black, short-hairy, the body ornamented with orange spots; feeds in April and May on *Corydalis* (*mnemosyne* typ. on *C. halleri*, *C. cava*, *C. solida*), concealed in day-time. Pupation in the ground in a loose cocoon; pupa thick, obtuse, hoary, luteous.

stubben-
dorfi. **P. stubbendorfi** *Mén.* (= *immaculata* *Mén.*) (10g). Dull white, the veins being black, forewing narrowly grey at the costal edge, rather more broadly transparent-grey at the apex and distal margin; near the apex a more or less distinct dark grey shadowy transverse band; two grey spots in the cell, which are sometimes absent. Hindwing almost without pattern, only the abdominal border being somewhat dusted with black; on the underside sometimes some yellow hairs at the abdominal margin. Pouch of ♀ whitish, similar to that of *mnemosyne*. Antenna, legs and fringes of wings black. — There occur singly specimens of the ♀ sex which are, as in the previous species, darkened all over, being grey or blackish: *melanophia.* ab. **melanophia** *Hour.* The markings of this aberration are indistinct or absent, not being visible on the dark ground, and the abdomen is thinly covered with yellowish hairs. — Larva conspicuously different from that of all other Parnassii, being similar to a large *Agrotis* caterpillar, black with

pale yellow oblique side-stripes, after the last moult light red-brown, with 2 pale yellow longitudinal stripes bearing black spots, there being moreover black dashes, lines, arrowhead-shaped spots and other black markings on the back. The under surface and sides as far as the yellow stripes greyish brown, the former with numerous pale dots. Head and thoracical legs black. The whole body short-hairy; reversible fork whitish yellow, almost transparent; in May and June on *Corydalis*-species, especially *C. gigantea*, concealed in day-time. Pupa in a rather strongly built cocoon, which lies underneath old pieces of wood, stones etc. (GRAESER). In the Altai Mts., Amurland, Ussuri (Eastern Asiatic coast-provinces). — A smaller form, in the ♀ of which the grey markings are intensified, inhabits Eastern Tibet (Kuku-nor, Sining) and Kashmir (also called Chinese Tartary): **tartarus** *Aust.*; *tartarus*. the cell-spots are more distinct and connected with one another and with the costal spot situated beyond the apex of the cell by a grey dusting along the sides of the cell. Submarginal band of forewing more distinctly marked, on both wings along both sides of the veins a more or less abundant dusting of blackish scaling; generally a grey spot at the costal margin of hindwing. Collar and underside of abdomen a little yellowish. Besides the difference in size (length of forewing 27 mm, as compared with 34 mm of the first-described form), there are in the ♂♂ hardly any noteworthy or constant differences; this sex is said to be on the whole paler. — **citrinarius** *Motsch.* (= *glacialis* *Butl.*) (11a) is much larger than the preceding forms. The blackish grey *citrinarius*. central spot of the cell is sometimes connected with the apical cell-spot by fuscous dusting along the sides of the cell, and the submarginal band of the forewing is more or less distinct and complete. Abdominal area of hindwing deep black as far as the cell, clothed with white hairs; on and along the veins blackish dusting. Collar, coxae and abdomen laterally clothed with yellow or reddish yellow hairs. Underside of wings slightly yellow. In some Japanese specimens (from Hakodate) the cell-spots and the submarginal band of the forewing have entirely disappeared, or are only very feebly indicated: ab. **eluta** *nov.* The ♀ *eluta*. as a rule somewhat more densely shaded grey, sometimes entirely fuscous, of a somewhat glossy aspect; these dark specimens may be named ab. **umbrosa** *nov.* At moderate altitudes, in July. Japan: Hondo *umbrosa*. (Nippon), Yezzo (Hakodate), Kiushiu; Korea; West and Central China.

2. Clarius-Group.

P. felderi *Brem.* (11a). Opaque white, with a very faint yellowish tint; fringes black or whitish, a *felderi*. thin marginal line being black. Forewing dusted with black on the veins, at the base and at the costal margin, bearing the usual spots; distal margin narrowly vitreous, this band usually extended only as far as three-fourths of edge. Hindwing with 2 black spots, the upper bearing often, the posterior more rarely, a red central dot; the posterior spot sometimes altogether wanting or only indicated by a dot; in the abdominal area usually a black band-like spot, and beyond the cell along the edge of the wing black dusting. The ♀ more sharply and extendedly marked with grey; the forewing bearing beyond the cell a more or less complete median band, which is however sometimes indicated also in the ♂, and a submarginal band which is more sharply defined than in the ♂ being, moreover, separated from the vitreous edge only by a row of white halfmoons. Hindwing of ♀ more extendedly blackish; the eye-spots mostly without red pupil, sometimes however also the anal ocellus bearing a red spot; near the distal margin a distinct blackish and somewhat undulate band, which is occasionally vestigial in the ♂. Often both wings more or less densely dusted with black. Strongly melanistic specimens are ab. **atrata** *Graes.* The underside of *felderi* with greasy *atrata*. lustre; the ocelli of the hindwing as a rule filled in with red and white; 3 red basal spots, more or less dusted with white. Frons, collar, and abdomen yellow-haired, antenna and legs black. Pouch of ♀ brownish, flat trough-shaped, occupying almost half the length of the abdomen. At the Lower Amur, Bureja Mts.; said to fly only in the forest. — Larva on *Corydalis*.

P. eversmanni *Mén.* (♀ = *wosnesenskii* *Mén.*) (10g). Ground-colour yellow in ♂, yellow or yellowish- *eversmanni*. white in ♀. Resembles in pattern very closely the ♀ of the preceding: forewing grey at base and costal margin, and greyish glossy at distal margin; beyond the cell a curved discal band shaded with grey and a similar, sometimes less distinct, submarginal one. Abdominal area of hindwing dusted with black; a spot at anal angle, occasionally (especially often in ♀) prolonged to a short band; a more or less distinct undulate submarginal band; further, 2 red ocelli, the posterior one sometimes being all black on upperside or being wanting, remaining however distinct below; base of hindwing above spotted with red. Head and body yellow-haired. Pouch of ♀ whitish, similar to that of *P. mnemosyne*, bearing a longitudinal groove. — In the Altai Mts., Amurland, Transbaikalia, Witim-district, in June and July. The butterfly is found on small clearings in the forest and on narrow forest-roads, where it is flitting up and down so very fast that one can hardly catch it except by watching for it. The area inhabited by this species extends as far as Alaska, the insect being known from there as *thor* *Edw.*, which form, as an American representative of the species, remains to be dealt with in another place.

P. clarius *Eversm.* (11b). Wings white. Cell-spots of forewing elongate-rotundate, deep black; *clarius*. beyond the cell an abbreviated curved macular band and near the vitreous distal edge a similar, but nearly

complete and more strongly marked band. Hindwing with 2 distinct red or yellow ocelli, and 2 anal spots, bearing sometimes red pupils; abdominal margin black-grey. ♀ more strongly marked than ♂, the middle band of forewing prolonged. This band sometimes marked as strongly as, or more strongly than, the submarginal band, the hindwing bearing near the edge a distinct band of arcs or halfmoons, which appear sometimes also in the ♂, this ♂-form being described as *dentata* Aust. (11b). Underside without red basal spots. Pouch of ♀ whitish, strongly elongate, similar to that of *P. mnemosyne*. Antenna black. — Altai, Saissan. Often confounded with the American *P. clodius* Eversm. or forms of the same; however, these are not difficult to recognize by the pattern being somewhat similar to that of *eversmanni* and *felderi*.

nordmanni. **P. nordmanni** Mén. (= *clarius* H. S. fig. 257. 258; = *patareus* Westw.) (11b). Similar to the previous, but forewing without submarginal macular band, the vitreous margin considerably widened, there being often a blackish spot before the hindmargin; ocelli of hindwing reddish yellow, distal margin glossy grey. The ♀ more strongly marked, partly powdered with blackish scaling; costal spot of forewing enlarged to an abbreviated band; the ocelli of hindwing sometimes connected by a black line. Underside without basal spots. In ab. *trimaculata* Schaposchn. the anal spot bears sometimes a distinct red pupil, being ocellus-like. Eastern Armenia and Caucasus. — From the North-Eastern Caucasus (Daghestan, 4000 m) the form *minima*. **minima** Honr. (11c) is known, being distinguished only by the inferior size and somewhat reduced markings.

3. Apollo-Group.

bremeri. **P. bremeri** Feld. (11c). White, with black veins. Forewing with 2 black elongate cell-spots, 2 costal spots situated beyond the cell, a blackish submarginal band, often represented only by some vestiges, a narrow vitreous distal margin in apical portion of edge, and a blackish spot at hind margin. Hindwing with 2 red ocelli bordered with black, the anterior one being usually the purer in colour and larger; further, the black abdominal area produced forward at apex of cell into a tooth-like projection; anal spots incomplete: a red spot at base above, while below there are 4 large red basal spots with blackish borders, and a continuous line of blackish, often obsolete, submarginal spots. Antenna blackish brown. Fringes of wings black, or partly whitish, especially on hindwing, a marginal line being black. ♀ rather larger than ♂, upperside more or less powdered with blackish scaling, the black markings intensified, ill-defined, anal spots of hindwing more distinctly marked, there being, moreover, a blackish, shadowy, submarginal band. Pouch small, leaf-shaped, pointed, on the broad portion of its under surface a longitudinal carina. Lower Amur: Bureja Mts., Ussuri. — In the Jablonoi Mts. (Transbaicalia), at altitudes from 1300 to 2000 m, the species has on the forewing the costal spots intensified and filled in with red, the submarginal band of the upperside of the hindwing being sometimes visible also in the ♂, and the basal spots being enlarged, sometimes doubled. This form is *graeseri* Honr. (11d). — In some specimens of the ♀ the ocelli of hindwing are connected by a black line and the anal spots are band-like, reaching the posterior ocellus, while in the ♂♂ which are considered to belong to these ♀♀ the submarginal band of the forewing is more distinctly marked; this form, which has received the name ab. *conjuncta* Stgr. (11c), seems to inhabit the more Southern districts of Amurland (Ussuri), where, however, also the main form occurs. — Larva slender, black, dotted with yellow, in May on various species of *Sedum*.

delius. **P. delius** Esp.*) (11d). Wings white, with a faint yellowish tint, bearing the usual black spots. On the forewing the proximal costal spot situated distally of cell as a rule with red pupil: submarginal band incomplete; the vitreous marginal band not reaching the hind angle; black hindmarginal spot present or absent. Ocelli of hindwing usually of lesser size, entirely red or with white pupil, sometimes strongly reduced. Underside with red basal spots. In ♀ the upperside more or less dusted with black, the markings intensified; forewing with hindmarginal spot, which is occasionally filled in with red; hindwing with anal spots, submarginal macular band, and blackish vitreous margin. Shaft of antenna ringed black and white. Fringes of wings usually white, on hindwing black at the veins. Pouch of ♀ very similar to that of the preceding species. Abdomen strongly hairy in both sexes. A widely distributed and variable species.***) — As individual aberrations are to be mentioned: ab. ♀ *herrichii* Oberth.; costal spots of forewing connected by a black shadowy band with the spot situated at hind margin. ab. *aurantiaca* Spuler, ocelli of hindwing stained yellow, and ab. *leonhardi* Rühl, ocelli entirely black. As ab. *anna* nov. (11e) a form may be introduced which bears a distinct red basal spot on the upperside of the hindwing; the ♀ here figured, which is moreover rather strongly powdered with black and therefore resembles already the following form, is from Sulden,

*) We follow here the customary nomenclature. If the International Rules of Nomenclature were applied in this case, the name *delius* would have to be rejected, since it was already preoccupied by *Papilio delius* Drury (1782), when it was first employed for the present insect as *Papilio delius* Esp. (1800). The new name taking its place would be *P. phoebus sacerdos* Stich. — For the classification of the forms of *delius* = *phoebus* and the validity of the employment of the latter name see Berl. Ent. Zeitschr., vol. 51, p. 81 (1906).

**) For the limits and extent of the variability, and the value and systematic arrangement of the forms, see p. 23 under *P. apollo*. What is said there, applies likewise to all the other species of *Parnassius*.

Southern Tyrol, the red basal spot occurs also in the ♂. In ab. **cardinalis** Oberth. this basal spot is very *cardinalis*. large, its black border is connected with the border of the enlarged anterior ocellus, the latter being joined to the posterior ocellus by means of a black line. — Inhabitants of the higher regions of the Western and Central Alps, at altitudes varying from 1500—2600 m: Mont Blanc, Simplon, Glarus, Thur and Rhaetian Alps (Albula), in the Bernina district (Engadin), Ortler (Sulden, Trafoi, Stilsfer Joch), etc. — Egg hemispherical, with a brown dot and brown ring. Larva black, with yellow spots; on *Saxifraga aizoides* and *Sempervivum montanum*. Pupa short, in a flimsy cocoon, especially often underneath stones. — In the East of the Palaearctic Region the species is represented by several local varieties: **phoebus** F. (= *altaica phoebus* Mén.) (11e) is the Central Siberian form; smaller than the European one, in ♂ the costal spots of forewing usually without red, the anterior one sometimes with white pupil; submarginal band faint and abbreviated or interrupted; no spot at hind margin; hindwing with red ocelli which are usually small, and sometimes with a submarginal row of feebly marked black spots; the veins not rarely marked with well-defined elongate black punctures. ♀ with better defined and more extended markings; vitreous margin of forewing separated from the submarginal band by large white uniform spots; the 2 costal spots often pupilled red, connected with one another by black scaling, on disc sometimes blackish shadows; on hindwing a greyish vitreous marginal band, distinct submarginal halfmoons, which are contiguous, forming a band, 2 larger red ocelli, the posterior one occasionally with white pupil; anal spots sometimes intensified and one of them filled in with red. In the central parts of South Siberia: Altai and Sajan Mts., Baikal district and Transbaikalia; Mongolia: Uliassutai. Here belong presumably also some specimens distinguished by small size (expanse 40—54 mm) recorded from the coast of the Okhotsk sea (Ajan and Gishiga). A small aberration from Irkutsk, with reduced markings, the posterior ocellus being represented only by a small black dot, has been named ab. **sedakovii** Mén. From the same district a strongly darkened aberration of the ♀ has *sedakovii*. been described as **dis** Gr.-Grsh. — It is remarkable that in the districts of the Lena, Vitim and Vilui, situated north of Lake Baikal, so far no form of *delius* has been found; only beyond (north of) the mountain-chain of Werchojansk, in the valley of the Jana R., about as far north as the 69° L. (*i. e.* beyond the arctic circle) the insect reappears in a slightly different form, **interposita** Herz. In size the same as *phoebus interposita*. (expanse 57—65 mm), pure white, the vitreous marginal band very narrow, the ocelli of hindwing broadly margined with black, bearing nearly always a white pupil and being larger than in *phoebus*. ♀ very sparsely scaled, of a glossy aspect. — **intermedius** Mén. is the name of a form which is the local race developed *intermedius*. in Western Siberia (Tabargatai, hills bordering the Khirgiz Steppe). Larger than *phoebus*, the ♂ bears costal spots with conspicuous red centre, at least in the proximal spot; submarginal band also strongly developed. — In specimens from the Ural, which are larger, that band is sometimes extended to near the hind margin. This race is called **uralensis** Mén. In both this and the previous form the spot at hindmargin of forewing *uralensis*. may be present or absent, the ocelli of hindwing are usually large, being with or without white pupil. The ♀♀ of the two forms are very similar: the wings more or less densely dusted greyish black, costal spots of forewing large, filled in with light red, the spot at hind margin also being sometimes centred with red, the white submarginal halfmoons smaller than in *phoebus*. Anal spots of hindwing sometimes connected with the posterior ocellus by means of a band-like shading, ocelli large, often pupilled with white. — **corybas** Fisch. *corybas*. (♂ 11e, ♀ 13d) from Kamchatka approaches again the European *delius*; being somewhat smaller, the submarginal band of forewing feebly marked and only partly developed, hindmarginal spot present or absent, the vitreous margin deeply reversed-crenate, costal spots and ocelli of hindwing filled in with pale red. ♀ as in ♀ of *intermedius*, with more sharply marked pattern, costal spots well developed, 2 to 4 of them being red internally; ocelli of hindwing large, deep red, in the type-specimen with white pupil; some specimens dusted with black. — **kamtschatica** Mén. being in ♂ not essentially different from *corybas*, the name may *kamtschatica*. at the most be kept for the very dark aberration of the ♀ originally described as this sex, corresponding in general aspect to ab. *herichii*.

Although the distinguishing characters of all these forms, which are mostly to be regarded as subspecies, are generally insignificant and not constant, the ♂♂ can be separated at least approximately correctly according to these distinctions. However, the identification of the ♀♀, which by the way bear often a red basal spot on the upperside of the hindwing, depends sometimes entirely on the knowledge of their habitat. The ♀♀ described by the various authors as belonging to *intermedius*, *uralensis*, and *kamtschatica* are compared with *herichii*, being therefore distinguished by the costal and hindmarginal spots of the forewing being connected by black dusting. As the case of *kamtschatica* proves, this dusting may be due to individual variability, occurring rarely in European *delius*, more commonly in the Eastern ♀♀. Several other forms of *delius*, of which *smintheus* Doubl. is the best known, inhabit North America, being outside the scope of this volume.

P. apollo L. is likewise a widely distributed and very variable species, which, like the preceding, is separable according to certain general characteristics into more or less constantly different localized forms. *) — The nomenclatorially typical *apollo* L. (= var. *scandinavica* Harc.) (12a) is the North-Eastern

*) All the forms of *apollo* regarded and characterized as local varieties (races or subspecies) are connected by intergradations, and among the members of each form there occur more or less frequently individuals which exhibit the general

- European form, distinguished by its large size; ground-colour of ♂ pure white, without or with very faint submarginal markings on the forewing, spots intense in colour and large; ocelli of hindwing also large, mostly broadly white internally, with heavy black border. ♀ more or less dusted with black, the submarginal spots better marked. Scandinavia and Finland (the original of our figure from the latter country). — **geminus** Stich. is the designation of the ordinary form from the mountain-chains of median height in Central Europe, as far as there are no special names for the inhabitants of certain districts. Smaller than the North-Eastern one; submarginal band on forewing as a rule incomplete, grey, more rarely blackish, on hindwing very faint or absent; ocelli often white internally. In specimens from higher altitudes the pattern is more sharply marked and more extended, the ocelli being reduced. This form may be named ab. **montana** nov. (13a, ♂ at 1860 m from the Stilsfer Joch road in the Southern Tyrol). The development and shape of the spots of the forewing is, however, variable, the spots situated beyond the cell are sometimes strongly reduced or the cell-spots have assumed a cordiform shape. Also the ♀♀ of *geminus* generally only moderately dusted with grey, though exceptions are not rare (see *nigricans*). Especially in the Alps of Switzerland and the Tyrol, southward extending beyond the Italian frontier, in the Jura Mts., the Limestone mountains near Vienna, in Lower Austria (Krems, Dürrenstein), and the Appenines. — The specimens from the Mosel valley and the Eiffel (West Germany) belong to the form **vinningensis** Stich. (= *eifellensis* Aust., *weskampi* i. l.) (12a), distinguished by the wings being somewhat narrower; ground-colour brilliant white; hindwing without submarginal band; ocelli kidney- or bean-shaped. ♀ slightly dusted with black, ocelli larger, tendency to develop the ab. *fasciata*. — **carinthicus** nom. nov. (for minor *Reb. & Rog.**) is a small, sparsely scaled local form from Carinthia (Friesach), which has an expanse of only 60–62 mm in ♂ and 65 mm in ♀; both sexes dusted with black-grey; forewing with broad vitreous marginal band; hindwing with continuous submarginal band; ocelli small, heavily bordered black, in ♂ mostly entirely filled in with red. — **provincialis** Kheil (12d) from South France (departement du Var, Languedoc, Provence) is densely scaled white; in ♂ the costal spots of forewing almost entirely missing, the black spot situated at the apex of cell sometimes reduced, the submarginal band shortened; in ♀ the markings enlarged, costal spots of forewing and submarginal band of hindwing present, on the whole without striking characteristics. — Better differentiated is **siciliae** Oberth. ♂ chalky white, with little blackish dusting, the ocelli broadly filled in with white, and therefore the red reduced to a narrow ring; in ♀ the spots of forewing below partly pupilled with red, both wings with submarginal macular band, that of forewing being sharply defined; hindwing, besides, with vitreous marginal band which is slightly shaded with grey, the red colour almost completely absent. Sicily, Madonia Mts., in July. — Sicily is inhabited by another, dwarfed, form: **pumilus** Stich. (13c), which one might mistake for a form of *delius* on superficial examination, except for the hindmarginal spot of the forewing and the grey colour of the shaft of the antenna. Besides the small size (length of forewing 32 mm) there are several other characteristics of this form: a very feeble submarginal band, in one of the two known specimen scarcely noticeable, very small ocelli, feeble dusting at the hindmargin of hindwing; on the underside all markings faint, only very thinly bordered with black. Exact locality not known. — **melliculus** Stich. (12c) is a form generally remarkable for the rounded shape of the wings; ground-colour pure white (specimens fresh from the chrysalis, in which the colour is not sufficiently developed, are yellowish), very densely scaled, vitreous margin of forewing narrow, shortened, the white ground-colour not rarely scalloped and touching the edge, the black spot large and heavy; hindwing with very large ocelli, broadly filled in with white, anal spots strongly developed, sometimes band-like, being extended to the posterior ocellus, the wing otherwise without a trace of submarginal markings. ♀ somewhat dusted with black in some places, ocelli specially large, inclination to develop the ab. *graphica*, hindwing with slight submarginal shading. Fringes of ♂ in both wings, of ♀ in hindwing for the greater part pure white. Swabia, Lower Bavaria: district of the Danube near Donauwörth and Regensburg, presumably also with similar characteristics in the Black Forest, in Franconia and the Upper Palatinate, inclusive of the Fichtelgebirge. — In **pyrenaicus** Harc. (13b) a strong colour-contrast between the sexes is said to be a chief characteristic; in ♂ the anal spots of hindwing are absent as a rule or vestigial, also the submarginal un-

characteristics of the form only to a slight extent or do not show them at all. Therefore it must be left to personal inclination to arrange the specimens in the collection either according to the individual peculiarities and independently of locality, or according to the general characters of the forms, bearing in mind that one has to deal in each case with normal and exceptional specimens. In consideration of a better understanding of the evolution of species, which is thought to obtain by the gradual splitting up of a species into new forms with hereditary characters, the latter arrangement is by far preferable. Besides these localized segregate units one distinguishes a number of individual aberrations. Though the names of these aberrations are not recognized from a scientific point of view as applying to classificatory units and therefore are treated as being outside the law of priority, an unrestricted enumeration of the names appears to be useful, since they are generally employed as a convenient and popular means of understanding in the intercourse between Entomophiles for exchange and commerce. These individual forms have their own peculiarities besides the general character of the subspecies (local variety), they reappear in the same way among various subspecies, and can therefore be united under their special name independently of the general distinctions of the subspecies to which each individual belongs, or may be arranged with the respective local forms under their special name.

*) The designation *minor* as a name for a classificatory unit (variety, subspecies) was in 1881 already preoccupied by STAUDINGER for a form of *discobolus*; the same name proposee in 1892 by REB. & ROG. for a race of *apollo* must therefore be rejected for this insect.

dulating band is very faint; vitreous margin of forewing broad, deeply scalloped, submarginal band narrow, strongly dentate, the ground-colour between this band and the vitreous margin separated into halfmoon-shaped spots. ♀ likewise with broad vitreous margin to the forewing, and strongly marked blackish vitreous submarginal halfmoons to the hindwing. — **nevadensis** Oberth. is the name of a form from the Sierra Nevada *nevadensis*. (Southern Spain) and the Eastern Pyrenees (?). Of medium size; ocelli said to be always yellow. No other characters mentioned. — **bartholomaeus** Stich. (♂ 12c, ♀ 12d) from the Alps of Upper Bavaria (environs *bartholomaeus*. of Berchtesgaden, Königssee), in July, is a sharply defined race. In size below the average of the other Central European forms; forewing more rounded; ground-colour pure white; costal spots situated beyond cell often enlarged, band-like and merged together, distal margin broadly vitreous, proximally of it a strongly marked submarginal macular band, all the spots being heavy and broad; hindwing with small, rich deep red ocelli, having sometimes a white pupil and being often distorted into a longitudinal shape, and mostly with distinct submarginal blackish macular band and blackish vitreous margin. Markings of ♀ intensified, especially the fuscous submarginal band of forewing broad, being separated from the broad vitreous margin only by a row of small white spots, the surface of the wings being, moreover, irrorated with minute black dots at the base and on the disc, the ground-colour therefore sometimes changed into a glossy grey-black. — A similar form is **brittingeri** Reb. & Rog. from Styria (Schoberstein near Steyr) and Lower Austria *brittingeri*. (St. Egyd a. Neuwald), also at Thürnitz, Lilienfeld, occurring at altitudes from 1000—1200 m. In both sexes, especially in ♀, more or less coarsely irrorated with black, the marginal markings less conspicuous, almost entirely wanting on the hindwing of ♂, the ocelli larger, more regularly rounded and more broadly white-pupilled; expanse on an average larger than in *bartholomaeus*. There occur ♀♀ which are almost entirely washed with black, the white ground-colour appearing only here and there. — **albus** Reb. & Rog. (12e) has *albus*. a pure white ground-colour; the ♂ with little black shading and rather well-defined but narrow marginal markings on the forewing. The ♀ on the other hand often blackened in strong contrast to the ♂; besides, the form is of considerable size, the anterior ocelli of the hindwing frequently entirely red bordered with black. Silesian-Moravian Gesenke: Schneeberg near Glatz; Bohemia. — **carpathicus** Reb. & Rog. is closely *carpathicus*. allied to the preceding form. Wings very broad; ground-colour white, with a slight yellow tint, in the ♀ usually darkened by a black dusting; all the black spots conspicuous and large; ocelli mostly regularly rounded, with heavy black border, frequently without white pupil. Anal spots of hindwing usually quite black. Occurring in typical specimens in the High Tatra, most likely also in the other chains of the Carpathian Mountains (Hungary). — **bosniensis** Stich. is similar; from Bosnia and Herzegovina; the ground-colour *bosniensis*. somewhat yellowish, the submarginal band of forewing broader and larger, the spots however less strongly marked. — A form in which the white colour is likewise predominant is **liburnicus** Reb. & Rog. Wings *liburnicus*. elongate; hindwing of ♂ without marginal markings, the anal spots also being absent or vestigial, the black spots of forewing conspicuous, but of small size. ♀ sometimes with blackish dusting on the disc of forewing, also some shading along the distal edge. Croatian Velebit; said to extend northward as far as the Tyrol, there intergrading with the ordinary Alpine form *geminus*. — **sibiricus** Nordm. (12e) is the largest *sibiricus*. form of *apollo*, the ♂ being characterized by comparatively large bright-red ocelli on a pure white ground. ♀ contrasting strongly with the ♂, being much darkened; an aberration especially remarkable in this respect, with enlarged red ocelli and pale ochreous-tinged ground-colour of the wings, has received the name ab. **graslini** Oberth. The habitat of the type-specimen of this form is not certain, but as other similarly *graslini*. developed specimens are known with certainty from the Altai Mts., it appears advisable to place the name here. West Siberia, Fergana (Turkestan), Kuldja, Altai and Ala-tan. — The Ural Mountains and the Caucasus harbour a similarly large form, which approaches the form *apollo*, and may be named **limicola** nom. nov. (for *uralensis* *limicola*. Oberth. *) (12b). The marginal markings as a rule more sharply defined, sometimes the wings slightly dusted with blackish grey. The ♀♀ which belong here are also distinguished by an abundant dusting of black, by conspicuous markings, and large bright red, strongly black-bordered ocelli. — Habitually confounded with *sibiricus* or considered identical with it is **hesebolus** Nordm. (= var. *transbaicalensis*, *mongolica* Stgr. i. l.) *hesebolus*. (12b). On an average smaller; all the black spots of the forewing as well as the ocelli of the hindwing and the anal spots reduced, the latter often quite vestigial. ♀ as a rule less dark than in the preceding forms, though also here occur specimens with blackish dusting and enlarged ocelli. Northern Mongolia (Kentei), Transbaicalia, northward as far as the Wiljui district, in July-August, also west of Lake Baikal (Irkutsk).

Of individual aberrations not restricted to a definite subspecies the following are to be recorded: ab. **nigricans** Caradja (13b), a name for specially strongly melanistic ♀♀; this darkening occurs often in connection *nigricans*. with a pale ochreous tint of the white ground-colour. — On the other hand, ♀♀ with specially light colour, having the aspect of ♂♂, are to be designated as ab. **inversa** Aust. — ab. **pseudonion** Christ. (12b) *inversa*. has a red pupil in one or both costal spots situated beyond the cell of forewing, and as a rule also in the hindmarginal spot. — In ab. **albosignata** Schultz the costal spots have white centres. — The rare specimens *pseudonion*. in which the cell-spots are connected with one another by black dusting forming a kind of bridge are *albosignata*. named ab. **cohaerens** Schultz. — However, if there is a band between the costal spots situated beyond the *cohaerens*. cell and the hindmarginal spot, we have to deal with a characteristic quite independent of the preceding

*) The name *uralensis* was already in 1859 given to a form of *detius*; as both forms are to be considered as classificatory units (subspecies), it is necessary to substitute here a new name.

fasciata. aberration, deserving to be recorded under a special name, ab. **fasciata** *nov.* (13a). — Yellow instead of red ocelli in fresh specimens, which are not faded, are the distinction of ab. **flavomaculata** *Deck.* — The rare case of the ocelli being filled in with deep brown-red instead of carmine was the reason for proposing the name ab. **brunneomaculata** *Stich.* (13a). — Individuals with entirely black ocelli are designated ab. **novarae** *Oberth.* (13b); the elimination of the red colour is accompanied in the less well-known ♂♂ also by a disappearance of the costal spots and the hindmarginal spot of the forewing, in the type-specimen even the anterior ocellus of the hindwing being missing. — By the name ab. **philippsi** *Schultz* a form is designated in which the ocelli are devoid of a black border, while in ab. **albomaculata** *Musch.* the black ocellar ring is entirely filled in with white, without any red; and ab. **intertexta** *nov.* those specimens may be named in which the ocelli bear an additional yellow or very rarely white ring between the red centre and the black border, the ocelli therefore being either quadricolorous, or concentrically black-white-red with white pupil. — In ab. **graphica** *Stich.* (12c) the white centre of the posterior ocellus is separated into two spots by a red streak situated upon the median nervule. — ab. **nexilis** *Schultz* is characterized by a bridge-like bar connecting the ocelli with one another, or the anterior ocellus with a basal spot, or the posterior ocellus and the anal spots. — The presence of a distinct red basal spot on the hindwing above distinguishes ab. **excelsior** *Stich.* (13a), while specimens with an abundance of red within the anal spots of hindwing belong to ab. **decora** *Schultz*, this occurring not rarely in the ♀, sparingly in the ♂ (13b). — A plentiful distribution of red on both wings was the main reason for the introduction of the name ab. **wiskotti** *Oberth.*; the hindwing bears in this form at the base broad red tear-shaped spots which extend between the veins into the wing, especially on the underside, and the anterior, enlarged, red ocellus is continued to the posterior one by means of a complete chain of other red spots.

The egg is flat, chalky white, glossy, covered with small pustules, hibernating according to recent observations (KHEIL), and the larva appearing early in spring when there is still snow lying, but the food-plants have already young shoots. This observation is in accordance with what was formerly assumed to be the case, while it has been stated by others that the larva hibernates (SELMONS, RÜHL). The adult larva is 48–50 mm long, velvety black, finely pubescent, with steel-blue warts on the back and a row of reddish yellow spots on each side, stigmata also reddish yellow, surrounded by black dots. Head small, black, a reversible, yellowish, fleshy fork in the neck; feet black. On *Sedum album* and *S. telephium*, also *Semprevivum tectorum*. Gregarious when young, especially in bad weather gathering together in small clusters in covered places; feeds only in bright sun-shine, and turns in June into a chrysalis on the ground, under stones, etc., in a soft loose cocoon. Pupa obtuse and thick, about 25 mm long, bluish hoary; duration of pupa stage 8–10 days according to the weather. The butterfly yellowish when leaving the pupa-shell, being soon bleached white by the influence of day-light. Time of appearance different according to altitude and weather, under normal conditions from mid June till the end of July, but specimens have been observed already in May, even in April, and as late as August and September. Development very irregular, all stages of the species being found together at certain times of the year (SELMONS). The flight is fluttery and clumsy, faster at noon, at other hours similar to that of *Aporia crataegi* L. The butterflies suck at flowers and show a predilection for the flower-heads of thistles. A few rays of the sun are sufficient to awake them from their rest, and one encounters them till late in the afternoon on flowering meadows, alpine pastures and inclines covered here and there with vegetation. The instinct of pairing is developed to a high degree, copulation occurring as a rule soon after the emergence of the ♀ from the chrysalis. One meets rarely with a ♀ at large without a pouch, the sign of copulation having taken place; but we have repeatedly found ♀♀ singly or in copula of which the wings were still damp and flabby, though the abdomen had already the pouch.

davidis. **P. davidis** *Oberth.* appears to belong with the two following insects to a special group of forms. Anyhow, it is no more tenable to unite this insect, which is known only from one ♀, with *P. nomion* than to place *honrathi* and *dux* in nearest relationship with *apollonius*. *P. davidis* differs as follows from the form following next: vitreous margin of forewing somewhat narrower, the dark submarginal band broader, enlarged across disc as far as cell by means of black dusting, the first costal spot beyond cell broader, almost square, hindmarginal spot likewise angular, with broader black border. There are no noteworthy differences in the hindwing. On the underside the two forms approach each other still more in characters, especially in the hindwing, but here the distal marginal band is less distinct, the basal spot situated behind the costal vein has a white centre, and the ocelli are a little narrower and more sharply bordered with black. Fringes of both wings black according to the original description,*) but whitish midway between the veins accord-

*) This character which is mentioned in the diagnosis as specially characteristic cannot be considered as being of specific value. The colour of the fringes is not rarely considerably variable in the forms of *Parnassius*. We have before us, for instance, specimens of *P. apollo* from various places in which the fringes are for the greater part whitish, or chequered, or entirely black, and also individuals of *P. delius* with uniformly white and with chequered fringes; likewise, in species in which the fringes are white with black spots at the tips of the veins, the black dots vary in extent (see *honrathi*). Further, the colour of the antenna is also a very unsafe guide in drawing conclusions as to specific distinctness or the place where a specimen belongs, since moisture and other mechanical causes are liable to destroy partly or entirely the white colouring of the antenna

ing to the figure. Antenna black; pouch of ♀, as far as its shape can be made out from the figure, similar to that of *P. apollo*, but the carina narrower, the distal lobe shorter and more obtuse. Northern China, between Peking and Jehol. — **honrathi** Stgr. (= *corybas* Ersch., nec Fisch.) (13d) is a better known form, *honrathi*. which bears a very distant similarity to *P. apollonius* on account of the external spots of the forewing and the basal one of the hindwing being filled in with red; differs, however, from that insect specifically in the marginal pattern of the wings and would have to be placed near *discobolus*, if there did not exist in this and the two other forms here dealt with a certain homology in the total of the characters; as special distinctions the black venter, legs and antenna are mentioned, the fringes being chequered black and white or entirely black. Sarafshan (Hazret Sultan Mts., south of Samarkand), 2000–2500 m, in July, in the Pamir eastwards as far the meridian near Farab, westwards extending to the crest of the mountain-chain of Darvaz, at similar altitudes. — In unmistakable relationship with this form stands **dux** Stgr. (= *principes* Gr.-Grsh., *dux*. nec Honr.), from Bokhara between Katta- and Kitchi-Kuramuk, occurring at an altitude of about 2300 m, in June; this form agrees in the forewing almost exactly with the preceding, except that the submarginal band is rather more sharply dentate and the vitreous margin partly interrupted by whitish streaks which project towards the margin. Hindwing likewise with basal spot, which is yellowish red like the ocelli; the latter without white pupil; marginal band obsolescent, the submarginal band on the contrary modified to sharply defined black wedge-shaped spots or halfmoons, a character which is especially conspicuous on the underside and reminds one somewhat of *P. apollonius*; the ocelli below with reddish white centre, anal and basal spots of hindwing bright red, the latter very large, the third spot, which is absent or vestigial in the previous form, occupies nearly half the cell, all with only thin blackish borders. Antenna black; fringes white, chequered with black.

P. apollonius Erersm. (13e) is recognizable especially by the sharply defined black submarginal *apollonius*. spots of both wings; moreover, in ♂ there is hardly a distinct greyish vitreous marginal band, the edge being however a little more sparsely scaled with white than the disc and only anteriorly shaded with grey. Arrangement of spots as in the allied species; 3 costal spots beyond the cell, the central one being usually vestigial, the proximal or the distal one or both centred with red, the hindmarginal spot rarely quite black. Hindwing with red basal spot; the abdominal area deep black, anal spots present; on the underside 3 red basal spots, one of them situated behind the cell, being much more distal than the others and more feebly marked. ♀ washed with blackish grey, almost transparent, costal and hindmarginal spots of forewing more broadly filled in with red; hindwing without black abdominal area, being here only dusted with black as on disc. Antenna and abdomen black above, the latter sparsely clothed with white hairs. Sarafshan, Fergana (July), Transalai, Tianshan (Kuldja, in May), Dsungaria, at moderate altitudes. — Larva black, velvety, with two bright red spots on each segment; feeds on Scabiosa in May, the butterfly usually emerging in June. There occur specimens of this butterfly with yellow instead of red centres to the ocelli: ab. **flavo-** *flavo-*
maculata Aust. Also individuals with reduced ocelli, the centres of which are not light in colour; these *maculata*.
are named ab. **occaecata** Schultz. — A smaller, lighter coloured race, with smaller submarginal spots, is *occaecata*.
alpinus Stgr. (= *alta* Rühl) (♂ 13e, ♀ 14a); otherwise hardly different from the ordinary form. Northern *alpinus*.
Fergana, and Issyk-kul. Similar specimens, however, fly also within the district of the main form in the Alai and Transkei Mts., where GRUM-GRSHIMAILO met with them at altitudes of from 1900–4800 m on mountain-slopes which have the character of Steppe. Sometimes the submarginal spots of this variety are obsolescent on both wings or entirely absent, the name ab. **albina** Schultz being employed for such speci- *albina*.
mens, and ab. **decolor** being the designation for individuals in which all the spots of the forewing are *decolor*.
plain black. — From the Sarafshan Mts. (at the Sary Ob) a form has been described as **daubi** Fruhst., in *daubi*.
which the ground-colour is lighter than in *apollonius*, and the submarginal spots broader, this being especially obvious in the hindwing of ♀. Moreover, it is recognizable by the reduced black dusting of the basal portion of the hindwing, and by the enlarged, more broadly white-centred ocelli; the ♀ characterized, besides, by the darker colour of the underside of the hindwing. — Still larger than the preceding form is **gloriosus** Fruhst. *gloriosus*.
From the Alexander Mts. in Northern Turkestan. Ground-colour of ♂ purer white, the black submarginal dots very heavy, the costal spots of forewing and the anal spots of hindwing enlarged, the ocelli very large, darker red in colour, their black border twice as broad as in the other forms; the ♀ reminding one of *alpinus*; cell of forewing and basal area of hindwing, however, densely scaled white, only the distal area being grey.

P. nomion Fisch. (14b) is similar to *P. apollo geminus*, but differs in the vitreous marginal band of *nomion*. the forewing being broken up into elongate arched spots or lunules, and in the hindwing bearing dark marginal and more sharply marked submarginal spots, the latter being developed to large vitreous halfmoons, especially on the underside. The hindwing above usually with red basal spot, the whole surface of the wing above with a peculiar silky and below a greasy gloss. ♀ darker, more conspicuously marked. Shaft of antenna whitish, club black, abdomen whitish, except a small dorsal portion. In specimens which

consisting of white scales, or rub off these scales, the black shaft, originally of that colour in all cases, thus reappearing. This may probably also explain the occurrence, for instance, of individuals of *P. apollo* with white-ringed antennae, such specimens being usually considered hybrids between *apollo* and *delius*, chiefly an account of that character.

agree with the figure of the name-type the costal and hindmarginal spots of the forewing are heavily centred with red. If specimens in which only the hindmarginal spot is centred-red, while all the other spots of the forewing are black, should be considered worth a name, ab. **venusi** *Schauf.* has to be employed for them; when there is no red at all on the forewing, we have ab. **virgo** *Schauf.* (14b), this being the commonest of the 3 forms mentioned. Siberia (Altai), Amurland, Alaska. — A race with a more dull white ground-colour, more sharply marked submarginal macular band and darker margin is described as **mandschuriae** *Oberth.* (= *titan Fruhst.*). In this form the ♀, which corresponds to ab. *virgo*, bears in the forewing entirely black spots only; the ocelli of the hindwing are very large, vivid red, with narrow black border, usually without white centre; in the anal angle there are heavier black spots, which are filled in with red below. Manchuria, Ussuri district (Sidemi, Sutchan). — A smaller form is characterized as **nominulus** *Stgr.* (14a): wings more strongly dusted blackish, hindwing more intensely darkened behind cell, the marginal spots deeper in tint and larger, the ocelli reduced. East Sajan.

P. nomius *Gr.-Grsh.* (14c) gives one the impression of being a distinct species: smaller than *nomion*, wings more rounded, ground-colour pure white, with sparser black dusting, costal and hindmarginal spots of forewing heavily filled in with red, the costal ones placed nearer the apex, submarginal band reduced; ocelli of hindwing strongly enlarged, with or without white pupil, the white portion of the posterior spot sometimes divided, anal spots strongly developed. Not all the specimens as extreme in characters as the one figured. — Nanshan Mts.; south of the Kuku-nor (Amdo).

P. discobolus *Alph.* (= *tianschanica Oberth.*) (♂ 14b, ♀ 14a) is again a very inconstant species. The originally described form has a pure white or slightly yellowish ground-colour, sparsely irrorated with blackish scales; costal spots of forewing with small red centres, hindmarginal spot very large, feebly dusted with red internally; vitreous margin moderately broad, submarginal band not sharply defined. Hindwing with deeply red-centred ocelli and feeble submarginal wedge-shaped spots. ♀ darker, more conspicuously marked; strongly darkened specimens bear the name ab. **nigricans** *Stgr.* Commonly in the Tianshan Mts., in Sarafshan and Fergana, preferring localities with a profuse alpine vegetation, up to about 2300 m. — In the Alatau (and Tabargatai ?) there flies a race of smaller average size, **minor** *Stgr.* (14d); this is much dusted with greyish black in both sexes, the submarginal spots of hindwing are intensified, the ocelli often centred with white. — **insignis** *Stgr.* (14c) is distinguished by broader black spots, more sharply marked bands and enlarged deep red ocelli; occurring in the northern districts of the area inhabited by the species, at the Issyk-kul, but also with similar as well as identical characters in the Alai Mountains and in Afghanistan (Rochan). In the first locality intergrading with a form for which the name ab. **superba** *Gr.-Grsh.* (nec *superbus Rühl*) may be employed: ♂ darker, more densely powdered with black, all black spots intensified, especially the submarginal triangles of the hindwing, vitreous margin very broad, but the distal costal spots usually plain black, and not rarely connected with the hindmarginal spot by means of denser black shading. Occurs on inclines which are covered with species of *Astragalus*. — In the southern parts of the area, the Transalai, Pamir, at altitudes of from 2600 to 4000 m, there flies from June to August a form named **romanovi** *Gr.-Grsh.* (14c). Ground-colour of wings yellowish white, in ♂ little darkened by fuscous dusting, the distal costal spots of forewing enlarged, their number being sometimes increased to 4, broadly filled in with red; submarginal wedge-shaped spots of hindwing also enlarged, in ♂ isolated, in ♀ united to a broad macular band; ocelli enlarged, completely filled in with red, or centred with white, the latter obtaining especially in ♀. The ocelli are not rarely connected with one another by a black bar: ab. **connexa** *Schultz.* — **olympius** *Stgr.* (14d) is larger, pure white, more or less abundantly irrorated with black scales. Wings more elongate than in the other forms (too narrow in the figure, which is a reproduction of a water-colour drawing taken from the name-type); submarginal band of both wings reduced, often represented only by isolated irregular spots, the vitreous margin better defined, narrower, almost entirely obsolete in hindwing. Costal spots of forewing usually centred with red; ocelli of hindwing large, bright red, the posterior one also on the upperside occasionally with white pupil. Occurs together with *discobolus* and transitional specimens on the mountains of the Kurukdag (Korla). — All these forms of *discobolus* are connected by intermediate stages and transitions, even within the special habitat of each: it is therefore impossible to give a definite geographical delimitation for the various varieties.

P. actius *Evversm.* (14d) can be recognized by the more elongate and a little more pointed forewing. Ground-colour usually pure white, more rarely slightly yellowish; vitreous margin of forewing narrow, as a rule not reaching the posterior angle, or the edge itself posteriorly narrowly white; submarginal spots feebly developed: in ♂ usually only the anterior costal spot centred with red, in ♀ both spots. The ♀, besides, somewhat duller, hindmarginal spot of forewing sometimes also marked with red, the submarginal markings more strongly developed. Hindwing grey at the base in both sexes, only in rare exceptional cases with a red basal spot above. The original specimens were said to have come from the southern foot-hills of the Altai, this habitat being however doubtful; known with certainty from the Southern Alatau (near Kulджа) and Turkestan (Fergana, Namangan). — **caesar** (*Gr.-Grsh.*) *Stgr.* (= *mouzaffar Gr.-Grsh.*) (14e) is of larger

average size, in both sexes purer white, with reduced marginal markings, from the Tianshan, near Korla, and the Eastern Pamir (4000 m). Near Korla there occurs a by-form, ab. *actinobolus* Stgr. (14e), in which *actinobolus*. the pure white ground-colour is not at all clouded, the submarginal spots being absent from both wings or faintly indicated. — *superbus* Rühl (nec *superba* Gr.-Grsh.), on the contrary, is characterized by the blackish *superbus*. marginal markings being deeper in tint and more extended. Moreover, in this form the costal spots of the forewing are merged together to a large patch bearing two red dots, the hindmarginal spot being large and strongly marked with red; ♀ more densely dusted with black. Transalai district, 3–4000 m.

The group of varieties of *P. jacquemontii* Boisd. is the last of the series of species in which the *jacquemontii*. ♀ bear carinate pouches*) and have usually a red basal spot on the hindwing. The true home of the species are the high mountain-passes of the North-Western Himalayas, the insect reaching there the Palaearctic area (in Kashmir: Ladak) and appearing in a number of varieties.**) The type-specimen differs essentially from *nirius* here figured, as follows: rather larger (length of forewing 34 mm), costal spots and hindmarginal one of forewing proportionally larger, abundantly centred with red, submarginal macular band rather more sharply marked, extending to hindmargin; ocelli of hindwing larger, with white pupil, the submarginal halfmoons somewhat broader and the anterior ones more distinct, a red spot at anal angle, the black abdominal area rather narrower, especially without tooth-like projection at apex of cell. — ab. *nirius* Moore (15b), from *nirius*. Ladak and the Karakorum, is a transition to the following form, which must likewise be regarded as an aberration. Of lesser size, the costal spots small, both or at least the anterior one being centred with red, and the marginal markings somewhat reduced. — ab. *rhodius* Hour. has narrower but sharper marginal *rhodius*. bands: the costal spots of forewing without red pupil, the hindmarginal spot also plain black; ocelli of hindwing small, as in *nirius* completely filled in with red. Likewise from Ladak. — *himalayensis* Elw. (15b) *himalayensis*. is extremely variable, being sometimes hardly distinguishable on the upperside from the previous forms, there appearing also transitions towards *tibetanus*. Recognizable by the pale red spots on the underside of the hindwing having no black borders or only thin vestigial ones. Upperside more or less abundantly dusted with black; costal spots of forewing as a rule filled in with red and the hindmarginal spot bearing a red pupil; ocelli of hindwing small, all red or with small white centre; anal spots always present, frequently marked with red; submarginal bands of both wings well developed, that of hindwing consisting of rather sharply marked black halfmoons or cap-like spots, which are more or less contiguous, being not rarely isolated; usually a distinct red spot at the base. There occur singly individuals with entirely black costal and hindmarginal spots on the forewing, the ground-colour being almost white, the submarginal markings reduced, the red basal spot missing on the hindwing, and the reduced ocelli of the hindwing being all red strongly bordered with black: ab. *impunctata* Aust. The fringes of both forms chequered whitish and black, *impunctata*. being more rarely all whitish. The true home of *himalayensis* are the central chains of the Himalayas (frontier of Sikkim-Tibet), the insect, however, extending north-westwards as far as Kashmir, where it merges into the previous subspecies. The *jacquemontii*-forms of the Himalayas occur from 3500 to 6000 m; they have a fast continual flight, and are fond of hurrying incessantly hither and thither close to the frozen or snow-covered ground. — A form very similar to *nirius* is *chitralensis* Moore, from Chitral, North-East *chitralensis*. Afghanistan. Costal spots of forewing small, hindmarginal spot vestigial, all black or centred with white, the posterior ocellus reniform (individual character?), the black basal area projecting tooth-like on the disc behind the cell. — A well distinguished form generally confounded with *rhodius*, being sold under this name and contained as such in collections, is *rubicundus* Stch. (= var. *magna* Stgr. i. l.) (15a). Usually larger than *rubicundus*. *rhodius* (length of forewing 32–34 mm), ground-colour pure white, vitreous margin of forewing broad, submarginal macular band mostly sharply marked, separated from the marginal band only by a row of white halfmoons; costal and hindmarginal spots large, as a rule filled in with red. Hindwing with grey vitreous margin, the submarginal halfmoons mostly well developed, ocelli large, mostly all red, a distinct red spot at base, the black hindmarginal area surrounding apex of cell. On the whole similar to *actius*, but recognizable by the rounded shape of the wings, the peculiar marginal markings and lastly by the red basal spot, though the last character is not always reliable. — Here belongs ab. *parcirubens* Schultz, having like ab. *rhodius* plain black costal spots, and ab. *mutilata* Schultz, *parcirubens* *mutilata*. in which the submarginal row of spots is absent from the hindwing. Both aberrations occur also within the area of the next subspecies. Pamir, Transalai, Buchara, Fergana, and Sarafshan. — In the eastern districts of Fergana (Alps of Osh) there flies again a somewhat smaller, but very inconstant, local form, inclining towards *rhodius* and *nirius* and being likewise sold by dealers under the former name. This is

*) *P. jacquemontii* Boisd. was originally the name for a composite species, i. e. the description was based on the sexes of two different species, the ♀ being described as having a non-carinate pouch. As the original ♂ from BOISDUVAL's collection is preserved in the collection of Monsieur CHARLES OBERTHÜR (Rennes), the identification of this ♂ is rendered certain, and we know further that to this ♂ belongs a ♀ with a carinate pouch. The composite species has later been dealt with in this way that the name *jacquemontii* was preserved for the species identified by means of the original ♂, while the ♀ of the Boisduvalian diagnosis, having a non-carinate pouch, together with the ♂ which has been recognized as belonging to this kind of ♀, has been separated under the designation of *P. epaphus* Oberth.

**) The variability of the species — at least partly — appears to be due to horodimorphism. For, as according to statements of English explorers the occurrence of a second broad is established in *P. hardwickii*, which insect is found under the same conditions and in identical localities, we may assume that the same obtains also in the present case.

- variabilis*. **variabilis** Stich., which bears 1—2 feebly red-centred costal spots, is sparsely marked and very little dusted with black; the submarginal band of the forewing sharply dentate, narrower than in *rhodius*, the vitreous margin broader, hindmarginal spot strongly marked; submarginal band of hindwing represented only by isolated halfmoons or cuneiform spots, the ocelli small, red, strongly margined with black, the black basal area very abundantly irrorated with white. In specimens (aberrant) with two complete red costal spots the pattern is on the whole brighter, being almost as in *rubicundus*. — A further subspecies is **mercurius** Gr.-Grsh. (15a) from the Sining Mts. (Amdo, Kuku-nor). Much smaller than *rubicundus*, the marginal markings feeble, grey, the costal and hindmarginal spots of the forewing red-centred; hindwing with large, continuous, submarginal halfmoons, ocelli bright red, being also below margined with deep black, basal spot vestigial or absent. ♀ more abundantly dusted with grey, the grey places on the forewing almost vitreous also on disc.
- tibetanus*. otherwise very similar to the darker specimens of *himalayensis*, but smaller. — **tibetanus** Rühl (Leech MS.) (15d) is a magnificent, strongly darkened race which surpasses the previous in size and has the ground of the wings glassy: costal and hindmarginal spots of forewing frequently all red-centred, submarginal band sharply defined, the dark vitreous margin broad, separated from the submarginal band only by a narrow stripe of whitish spots. Hindwing with heavy red ocelli broadly outlined in black and usually bearing a white pupil; generally with a red basal spot and large, triangular, black submarginal spots. The ♀ as a rule lighter in colour, the pattern therefore more prominent, the cell of the hindwing bearing occasionally a second red spot near the base. South-East Tibet: Junling (Tsang-ku); West China (Hukow).
- epaphus*. **P. epaphus** Oberth. and allies are a continuous series of forms of lesser average size than the previous species, the pouch of the ♀♀ being without carina, but bearing at the broader end transverse folds instead. The name-typical form is distinguished from the following one essentially only by the broader and more sharply defined marginal markings of the ♂ and the larger costal spots of the forewing, and in the ♀ by the better developed anal spots of the hindwing, by a feeble shadowy marginal band situated in between the halfmoons and the wing-edge, and by the purer white ground-colour of the forewing, which, in the next form, is dusted over on the disc in consequence of a shadowy expansion of the submarginal band. The last character taken from the figure of the original specimen appears to be individual. North-West Himalayas: Kashmir (Ladak = Leh, up to 4000 m; Chonging valley, in July-August); Pamir. — **cachemiriensis** Oberth. (15c) is presumably the dry season form of the previous (Moore), recognizable by the thinner markings, especially in ♂; costal spots of forewing reduced, submarginal spots essentially smaller, the ocelli above and below and the basal spots below yellowish; ♀ more abundantly dusted with black, there being no further noteworthy differences from the typical *epaphus* ♀. Kashmir. — As **poeta** Oberth. (15a) a form is designated which is more or less dusted with grey. Forewing with a red pupil in both costal spots and frequently also in the hindmarginal spot; hindwing with large ocelli which are usually entirely filled in with red, mostly a red spot at base, the submarginal spots well developed; on the underside the ocelli with white centre, the posterior one being continued by a row of anal spots which are mostly ocellus-like, being marked red and white. The red colour of the ocelli occasionally replaced by yellowish. Western China: Ta-t sien-lu, Tsang-ku. — The wings of some specimens are more abundantly powdered black, the black basal area of the hindwing is extended to the ocelli, the marginal band is broadly interrupted by white spots, and the hindmarginal spot of the forewing is strongly centred with red. For these the designation ab. **oberthueri** nov. (? = tatsienluica Verity) may be introduced. The ♀ of this form bears a great similarity to *tibetanus*. — From North-East Tibet, Nanshan, from an altitude of 4000 m, a very small, on the whole light-coloured form is known as **nanchanicus** Aust. (= nianschana Stgr. i. l.) (15b), in which the submarginal band of the forewing is only feebly dentate and the ocelli are enlarged; moreover, the black basal area of the hindwing is more extended than in the first-described form; however, the anal spots remain sometimes all black, the fringes of the hindwing are less conspicuously spotted black, while the red basal spots of the underside are enlarged and white-centred. — A similar form, darker in tint, is *sikkimensis* Eluc., which inhabits the Indian portion of the Himalayas and is therefore outside the scope of this volume. — **tsaidamensis** Aust. is apparently restricted to the mountain-chain south of Tsaidam (Marco-Polo), being recorded from an altitude of 5000 m. Similar to the preceding, the marginal band reduced, consisting on the forewing of a row of small isolated spots which hardly extend down to the middle, while there are on the hindwing only a few vestigial spots at the anal angle. Ocelli very large, white-centred; no red basal spot on upperside of hindwing; fringes sharply spotted white and black. — **huwei** Fruhst. (= aksuensis Stgr. i. l.) (15d) is also similar; the limpid marginal band broad, submarginal band of forewing narrow and abbreviated, but sharply defined; costal spots small, the anterior one usually with red pupil; the marginal dusting of hindwing faintly grey, but rather broad. ♀ with more extended grey-vitreous wing-area, strong black submarginal bands and abundant red filling of the costal spots and ocelli. Southern parts of the Tianshan, near Aksu on the Kia River, in July. — **altynensis** nov. subsp. (Stgr. i. l.), from the Altyn tag, is distinguished only by the more sharply marked submarginal spots, more abundantly red-centred costal spots of forewing, larger red basal spot and enlarged ocelli.
- beresowskyi*. **P. beresowskyi** Stgr. (15c) deviates so considerably from the *epaphus*-forms in its superior size and in aspect that it may be treated as a distinct species. We place it here on account of the structure of the

♀-pouch being similar to that of *epaphus*. In size equalling *actius* or *rubicundus*. Ground-colour pure white, all the markings deep black. Submarginal band composed of strong, elongate, anteriorly almost arrowhead-shaped wedge-spots, in the ♀ less conspicuous and continuous down to the hindmargin; the dark vitreous margin interrupted at the edge by small white spots. Costal spots all black or the anterior one centred with red. Hindwing with red basal spot, a row of deep black halfmoons or wedge-shaped spots near the edge, the margin profusely grey; ocelli strongly edged with black, the posterior one sometimes all black. On the underside the red colour of the basal spots essentially reduced in favour of their black borders. North-East Tibet: Amdo, Sining Mts.

4. *Hardwickii*-Group.

P. *hardwickii* Gray (15b) is again a very variable species. The name-typical form is here and *hardwickii*. there somewhat dusted with black, and is more brightly and strongly marked than the light form here figured and usually treated as *hardwickii* by dealers. The costal spots are especially strongly developed, three of them being centred-red, the hindmarginal spot being also filled in with deep red; the submarginal band of forewing consists of a row of contiguous spots. Ocelli of hindwing proportionally large; the marginal spots strongly developed, shaded with blue and centred with white. — In ab. *after* *Fruhst.* the ground *after*. of the wings is more abundantly dusted with black, especially at the base and on the disc of the forewing, as well as in the basal and hindmarginal areas of the hindwing; costal spots of forewing centred red and the submarginal spots all intensified and contiguous. — ab. *charino* Kirby (*Gray MS.*) is the darkest form. *charino*. In this the white ground-colour remains visible on the forewing only in the cell, on the hindwing here and there on the disc and in the costal area. The distribution of red is variable, there occurring specimens as in the name-typical form in which the costal and hindmarginal spots are abundantly filled in with red, but also individuals with feebly red-centred spots and obsolete ocelli, sometimes also examples with yellowish ocelli. — On the other hand, ab. *albicans* *Fruhst.*, recorded from Sikkim (Lochung valley and Donkia pass *albicans*. = about 4200 m), is a lighter form with reduced markings. All the bands and spots smaller, very little red on forewing, the blue spots of hindwing reduced, the last ocellus without red, the anterior one with a red dot only; the ♀ corresponding to this ♂ is without any red spots above, there being below blackish scaling in place of the red basal spots. — The most extreme albinistic development is represented by ab. *otos* *Fruhst.*, described from Kashmir. Smaller, the pattern very strongly reduced, partly diffuse, especially *otos*. the abbreviated submarginal band of the forewing; red spots entirely absent from above. On the hindwing only the anterior ocellus preserved but very small, the submarginal spots, however, rather intensely black, without blue shading. — All these varieties appear to be seasonal or extreme individual forms. There occur several broods according to the reports of English explorers.*) The spring-brood hibernates as pupa, but it is stated that also single late butterflies pass through the winter, reappearing in March and occurring with the spring-form. The second brood flies in August and September, a few retarded specimens — those which hibernate — have been observed in October, at which time also the larvae were found on «low plants».

According to F. MOORE (Lep. Ind.) the dry hot season extends in the Western Himalayas from April to June; at the end of June the rainy season commences, lasting till the end of August; then follows a transitional period (end of hot season) with little rain, and in mid-November the cold season begins. We can therefore distinguish: a) a dry-season form: Light pattern as in our figure, with the extreme aberrations *albicans* and *otos*; b) a rainy-season form: Dark pattern, the extreme form being ab. *charino*; c) a cold-season (winter) form which is a retarded development of b) (therefore no new brood), with transitional characters, ab. *after* belonging here. All three forms are connected by intergradations, so that there are no definite lines of separation. The ♀♀ are on the whole darker, being more abundantly marked with black and red than the ♂♂; they possess a bladder-like, whitish yellow pouch which is produced backwards, being laterally flattened, and provided beneath with a longitudinal groove. The species is distributed all through the Himalayas, reaching in the West, in Kashmir, the Palaearctic Region.

P. *przewalskii* Alph. is a similar species, being however specifically distinct on account of the dif- *przewalskii*. ferent structure of the pouch of the ♀. Smaller than a typical specimen of *hardwickii*, with only slight differences in the forewing, marginal band narrow, ending in an acute point at hinder angle, the submarginal band appearing as far as hindmargin as a narrow tapering stripe shaded with black, the band broken step-like at 3. subcostal, in the ♂ strongly incurved in middle, in ♀ on the whole broader and more even. Beyond the cell 2 costal spots, centred with deep red like the hindmarginal spot, on the disc blackish shading. Hindwing with large red basal spot, two large broadly red ocelli, between which there is a black diffuse streak, there being another small black spot between the anterior ocellus and the basal spot; the blackish posterior area projecting tooth-like at apex of cell, sometimes (in ♀) the cell completely encircled; from the posterior ocellus extends forward and backward a curved band of black spots; close to the margin 4 black spots filled in with blue, the anterior one sometimes plain black. Underside like upper, but paler, the anal spots filled in with pale red, the ground of wings brownish. Pouch of ♀ whitish, encircling the

*) LANG, in Proc. Zool. Soc. Lond. 1865. p. 488; GRAHAM YOUNG, ibid. 1866. p. 38.

last abdominal segment as a broad halfring, flat bladder-shaped, posteriorly acuminate. Apparently only 3 specimens known (2 ♂♂, 1 ♀), from Central Tibet, Mts. of Burkhané-Buddha (Amdo), at an altitude of 4600 m.

szechenyi. **P. szechenyi** *Fric.* (t5e) is distinguished by a very broad vitreous margin to the forewing, this band together with the submarginal one forming a broad distal area which is divided by a row of white contiguous halfmoons proximally sharply bordered with black; costal and hindmarginal spots filled in with pale red, of the costal ones at least the posterior. Hindwing with large, red, white-pupilled ocelli, broad black posterior area strongly irrorated with white, and two large black anal spots with blue filling, from which emanates forward an anteriorly vitreous grey and posteriorly black submarginal band. Underside of a peculiar greasy gloss, somewhat yellowish, most markings only feebly shining through. Shaft of antenna and fringes of wings whitish. Amdo (Kuku-nor), North-East Tibet. — **germanae** *Aust.* is a form in which both sexes, but especially the ♀, have the disc of the forewing shaded with black; hindwing with dark marginal band, the submarginal band separated into spots, the large blue-centred anal spots being accompanied further forward by two similar spots and a blackish subapical spot. Ta-tsien-lu, Western China.

orleans. **P. orleans** *Oberth.** (t3c). Ground-colour with a feeble yellow tint; forewing with the costal spots connected, band-like, including 2 or 3 red dots, hindmarginal spot likewise frequently filled in with red, between these spots a blackish discal shadow; marginal band moderately wide, interrupted by narrow white marginal spots; submarginal macular band deeply incised. Hindwing with large, red, white-centred ocelli, 1 or 2 anal spots, mostly also filled in with red, and with a submarginal row of 4 or 5 black spots partly filled in with blue. ♀ more sharply marked, the costal spots of forewing connected with the hindmarginal one by denser black shading, the submarginal spots of hindwing larger, brighter. Apart from these characters the general aspect very similar to that of *P. evermanni*. Ta-tsien-lu, Western China. — In the ♀ of *groumi.* the smaller form **groumi** *Oberth.* (t6b) from Amdo (Kuku-nor) the red is usually absent from the spots of the forewing, the spots themselves being very strongly marked, the black discal shadow stronger, ground-colour of wings purer, submarginal band of forewing separated into spots and abbreviated, ocelli of hindwing bright red, anal spot black.

cephalus. We place here **P. cephalus** *Gr.-Grsh.* (t6b), which has hitherto been treated as being allied with *P. delphius*, but which must be dealt with together with the following insect as a special form-group on account of the pouch of the ♀ being different (RÜHL) from that of *delphius* and agreeing (VERRY) with that of *szechenyi*. This species resembles *stenosemus* *Honr.* (see below). Ground-colour pure white; forewing with complete blackish submarginal band and a sometimes abbreviated discal one, as well as with white and black chequered fringes. Hindwing with very narrow dark margin, two blue anal spots, which are continued anteriorly by two further black spots and a submarginal band. Amdo (Sining). — *elwesi.* **elwesi** *Leech* is somewhat larger, being similar to the preceding and *illustris* and having likewise black and white chequered fringes; from the high plateau north of Ta-tsien-lu in West China; only one specimen known, bearing on forewing an additional, diffuse, black streak between the cell-spots and a red dot between the radials within the abbreviated discal band; no spot before hindmargin. Hindwing with large red ocelli and bright blue anal spots, but without basal spot. A similar individual, without red spot on forewing and the ocelli of hindwing partly (asymmetrically) reduced to black spots, has been recorded from Tonghō, West China (Ch. OBERTHÜR).

delphius. **P. delphius** *Eversm.* (♂ t5d, ♀ t5e) is a species consisting of numerous forms. The type of name was recorded from the southern foothills of the Altai, having come from the Tarbagatai according to the label of the original preserved in the Museum at St. Petersburg, the species being known in an identical form, or nearly, from the Alatau and Tianshan, as well as in slight modifications from the district of the Issyk-kul and from North Fergana. Characters: Discal markings dull, submarginal band of forewing distinct, hindmarginal spot absent as a rule; ocelli of hindwing bright carmine, hindmarginal spots black, blackish hindmarginal area broad, 2 bluish black anal spots, a faint submarginal and narrow marginal band. — The following aberrations occur with the principal form, being connected with it and with one another by all *caeca.* intergradations: ab. **caeca** *Dönitz* with plain black ocelli, from Fergana, presumably also as an aberration *namangana.* among the other races. — ab. **namangana** *Stgr.* (t6a), markings sharper and broader, disc of forewing more strongly shaded with black, hindwing with 2 larger blue submarginal spots and 2 smaller black ones, these sometimes dusted with blue, hindmarginal spots red, from North Fergana (Namangan and Naryn) and *maximina.* Kuldja. — ab. **maximina** *Stgr.*, larger, resembling *albulus* in shape, submarginal spots heavy, contiguous, hindwing almost without marginal band, but with 2 very large blue-centred anal spots and 2 likewise blue-scaled *infernalis.* submarginal ones, by which this form can easily be distinguished from all the others: Issyk-kul. — ab. **infernalis** *Elw.* (t5f), forewing with enlarged black band which appears sharply defined on the white ground, marginal band broad, hindwing below with red basal spots, which are sometimes absent; Alps of Osh (East *styx.* Fergana) and Kuldja. — ab. **styx** *Stgr.* (t5f), upperside for the greater part black, sometimes without a trace of the white ground-colour, the bands only feebly defined, hindwing with large red ocelli margined

*) This name is spelt *orleansi* in catalogues.

with deeper black, and with 2 anal spots dusted with blue, from Kuldja, transitions occurring in the localities where the preceding form flies. — ab. **infumata** *Aust.*, recognizable by the ground-colour of the wings *infumata*. having a dirty yellow tint, from Karategin. — In the West of the area of the species, adjoining the southern and eastern districts, a special race, **staudingeri** *Bang-Huas* (15e), with several aberrations, appears *staudingeri*. to have separated: ground-tint of the main form purer and more extended white, bands of forewing rather sharply defined, but narrow, no black shading on disc in ♂, hindmarginal spot present; hindwing with narrow grey margin, a submarginal band of halfmoons, 2 rather large blackish anal spots, small ocelli, filled in with deep red. ♀ with stronger markings, disc of forewing dusted with black, submarginal band broader, ocelli of hindwing larger, the margin of hindwing more strongly blackened. From Sarafshan (Samarkand), Alai and Transalai Mts. In the last locality occur transitions to the very similar **illustris** *Gr.-Grsh.* (= transiens *Aust.*) (16a). This form is in both sexes likewise recognizable by the narrowed, sharply defined bands and the pure white ground-colour of the forewing; hindwing with small or obsolescent anal spots and reduced submarginal band of which often remain only single isolated small spots, the distal edge rather broadly grey, in ♂ deeply scalloped; from the Eastern Transalai district, at altitudes of about 3200 m, flying on inclines covered with Festuca and various species of Allium, found like *infernalis* in July, intergrading with that form in the North and East of the district. Larva brownish, with light longitudinal side-stripes, darker dots and spots on the segments, placed transversely; concealed under stones; food-plant not known. — ab. **cardinal** *Gr.-Grsh.* (15f) flies likewise in the Sarafshan and Transalai (Ghissar Mts., and Mts. of Peter the Great); a magnificent form, profusely marked with black, the deep red ocelli of hindwing enlarged, their black borders connected by a broad bar; the ♀♀ usually darker, with more extended pattern. On hindwing below large red basal spots and a red-centred hindmarginal spot. Otherwise the ♂ agreeing with *staudingeri* or *infernalis*. — In South-Eastern Fergana (Alai Mts.) and at the head-waters of the Naryn River in the Tianshan (Nura Mts., Jitim-tau) the prevalent race is **albulus** *Honr.* (? = *delphinus* *Christ. i. l.*) (16a) *albulus*. with its aberrations, though there occur in these districts also occasional specimens similar to the neighbouring subspecies and *delphinus*. All forms of *albulus* are distinguished by somewhat broader, at the apex more rounded wings. The type with narrow limpid margin to the forewing, submarginal band separated into more or less strongly marked spots, the costal spots modified into a short band, hindmarginal spot isolated; with narrow blackish margin, 2 bluish anal spots, before which there stand 3 or 4 blackish submarginal spots; ocelli large and bright, hindmarginal spot often centred red. At altitudes of from 2100 to 3600 m. — In ab. **marginata** *Huwe* the limpid margin is considerably widened on both wings, the submarginal spots of hindwing reduced or absent, with the exception of the last two blue-centred spots, hindmarginal spot mostly red-centred, more often in ♀ than in ♂. Nura Mts., Jitim-tau. — ab. **boettcheri** *Huwe* *boettcheri*. has specially dark and sharply defined markings, the short costal band of forewing being enlarged and joined to the hindmarginal spot by means of a curved black band; hindmarginal spots of hindwing mostly red; otherwise as in *albulus*. — Specimens without hindmarginal spot on forewing are ab. **pura** *Huwe*, in the most extreme individuals of which the middle cell-spot is obsolete, while the submarginal spots of forewing are absent. — ab. **rubropicta** *Huwe* has in the short costal band of forewing 1 or 2 red spots, one before and another in between the radials. — For individuals in which the anterior ocellus of the hindwing is plain black the designation ab. **semicaeca** *Huwe* may be applied; in this form the anal and basal spots of hindwing below usually likewise all black. — ab. **denigrata** *Huwe* (16a) is the name of specimens in which both ocelli are plain black, a character which appears to be generally accompanied by a reduction of the red spots on upper- and underside. — All these aberrations occur with the principal form in the localities mentioned under ab. *marginata*. — In the district of Kashgar (Chin. Turkestan) a race appears to have developed which is on the one hand similar to *albulus* and on the other to ab. *maximina*: **dolabella** *Fruhst.* *dolabella*. Ground-colour pure white; forewing with broad black bands, submarginal band continuous, separated from the vitreous margin only by isolated, distinctly defined, white spots; ocelli of hindwing bright carmine, very broadly bordered with black, connected by a black line (? individually), submarginal spots black, also the posterior ones without blue, the anterior ones contiguous, band-like, separated from the marginal band as on forewing by white spots. — Towards the South of the area, extending to the Himalayas, there appears **hunza** *Gr.-Grsh.* (16b). Similar to the following, but larger; the band not well defined, the short costal band of forewing not prolonged, sometimes more abundant grey scaling on disc; hindwing with very narrow grey margin, but strong submarginal band, which terminates in 2 black spots, ocelli all black (? individually), reduced or punctiform. — **stoliczkanus** *Feld.* (16c) is smaller and has better defined markings. The discal band of forewing shortened, in exceptional cases running into the submarginal band. Hindwing with broad marginal band, in which there stand 4 or 5 darker spots, which are dusted with blue in ♀; as a rule only one ocellus preserved, namely the posterior one, being sometimes reduced to a dot; moreover, often a red hindmarginal dot. N.W. Himalayas: Ladak, Marka, Rupshu. — **atkinsoni** *Moore* is probably an aberration of the previous, a ♀ from Kashmir (Pir Pinjal); the bands of forewing broader, all three complete, submarginal spots within the marginal band of hindwing distinctly blue, 2 ocelli, the posterior one enlarged, and 2 red-centred hindmarginal spots. — Likewise from Kashmir (Ladak, Kutie pass) is **stenosemus** *Honr.* (16b), being most probably an individual or seasonal form of *stoliczkanus*; larger, the markings less well defined, bands

of forewing complete, the discal one posteriorly sometimes separated into spots, hindwing with narrow marginal band, 2—4 blue-centred submarginal spots, being preceded by a narrowly shaded band; the anterior ocellus sometimes absent, or reduced to a black dot. Otherwise similar to the figure of *namangana*.

acdestis. — **acdestis** Gr.-Grsh. (16b) is best placed here. Hindwing with very narrow marginal band, the submarginal spots isolated, small; the ultracellular costal spot of forewing continued by grey scaling, forming an S-shaped band. Ando (Sining). — In West China (Tonghō) there occurs a uniformly grey race which, in aspect, reminds of the ♀ of *delphius* (verus), being however more abundantly dusted with grey on the disc of forewing and in the basal half of hindwing; this form may be named **cinerosus***) *subsp. nov.* — A subspecies remarkable especially for its small size is **lampidius** Fruhst. from South Tibet (Khamba-jong) (not Sikkim). Ground-colour pure white, the ♂ resembling *staudingeri*; cell-spots and marginal band of forewing narrowed, also the discal band narrower, being obtusely angulate behind cell. Hindwing black from base to the ocelli and to near the anal angle, the strongly black-bordered ocelli both distinctly centred with red, at anal angle 2 blackish dots, near the distal margin a narrow grey band. ♀ with lighter vitreous bands on forewing and larger, light carmine, ocelli on hindwing. At the base of hindwing a pale red spot in ♂ and ♀. — The ♀♀ of all forms of *delphius* have pouches which encircle the abdomen belt-like, being broader than high and ending in two points.

5. Acco-Group.

The species of this and the next group form a separate section on account of the subcostals 1 and 2 being partly or entirely merged together.

acco. **P. acco** Gray (16c) is a rare species of which the name-typical form is known from Kashmir. Forewing usually with 3 complete bands distally of cell, the proximal one sometimes shortened or narrowed; hindwing with red basal spot, the ocelli small, with reddish or whitish centres, near the distal margin a row of black cunei- or luniform spots, the marginal band itself with a black interrupted dusting; in the ♀ the red spots somewhat stronger, the pouch baggy, encircling the abdomen, grooved below, ending in two points. Ladak, Barren Mts., Karakorum (3500 m), Sikkimese-Tibetan frontier. — Specimens from South Tibet have received the name **gemmifer** Fruhst.; recognizable by the darker marginal band and by the deeper red and broadly black-edged ocelli of hindwing.

simo. **P. simo** Gray is a small and rare species from Kashmir (Ladak) with rather pointed wings; the first-described form differs from the following one only in the submarginal band of the hindwing being vestigial, consisting of a row of small halfmoons, and in the discal markings of forewing being less complete. — *simonius*. **simonius** Stgr. (16d) flies in South Fergana (Transalai); rather larger, being recognizable by the narrow, but sharply marked, submarginal band of hindwing. — The form from the Issykkul is **simulator** Stgr. (16d), which has on the whole a more sharply marked pattern; submarginal band of hindwing composed of prolonged halfmoons. — *boëdromius*. **boëdromius** Püng. (16d), from Chin. Turkestan (Aksu), is on the contrary distinguished by a reduction of the markings. On forewing the discal band almost entirely absent, no red spots either above or below, ocelli vestigial. — *gylippus*. **gylippus** Fruhst., from Aksu, is to be regarded as an aberration of the preceding or as a mountain-form; bands again widened and intensified and ocelli red, the marginal band of forewing especially wide, being almost merged together with the submarginal one, the two bands being separated only by a line of small white spots. — *acconus*. **acconus** Fruhst., from South Tibet (Khamba-jong), is similar to *simonius*; ground-colour yellowish, forewing with sharply marked submarginal and discal bands; hindwing with rather large red ocelli and a proportionally broad complete submarginal band, on underside 3 elongate red basal spots and a red hindmarginal one. — The pouch of the ♀♀ of this species is similar to that of the previous, but narrower, being tubular.

tenedius. **P. tenedius** Eversm. (16c) deviates somewhat from the general aspect of the group. ♂ with the ordinary cell-spots, the central one rounded, further with an abbreviated band distally of cell bearing 2 more or less distinct red dots; with narrow vitreous margin and a submarginal row of sharply marked small black spots. Hindwing with red basal spot; ocelli small, at the apex of cell a small black streak, near the edge a row of small black spots; the spots stronger below, between the posterior ocellus and the anal angle a complete chain of usually red-centred spots which shine through above, basal spots much prolonged. ♀ more strongly marked, the costal spots of forewing more profusely red, the hindmarginal spot being also filled in with red; black-grey abdominal area of hindwing wider, the anal spots marked also on upperside, all the red paler, the distal margin blackish. — East Turkestan: Issykkul; South Siberia: Altai, Sajan, Kentei Mts.; upper districts of the Lena and Viljui (July), Jakutsk.

6. Charltonius-Group.

This group, the last, contains the finest species of the genus.

imperator. **P. imperator** Oberth. (16e) is the largest representative of the group. Forewing broad, rather profusely dusted with grey, the dusting denser behind the cell, forming an almost band-like prolongation of the

*) Compare Etudes d'Entomol., Fasc 19. t. 8. f. 71 (1894).

short costal band, submarginal band broad, anteriorly more strongly marked, separated from the limpid marginal band only by a series of white halfmoons. Hindwing with large ocelli, abundantly filled in with white, and two large anal spots shaded with blue, a shadowy band extending from the latter forward; at the base sometimes traces of a red spot. Somewhat variable: the red scaling of the ocelli sometimes replaced by orange, the spots occasionally entirely filled in with red, being isolated, or connected by a black bar, the blue spots sometimes 3 or 4 in number. The ♀ mostly more abundantly dusted with black than ♂. West China: Ta-tsien-lu. — Of nearly the same size is **supremus** *Fruhst.* Ground-colour pure white, spots of *supremus*. forewing strongly enlarged; ocelli of hindwing larger and lighter red; anal spots likewise larger, filled in with light-blue, submarginal band much feebler, at base a conspicuous red spot as in *imperatrix*. Under-side of hindwing more abundantly red, there being, besides the basal spot, two elongate red diffuse dashes near the base, otherwise like the name-typical form. Habitat not certain, probably Chin. Turkestan. — **musageta** *Gr.-Grsh.* (16d) is of nearly the same average size. Purer white, with narrower bands, the band- *musageta*. like black shading on disc of forewing connecting the costal and hindmarginal spots faint or absent. Hindwing occasionally with red basal spot. Amdo (Sining), on the River Chuanchu. — **imperatrix** *Alph.* is *imperatrix*. somewhat smaller, but more profusely and sharply marked with black. Nanshan (Humboldt Mts.), about 3000 m, June-July. Ground-colour slightly yellowish, almost without black dusting; on forewing the hindmarginal spot considerably intensified, deeply black, entirely isolated. Hindwing always with very conspicuous red basal spot; ocelli large, bright carmine, usually without white; submarginal band broad and sharply defined, posteriorly continued by 3 distinctly marked round black spots, the last 2 being less shaded with blue. — The smallest form is **venustus** *Stich.* (forewing 32 mm). Ground-colour white, submarginal band of *venustus*. forewing narrow, dentate, the anterior portion standing nearer the margin, costal spots connected with the hindmarginal spot by means of dense, black, posteriorly dilated shading; ocelli of hindwing yellowish red (? individually), the posterior one with white pupil, basal spot only feebly shining through, anal spots light blue inside, submarginal band feebly grey, very thin, several times angulate. Samarkand (Sarafshan). — A further form of the species, *augustus* *Fruhst.*, characterized especially by more strongly marked bands, flies outside the Palaearctic Region on the frontier of Sikkim and Tibet. — Pouch of ♀ of all forms very similar to that of *delphiis*, only more robust, darker, below sledge-shaped, posteriorly produced into two pointed lobes.

P. charltonius *Gray* has slenderer wings; from the North-Western Himalayas, the name-typical *charltoniu* form from Kashmir (Ladak); distinguished from the following form especially by the short costal band of forewing being united with the hindmarginal spot by means of a strongly angulate, distinct, grey shadow-band. — This connection is absent from **princeps** *Horr.* (16e), or is only faintly indicated. The ocelli of *princeps*. hindwing often more strongly developed, the posterior one sometimes forming a real chain with the red-centred anal spots, and bearing mostly a red dot in its anterior portion, the costal ocellus entirely red, sometimes angulose. Pouch of ♀ large, heliciform. South Fergana (Transalai), Pamir. — The species is rather constant in the general characters of the pattern, only one conspicuous aberration has been recorded (*Gr.-Grsh.*), with almost obsolete markings of the forewing and a black dot in place of the whole row of red spots on the hindwing. It is stated of the name-typical form that it flies at altitudes of 4500 to 5000 m, «swimming very fast and close to the ground in a zigzag course, as if beating the ground like a hen harrier beating a meadow» (*Lang*). The ♀♀ descend apparently for ovipositing to the meadows lying at lesser altitudes, because the usual abodes of these insects are still covered with snow at the period of the first stages of the metamorphosis. Leech observed in the North-West Himalayas both sexes in numbers together on rough grassy inclines close to the snow-line, while he met only with single ♀♀ in the warmer valleys, some thousand feet lower down. He states further that the flight is rapid and continual, the insect being only caught without difficulty when it sits resting on the rocks.

In structure and aspect **P. loxias** *Püng.* (16d) stands in very close relationship to the preceding *loxias*. species, being the last of the series of *Parnassius* known. Of lesser size than *charltonius*; forewing of ♂ with only a narrow and indistinct costal halfband, the submarginal band sharper, composed of long-horned halfmoons; ocelli of hindwing reduced in size, no anal spot. In ♀ the discal band of forewing prolonged, but only narrowly and feebly shaded, submarginal band intensified; ocelli of hindwing larger, the marginal band sharper, near anal angle a blackish shadow, occasioned especially by the black spots of underside shining through, abdominal area more broadly black, the submarginal row of spots intensified. Only 3 specimens known, from Chin. Turkestan, north of Aksu.

Corrections and additions.

Parnassius citrinarius ab. *umbrosa* *Stich.* (p. 21) is identical with ab. **melanochroa** *Reb.* This name *mela-* *nochroa*. has priority (June 1906).

Of *P. delius* (p. 22) there have further been named: ab. **hardwickii** *Kane*, a form with 3 red dots *hardwickii*. in the costal spots of the forewing. — ab. **inornata** *Wheel.*, has these spots plain black. — ab. **nigrescens** *inornata*. *Wheel.*, strongly melanistic ♀♀. *nigrescens*.

The ab. *dis Gr.-Grsh.* (p. 23) does not belong to *P. phoebus*, but as melanistic aberration to *nomion* (p. 27) (VERITY).

rubidus. From *P. apollo geminus* there have further been separated: **rubidus** *Fruhst.*, from the Eisacktal in
rhaeticus. South Tirol. — **rhaeticus** *Fruhst.*, from the Engadin (Switzerland). — **valesiacus** *Fruhst.*, from the Wallis
valesiacus. (Zermatt). — **nivatus** *Fruhst.* from the Swiss Jura. We record these names without criticism merely from
nivatus. information in *litt.*, in order to avoid forestalling the publication of the original descriptions (in Soc. Ent.).
 — To avoid further shifting, the race from the Berner Oberland (Grindelwald) may be considered typical
merzbacheri. for *geminus* *Stich.*; *montanus* *Stich.* (p. 24 as ab. *montanus*) is a local form from the Ortler district, coordinate
 will be introduced for the *apollo*-form from the Tianshan. The name will only be valid, if it is proposed
 for the form from the western districts of the Tianshan; for that inhabiting the eastern districts the name
mongolicus. **mongolicus** *Stgr.* (p. 25) would eventually stand. — As var. **alpherakyi** *Krulik.* another *apollo*-form, from
alpherakyi. the Altai, has been designated, which name, at the highest, may be accepted for a specially strongly dark-
 ened aberration of the ♀ of *sibiricus* (p. 25), while ab. *fumigatus* *Krulik.* is the same as *graslini* *Oberth.* (p. 25).
democratus. — From *limicola* *Stich.* (= *uralensis* *Oberth.*) may, with some doubt, be separable **democratus** *Krulik.* from
 South-Eastern Russia (Viatka, Kasan): Expanse 70–90 mm, upperside pure white, ♂ almost without any
 dark dusting, submarginal band vestigial on forewing, absent from hindwing, the black spots of forewing
 strongly developed, ocelli moderately large, strongly bordered with black, mostly with large white centre,
 anal spots of hindwing usually strongly developed. ♀ only slightly dusted with blackish, lighter than in
sibiricus, submarginal band more or less distinct on both wings. Characters on the whole those of *limicola*,
 but the ♀ lighter than OBERTHÜR's original specimen (*uralensis*).

privignata. A form of *P. discobolus* with yellow instead of red spots has received the name ab. **privignata** *Krulik.*
urumtsiensis. As *P. actius* var. **urumtsiensis** *Verity* a form has been designated which is close to *superbus*, but has
 yellowish ground-colour, the anterior spot of the submarginal series of hindwing, moreover, being conspic-
 uously enlarged and the ♀ bearing nearly all a red basal spot on hindwing. Urumtsi, north-east of Korla.

cyrnus. *P. mercurius* **cyrnus** *Fruhst.* is a *jaquemontii*-form from Aksu, the description of which is in press
tatsienluica. (Soc. Ent.), and *tatsienluica* *Verity* is a form of doubtful relationship (the original ♀ having no pouch), being
 considered by the author to be a variety of *jaquemontii* and closely related with *tibetanus*. Differs from the
 latter by the marginal band of hindwing being interrupted between the veins by white spots, and by the
 anal spots being large but devoid of red. Wings more or less dusted with black, sometimes transparent.
 The description reminds one strongly of ab. *oberthüri* *Aust.* The form, if not identical with *oberthüri*, can
 only be kept separate as an aberration of *tibetanus*.

The literature has thus been consulted down to 1. December 1906 (VERITY, *Livr.* 6).

Alphabetical List

of the Palaearctic forms of Papilionidae with references to the original descriptions.

* denotes that the form is also figured in the place quoted.

acco Parn. *Gray.* Catal. Lep. Brit. Mus. I. p. 76 *
accestis Parn. *Gr.-Grsh.* Hor. Ross. XXV. p. 486.
actinobolus Parn. *Stgr.* Iris X. p. 347.
actius Parn. *Eversm.* Bull. Mosc. 1843. p. 540 *.
aeacus Pap. *Fldr.* Wien. Ent. Mon. IV. p. 225.
afer Parn. *Fruhst.* Stett. Zg. LX. p. 354.
albicans Parn. *Fruhst.* Iris XI. p. 147.
albidior Thais *Verity.* Rhop. Pal. p. 31 (Stgr i. l.)
albina Parn. *Schultz.* Berl. Ent. Zt. 1905. p. 280 *.
albomaculata *Musch.* Bull. Soc. Lép. Genève I. p. 69 *.
albosignata Parn. *Schultz.* Berl. Ent. Zt. 1905. p. 275.
albulus Parn. *Honr.* Berl. Ent. Zt. 1889. p. 161 *.
albus Parn. *Reb.-Rog.* Jahresb. Wien III. p. 60, 71.
alcinous Pap. *Klug.* Neue Schmett. Insect. Berlin I *.
alebion Pap. *Gray.* Catal. Lep. Brit. Mus. I. p. 30 *.
alexanor Pap. *Esper.* Eur. Schmett. I. Suppl. p. 89 *.
alicea Thais *Neuburg.* Soc. Entomol. XVII. p. 154.
alpherakyi Parn. *Krulik.* Soc. Entomol. XXI. p. 49.
alpinus Parn. *Stgr.* Stett. Zg. 1887. p. 49.
altynensis Parn. *Stich.* Seitz Gross-Schmett. I. p. 30.
amasina Dor. *Stgr.-Reb.* Cat. Pal. Lep. p. 4.
amurensis *Seric.* Rom. Mém. Lép. VI. p. 130.
anna Parn. *Stich.* Seitz Gross-Schmett. I. p. 22.
apollinaris Dor. *Stgr.* Iris IV. p. 225.
apollinus Dor. *Hbst.* Natur. Schmett. IX. p. 156. t. 250. *
apollo Parn. *L.* Syst. Nat. ed. X. p. 165.
apollonius Parn. *Eversm.* Bull. Mosc. 1847. p. 71 *.
arcturus Pap. *Westw.* Ann. Mag. Nat. Hist. IX. p. 37.
asiatica Pap. *Mén.* Enum. Corp. Mus. Petr. I. p. 70.

athene Parn. *Stich.* Berl. Ent. Zt. LI. p. 88.
atkinsoni Parn. *Moore.* Lep. Ind. V. p. 121 *.
atrata Parn. *Graes.* Berl. Ent. Zt. XXXV. p. 71.
aurantiaca Pap. *Speyer.* Geogr. Verbr. Schmett. p. 278.
aurantiaca Parn. *Spuler.* Gross-Schmett. Eur. p. 4.
bartholomaeus Parn. *Stich.* Ins. Börs. XVI. p. 294 *.
bella Thais *Neuburg.* Soc. Entomol. XVII. p. 154.
bellargus Dor. *Stgr.* Iris IV. p. 226.
beresowskyi Parn. *Stgr.* Catal. Lep. ed. III. p. 6.
bianor Pap. *Cram.* Pap. Exot. II. p. 10 *.
bipunctata Thais *Cosmov.* Rühl-Heyne Gross-Schm. p. 701.
boëdromius Parn. *Püng.* Iris XIV. p. 177 *.
boettcheri Parn. *Huwe.* Ent. Zeit. Guben XVIII. No. 33.
borealis Pap. *Fldr.* Wien. Ent. Mon. VI. p. 22.
bosniensis Parn. *Stich.* Ins. Börs. XVI. p. 303.
bremeri Parn. *Fldr.* Reise Novara II. p. 133 *.
britannicus Pap. (*Spengel* i. l.). Seitz Gross-Schmett. I. p. 12.
brittingeri Parn. *Reb.-Rog.* Jahresb. Wien III. p. 59.
brunneomaculata Parn. *Stich.* Ins. Börs. XVI. p. 312.
burdigalensis Pap. *Trimoulet.* Cat. Lep. Gironde. p. 10.
cachemiriensis Parn. *Oberth.* Ét. d'Ent. XIV. p. 14 *.
caeca Parn. *Dönitz.* Ent. Nachr. 1892. p. 193.
caesar Parn. *Stgr.* Iris X. p. 347.
canteneri Thais *Stgr.* Cat. Lep. Eur. Ed. I. p. 1.
cardinal Parn. *Gr.-Grsh.* Rom. Mém. Lép. III. p. 397.
cardinalis Parn. *Oberth.* Ét. d'Ent. XIV. p. 7 *.
carinthicus Parn. *Stich.* Seitz Gross-Schmett. I. p. 24.

- carpathicus* Parn. *Reb.-Rog.* Jahrb. Wien III, p. 61 *.
caschmirensis Pap. *Rothsch.* Nov. Zool. II, p. 407.
cassandra Thais *Hbn.* Snlg. Eur. Schm., Fig. 910—3 *.
castiliana Thais *Rühl-Heyne.* Gross-Schm., p. 91.
caucasica Thais *Led.* Wien. Ent. Mon. 1864, p. 165 *.
centralis Pap. *Stgr.* Stett. Zg. 1886, p. 193.
cephalus Parn. *Gr.-Grsh.* Hor. Ross. XXV, p. 466.
cerisyi Thais *God.* Mém. Soc. Linn. Paris II, t. 2 *.
charino Parn. *Kirby.* Cat. diurn. Lep., p. 513.
charltonius Parn. *Gray.* Cat. Lep. Brit. Mus., p. 77 *.
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chinensis Pap. *Rothsch.* Nov. Zool. II, p. 385.
chitralensis Parn. *Moore.* Lep. Ind. V, p. 107 *.
cinerosus Parn. *Stich.* Seitz Macrolep. I, p. 34.
citrinarius Parn. *Motsch.* Bull. Mosc. 1866, p. 189.
clarus Parn. *Eversm.* Bull. Mosc. XVI, p. 539 *.
clymenus Pap. *Leech.* Butt. China, p. 523 *.
clytia Pap. *L.* Syst. Nat. Ed. X, p. 479.
cohaerens Parn. *Schultz.* Berl. Ent. Zt. 1905, p. 274.
confusus Pap. *Rothsch.* Nov. Zool. II, p. 270.
conjuncta Parn. *Stgr.-Reb.* Cat. Pal. Lep. III, p. 5.
connexa Parn. *Schultz.* Berl. Ent. Zt. 1905, p. 278.
corybas Parn. *Fisch.-Wald.* Ent. Russ. II, p. 242 *.
cretica Thais *Reb.* Verh. Zool.-Bot. Ges. Wien LIV, p. 2.
cyrnus Parn. *Fruhst.* Soc. Entomol. Decbr. 1906.

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daubi Parn. *Fruhst.* Soc. Entomol. XVIII, p. 49.
dauidis Parn. *Oberth.* Ét. d'Ent. IV, p. 23 *.
dealbatus Pap. *Rothsch.* Nov. Zool. II, p. 336.
decolor Parn. *Schultz.* Berl. Ent. Zt. 1905, p. 280 *.
decora Parn. *Schultz.* Ent. Zt. Guben XX, p. 117.
dehaani Pap. *Fldr.* Verh. Zool. Bot. Ges. Wien 1864, p. 323.
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denigrata Parn. *Huwe.* Berl. Ent. Zt. 1905, p. 325.
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deyrollei Thais *Oberth.* Pet. nouv. Ent. I, p. 3.
dialis Pap. *Leech.* Entom. XXVI, Suppl. 104.
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discobolus Parn. *Stgr.* Stett. Zg. 1881, p. 275.
dolabella Parn. *Fruhst.* Ent. Zeit. Guben XVIII, p. 29.
drusus *Fuchs.* Stett. Zg. 1884, p. 21.
dux Parn. *Stgr.* Cat. Lep. Ed. 3, p. 5.

elunata Pap. *Spengel.* Aberr. Machaon, p. 9 *.
eluta Parn. *Stich.* Seitz Macrolep. I, p. 21.
elwesi Pap. *Leech.* Trans. Ent. Soc. Lond., p. 113 *.
elwesi Parn. *Leech.* Entomol. XXVI Suppl., p. 104.
epaphus Parn. *Oberth.* Ét. d'Ent. IV, p. 23 *.
euros Pap. *Leech.* Butt. China, p. 521 *.
eversmanni Parn. *Mén.* Siemaschko Russ. Faun., t. 4 *.
evittata Pap. *Spengel.* Aberr. Machaon, p. 16 *.
excelsior Parn. *Stich.* Ins. Börs. XVI, p. 312.

fasciata Parn. *Stich.* Seitz Macrolep. I, p. 25 *.
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gigantea Parn. *Stgr.* Stett. Zg. 1886, p. 197.
gloriosus Parn. *Fruhst.* Iris XVI, p. 309.
govindra Pap. *Moore.* Ent. Mont. Mag. I, p. 101.
graeseri Parn. *Honr.* Berl. Ent. Zt. 1885, p. 272 *.
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graslini Parn. *Oberth.* Ét. d'Ent. XIV, p. 6 *.
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halteres Parn. *Muschamp.* Ent. Rec. XVI, p. 52.
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herrichii Parn. *Oberth.* Ét. d'Ent. XIV, p. 7 *.
hesebolus Parn. *Nordm.* Bull. Mosc. 1851, p. 425.
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Corrections:

- p. 9 line 12 from top read 1c instead of 2d.
 " 9 " 20 " bottom erase 1c.
 " 10 " 27 " top read 4c instead of 4e.
 " 10 " 29 " " " 3c " " 3e.
 " 10 " 40 " " add (5b).
 " 11 " 3 " " (5b).
 " 12 " 16 " " read 6c instead of 6e.
 " 14 " 4 " bottom read 6c instead of 6e.

2. Family: Pieridae.

The Pierids are for the greater part medium-sized butterflies: however, a few Palaearctic and several Exotic forms are large. The chief character as regards pattern consists in dark, blackish, streaks and spots on a white ground, but there are, especially among the Exotics, also a large number of species which rival in size and the magnificence of their coloration the most beautiful forms of other families of Butterflies. In these variegated species the upper- and undersides of the wings contrast very strikingly. Whereas our Palaearctic Pierids conform to the colour-character of the family (white and black), we find among the Exotics many species in which the ground-colour of the upperside is yellow, blue, red or black, but also forms with a white upper- and a bright-coloured underside. Thus the Neotropic *Perote*-species completely disown their kinship with the cabbage-whites by the assumption, above and beneath, of a black ground traversed on the forewing by a red band, and *Archonias critias* and allies resemble the species of the *aeneas*-group of the South American Papilios. The sexual dimorphism is also well developed in many Palaearctic Pierids, seasonal dimorphism being less conspicuous among them.

Antenna of various length, rather short f. i. in *Leptidia*, and on the contrary very long in the South American genus *Leptophobia*; the club suddenly or quite gradually incrassate. Foreleg of normal size, fit for use; the claws bifid. Proboscis well developed. The butterflies suck at flowers and on moist places on the ground. Palpus well developed, but of various sizes and shapes. Secondary sexual ♂-characters (scent-organs) occur in the species of several genera, f. i. in *Colias* as scale-spots on the hindwing, in *Catopsilia* as broad areas of thick scaling, in *Appias* (*Tachyris*) as brushes on the underside of the abdomen. The ordinary Palaearctic species of *Pieris* (*brassicae* and allies) possess "plume-scales" (AURIVILLIUS), which are distributed over the greater part of the wings and are apparently the cause of the restriction of the dark markings of the ♂♂.

The Pieridae — like most *Rhopalocera* — are lovers of sun-shine. They extend, in company with a few Satyrids, farther into the Arctic, Antarctic and Alpine Regions than the other Butterflies without foregoing the brightness of colour as compared with their congeners from warmer climes. The high mountains of South America and the south-eastern boundary of the Palaearctic Region are even inhabited each by two genera entirely confined to them, namely *Nymphula* with about 6 species and *Andina* with a single *Colias*-like species occurring in South America, and *Mesapia* and *Baltia* found in Asia.

The Pierids are as a rule moderately good fliers, however some being exceptionally fast (*Appias*) and others so slow that one can catch the flying insect with the hand (*Leucidia*). They have one or several broods. Of certain species, f. i. *P. brassicae* and some *Catopsilia*, it is known that they migrate at times in enormous flocks, which may be considered nuptial swarms.

The eggs are elongate and of various colours, being deposited end upwards, either singly or in batches on the underside of the leaves of the food-plants.

The larvae are cylindrical, being mostly of a green or greenish ground-colour ornamented with pale longitudinal stripes and clothed with short hairs; larvae bearing thorn- or such-like projections have not yet been found in the Palaearctic Region. The forked osmaterium which is found in the neck of the larvae of the Papilionids and is said to protect the insects by its nauseous odour against the predations of enemies, does not exist in Pierid larvae, but these are not only unpalatable for birds, but birds have been observed to die from feasting on the caterpillars of Pierids. They live on various shrubs and herbs, as Papilionaceae, Mimosae, Cruciferae and Capparideae. Some species, by appearing in enormous numbers, become noxious to cultivated plants not only in Europe, as is well known, but also in the Tropics.

The pupa is fastened by the tail to plants etc., and is either vertical or suspended, being kept in this position by a girth. Some pupae, f. i. the boot-shaped one of *Euchloris cardamines*, have a very peculiar shape. The pupa of *Zegris euphonia*, from South Europe and Asia Minor, lies in a rather dense cocoon, having still preserved a remnant of the girth. This character, which reminds one of the "Bombycids", is much better developed in the Mexican *Eucheira socialis*. The larvae of this species live gregariously and — just like our *Thaumatopoea*-species — march in procession to their food at night. The common bag-like nest of the pupae is suspended from a branch, the pupae being fastened with the head downwards (J. ALEMAN).

The Pierids hibernate partly as pupae, partly as larvae, sometimes — f. i. *Gonepteryx rhamni* — as imago.

In the Palaearctic Region the Pierids are predominating on account of their abundance in individuals, being in the Tropics more kept in the background. Some species inhabit a very large area, *P. rapae* for instance occurring in the whole Palaearctic and in the Nearctic Region, and *P. mesentina* in the southern Palaearctic districts, in India and Africa.

Though there is apparently no transference of poison from the food-plants to the insects, the Pierid butterflies are little persecuted by birds, being, it seems, unpalatable. Some species of the genus *Dismorphia* are so-called mimics, while in some other genera only the ♀♀ are mimetic.

We divide here the Palaearctic *Pieridae* into 23 genera.

Several fossil Pierids have been found, which do not differ in size from recent forms.

1. Genus: **Aporia** Hbn., Black-veined white.

Rather large butterflies, with stiff brittle wings, which make a distinct rustling sound during flight. While some authors, on account of the whole aspect of the insects as well as of the shape of the scales, which differ from those of the other Pierids, consider *Aporia* to be related to *Parnassius* (DIXEY), other authors believe those characteristics to indicate rather a certain affinity with the Danaids. — Among the Pierids the neurulation places *Aporia* near *Pieris* and *Delias*, being easily distinguished from the latter by the number of subcostals (in *Aporia* 4, in *Delias* 3), while it is still more easy to distinguish it from *Pieris* by the sparsity of the scaling, the wings being more or less transparent, the species of *Pieris* on the contrary being densely scaled.

The larvae, when young, live gregariously on *Prunaceae*, *Rubiaceae*, *Berberideae*, etc., hibernating young. The butterflies are on the wing early in summer (May, June), slowly, but sometimes also elegantly, sailing over meadows and fields and sucking by preference at Scabious and Thistles. — The genus is almost exclusively Palaearctic; only in the north of India there occur two species of which it is not known that they extend into the Palaearctic Region.

crataegi. **A. crataegi** L. (17a). White, with thin black veins, the ♀ with a large sparsely scaled discal area on the forewing: underside similar to upper. The whole of Europe and North Asia, going far northwards and extending in North Africa southwards to the slopes of the Aures Mts.: not in Egypt. In ab. *alepica*. *Cosmorici* (17a) all the wings are transparent. The form **augusta** Tur. (19a) has the cross-veins more distinctly black and the nervules are more strongly dusted with black at the distal margin, all the veins being more broadly edged with black beneath; from Sicily. — **hyalina** subsp. nov., from the Taurus (south. Asia Minor), is pure white in ♂, with thin dark veins, the tips of the same being scarcely perceptibly darkened; the ♀ not quite so transparent as in *alepica*, the dark edges of the veins being distally faint but broad, and the cross-veins of the forewing being more densely shaded with black. — **pellucida** subsp. nov., from Aidere, is sparsely scaled in both sexes, but the dark vein-streaks extend farther basad: beneath, the hindwing and the apex of the forewing have a yellowish tint, the veins of the forewing being rather broadly edged with fuscous. — TUTT enumerates, besides, the following aberrations: **suffusa** are specimens shaded with fuscous; **marginata** are individuals with a distinct black distal marginal band to the hindwing (somewhat reminding one of *Colias edusa*); **lunulata** has the disco-cellulars of the hindwing broadly marked with black, forming a distinct black halfmoon: **melana** has fuscous stripes between the veins of the underside of the hindwing; **flava** are entirely yellow specimens. — Larva clothed with short whitish hairs: ashy grey, dorsally black, with two orange-yellow or brown-red stripes and above the legs a reddish-yellow line; head, thoracic legs and anal legs black; on *Prunus*, *Pirus* and *Crataegus*, adult in May. Pupa whitish, with dots united to form stars. Egg conical, yellowish.

The butterfly is locally still very frequent, though its abundance and range have considerably diminished in consequence of the systematic destruction of the winter-nests and the war against the black-thorn-hedges. From former times swarms and migrating flocks of this butterfly are on record, and the "oracle of the blood-rain" is attributed to the dark red excretions of the butterflies of which large numbers had emerged from the pupae on a small space. The species appears to be commonest in Central Europe; Dr. SEITZ found the insect more singly in East Asia and likewise in Algiers, where he met with it near Lambèze in June. *A. crataegi* is rarer in southern Japan than in the north of that country, likewise in Amurland, where it flies together with *A. hippia*.

hippia. **A. hippia** Brem. (= *crataegioides* Luc.) (17b). Hindwing beneath dull ochre-yellow, otherwise similar to the previous, but the nervules of all wings and the cross-veins of the forewing broadly streaked with black, and the hindwing beneath bearing a yellow basal stripe. South-East Siberia, Mongolia, and *thibetana*. North China. — **thibetana** Gr.-Grsh. (= *tianschanica* Rühl) (17b) is a small form from China and Manchuria *kreitneri*. with the hindwing beneath more strongly and deeply yellow. — **kreitneri** Frir. (17c), from the Kuku-Nor *sulphurea*. and Amdo, is purer white above, with very broadly black cross-veins. ab. **sulphurea** Oberth. (17b) is an *transiens*. (accidental) aberration with light sulphur-yellow upperside. — **transiens** Alph., from Kham, approaches *bieli*, being darker than *thibetana*. From lack of material we are unable to decide, if it belongs to *hippia* or to *potanini*. *bieli*. — **potanini** Alph. (17c), from West China, of which we have likewise no specimen, has a peculiar reddish grey upper surface; the veins are not conspicuously dusted with black and the cell of both wings is lighter in tint than the rest of the wings.

GRAESER bred the larva of *hippia* in Amurland and sent winter-nests to Germany, where the larvae thrived. They feed on *Berberis amurensis* and *sinensis* and resemble (according to BUTLER) the larvae of *Arctiids*. They are covered with a short furry pile, being flesh-colour and bearing beautiful black spots on the black and at the sides; head, prothorax and anal segment black; the pile ferruginous on the 3., 4. and 12. segments, grey on the head and the prothorax, and testaceous red on the other rings. Pupa very similar to that of *crataegi*, many specimens not distinguishable from *crataegi*-pupae; ground-colour creamy, the black dots and stipples often united to form streaks. The butterflies in June, being common.

A. bieti Oberth. (17c) must be treated as a distinct species on account of the much narrower cell *bieti*. of both wings. In ♂ especially the apex of forewing, in ♀ the whole surface, but especially at the distal margin and along the veins strongly dusted with black, but there occur also ♀♀ with entirely transparent dark wing-membrane. The ♂ is bright yellow on the underside of the hindwing (with the veins narrowly edged with fuscous), the ♀ being less yellow. Together with *hippia* in Central and West China (Ta-tsien-lu), not rare. Specimens in which the black dusting is still more ample, especially on the underside of the hindwing where it extends over the whole surface, are named by OBERTHÜR ab. **fumosa** (17d). — **martineti** *fumosa*.
Oberth. (17d) is probably also a form of *bieti* or *hippia*; in the shape of the hindwing it resembles more *martineti*. our *crataegi*, while in colour it agrees better with *hippia*, the veins-streaks being deep black, but very narrow, especially in the apical area of forewing. *A. bieti* reaches as far as Yunnan (South China), entering here the Oriental Region. Blackish and yellow specimens occur sometimes commonly, sometimes rarely among the typical individuals.

A. davidis Oberth. (17d). While the underside is rather similar to that of the preceding, the *davidis*. upperside approaches already the *Pieris*-type, there being in the ♂ a broad, black, white-spotted band along the distal margin of the forewing, not being continued on to the hindwing. In the ♀ this band may become strongly widened, occupying sometimes even the whole of the forewing, there remaining only a series of spots or streaks below the cell and another row before the outer margin. Distributed from Amdo through West and Central China.

Whether **A. venata** Leech (= *davidina* Oberth.) (17e) is the spring-form of *davidis*, we are not able *venata* to decide. But as all the known *Aporia*-species have only one brood, we doubt it. *A. venata* is smaller, the vein-streaks are closer together, the cell of the forewing is narrower and that of the hindwing rather considerably shorter. In the ♂ the hindwing above is pure white, the vein-streaks shining slightly through from beneath; in the ♀ the white-spotted marginal band sends out black streaks which extend as far as the cross-veins, the black colour being never so sharply marked as in *davidis*. Underside bright lemon-yellow. South-West China.

2. Genus: **Metaporia** Bth.

Large or medium-sized butterflies with stiff wings, their flight being sailing as in *Delias*. The generic differences from *Aporia* are slight, referring mainly to the shape of the antennae, which have no distinct club, but are gradually incrassate, and to the 4. subcostal branching off at a short distance from cell; palpus porrect. The butterflies have more markings than the species of *Aporia*, the arrowhead-shaped spots present in most species, especially on the hindwing, being characteristic. Like the previous chiefly Palaearctic, but also represented by several species in the adjacent districts of India.

M. procris Leech (= *halisca* Oberth.) (17e). Hitherto only the ♂ known with certainty, being lemon- *procris*. yellow above and beneath, which colour has disappeared in worn specimens (LEECH). On both wings there penetrates in between the veins a submarginal row of arrow-spots, which are most distinct on the upperside of the forewing, where they are occasionally united to a dentate band, being distinct also on the underside of the hindwing. — Ta-tsien-lu and Ni-lu, in the mountains at a considerable altitude, in July; appears to be very rare.

M. lhamo Oberth. (17e). Of this form from East Tibet only ♀♀ are known, which have the appearance *lhamo*. of being strongly melanotic specimens of *procris*. Whether *lhamo* is the normal ♀ of the preceding, not occurring in a paler colour-form, or whether it represents, like our *Pieris bryoniae*, the *procris* ♀♀ only at higher altitudes, cannot be decided till a more abundant material is available.

M. soracta Moore (18a). On the forewing a broad, black, luniform spot is contiguous with the *soracta*. cross-veins. Underside yellowish white, with the same markings as the upper and with short arrow-streaks at the distal margin of the hindwing. The species is widely distributed in North-West India, entering the Palaearctic Region in Kashmir. The butterfly is on the wing in May, being an exclusive inhabitant of the forest, avoiding open grassy localities. The larva feeds, according to MOORE, on *Berberis lycium*; grey on the back, a blackish interrupted stripe above the legs, dorsad from it a white and then a light grey stripe; head dark grey; body with single small hairs. The pupa slender, of the usual shape and colour.

- leechii.* **M. leechii** *Moore* (19a). Smaller than *soracta*. The discocellular band of the forewing broader than in *soracta*, also the submarginal band, which is continuous to the 1. median, thus isolating a complete row of white marginal spots. On the underside of the forewing the veins much broader black, the markings otherwise as above, but the apex pale yellow; the hindwing beneath uniformly pale yellow, all the veins broadly black, the arrow-spots broader and better developed than in *soracta*. — This species reaches the Palaearctic Region in Ladak, occurring otherwise in the north of India (**MOORE**).
- leucodice.* **M. leucodice** *E.* = *altensis* *Hagen-Rühl*, *belucha* *Marsh.*, *sorex* *Gr.-Sm.* (19a). Considerably smaller than *soracta*: white, with a black submarginal macular band which is united at the veins with the black marginal wedge-spots. Underside with a yellow tint, at the distal margin a row of dark wedge-spots, Tabargatai, Tian-Shan, Fergana, Sarafshan, Beluchistan and, according to **KIRBY**, also in California (not likely). — The form *illumina* *Gr.-Grsh.* (19a), from Persia (Shabkuh etc.), has the veins above and beneath more broadly black, the hindwing and the apex of the forewing being beneath pale yellow.
- naellica.* **M. naellica** *Boisd.* (19b). ♂ above dark grey-brown, with a submarginal row of large white spots on the forewing; distal margin of hindwing yellowish white, with the exception of the dark edge, the dark arrowheads extending into the dark marginal band. Forewing beneath dark, cell lighter, a submarginal row of almost quadrangular elongate spots which are yellow in the apical area and white posteriorly, and a discal row of spots of the same colour; hindwing beneath yellow, the veins broadly streaked with black-brown, the arrow-spots sharply marked. The ♀ above much lighter, with a discal row of light spots; hindwing above yellowish, darker at the base, with broad black-brown arrow-spots. — Patria: Tibet and North-Western India.
- phryxe.* **M. phryxe** *Boisd.* (19a). The ♂ above white (feebly yellowish), the external veins broadly streaked with black, the streaks beingawl-shaped in centre: at apex of cell of forewing a large black spot: underside more yellowish, the veins dark grey, the hindwing bearing a yellow basal spot. The ♀ exactly marked like the ♂, but the dark markings somewhat paler. — Time of appearance: May and June. This species, which occurs in Kashmir and North India, is placed in **KIRBY**'s Catalogue of Rhopalocera under *agathon* *Grny.*, but is certainly specifically distinct from it.
- caphusa.* **M. caphusa** *Moore* is probably a local form of the preceding insect. Somewhat smaller than *phryxe* and the markings considerably darker, the white streaks standing in the distal area of the wings of *phryxe* being in *caphusa* separated into two rows of white spots. Underside like upper. — The larva similar to that of *soracta*, occurring in two forms, one being reddish brown, the other green: feeds on *Berberis nepalensis*. The species flies in June in Tibet (Kunawur) and the adjacent districts of the western Himalayas.
- largeteui.* **M. largeteui** *Oberth.* (18b). All the veins broadly black-brown, the streaks being notably widened distally: parallel with the distal margin a black-brown shadowy band on both wings, being always distinct beneath, but sometimes obsolete above. In many ♂♂ the dark colour so extended on the underside that there remain only some spots of the light ground-colour. — One of the commonest butterflies at the upper Yang-tse-kiang, from I-chang into Tibet.
- delavayi.* **M. delavayi** *Oberth.* (18a). This species, of which **LEECH** says that it resembles a gigantic *soracta*, has the forewing white with dark cross-veins and blackish apex. The delicate blue-white colour of the hindwing has a Nile-green tint in consequence of the yellow colour of the underside shining through. On the disc of the hindwing, above and beneath, there is a delicate brown lunate band, which is absent from the upperside in many specimens, shining feebly through from beneath. — In West China, common.
- oberthuri.* **M. oberthuri** *Leech* (18c). One of the largest Whites. Similar to the preceding, but the hindwing bears black arrow-spots between the veins, there occurring also darker specimens in which the arrow-spots have nearly disappeared from the upperside of the forewing: ab. *saturata* *nov.* — This species is nearest to the South-Chinese *hastata* *Oberth.* from Yunnan, which will be dealt with in that part of the present work which contains the Indian Butterflies. Not rare in Central and West China.
- lotis.* **M. lotis** *Leech* (18d). Not much larger than *crataegi*. The basal area bluish white on both wings, the distal half black-brown. The forewing has a white subapical band and an oval spot between the first 2 median branches near the apex of the cell. Hindwing with white paired marginal spots. — In West China.
- acraea.* **M. acraea** *Oberth.* (18d). Similar to the preceding, but lighter, the dark markings much paler, the ground-colour yellowish white: forewing above with a complete white median band and both wings with light marginal spots. — This form, perhaps a local race of *lotis*, occurs doubtless in West China, but exact localities are not yet known.

M. larraldei Oberth. (18d). Very similar to *lotis*, but the white marginal spots are replaced by *larraldei* submarginal ones, the underside also being very different in consequence of the greater extension of the black colour, which renders the arrow-spots indistinct. Very dark specimens, in which the black-brown colour is prevalent, are named var. **melania** by OBERTHÜR, who believes that this form is restricted to *melania*. certain localities near Ta-t sien-lu; however, it occurs also at Pa-tse-fang. Another form of this species — ab. *nutans* Oberth. — occurs outside the Palaearctic Region (in Yunnan).

M. paracraea Nicér., from West China (Tse-kou), is obviously a local form of *larraldei*. The white *paracraea* colour is still more reduced on the inner marginal area of the upperside of the hindwing than in *melania*, but the forewing has, above, a complete row of white submarginal spots, there being moreover a white discal wedge-spot between the 2. and 3. median branches. The yellow markings of the underside are more deeply coloured and the dark arrow-spots extend almost to the outer margin, being all well developed also on the forewing. The butterfly bears a great likeness to *oberthuri* in all its markings, but the colour of the light parts of the underside is very different, agreeing more with that of *larraldei*.

M. goutelli Oberth. (18e). All the veins as well as the submarginal arrow-spots situated in the *goutelli* marginal cells are black, these spots being well developed; in ♀ the whole forewing shaded with black. — In West China; according to LEECH the ♂ very plentiful, the ♀ however very rare.

3. Genus: **Mesapia** Gray.

In neuration there is no difference from the previous genera, but the wings have a peculiar rounded shape and the palpus and thorax are strongly shaggy. This insect is like the species of *Baltia* an inhabitant of high altitudes (15—18000 feet). Only one species.

M. peloria Hew. (18a ♂, 19b ♀). The ♂ above white with a yellowish flush, the distal margin *peloria* being almost completely transparent; hindwing beneath ferruginous yellow on the inner area, the veins being broadly black. In ♀ the upperside of the forewing and the underside of the hindwing yellow, with broadly black veins, the upperside of the hindwing being yellowish white with black marginal wedge-spots. — Occurs in North-East Tibet (Kuku-Nor), being apparently rare.

4. Genus: **Davidina** Oberth. .

According to the figure given by LEECH this butterfly has 5 subcostals, OBERTHÜR's figure showing even 6 subcostals, this figure being doubtless incorrect. As we have no specimen of this very rare species at our disposal, we are naturally unable to give correct details. According to LEECH's figure the 3 discocellulars are all well developed, while the upper one is absent from OBERTHÜR's figure. These differences appear to prove that the two authors had before them specimens of different species, the figures given by these authors being so very distinct in appearance that it seems to me questionable if LEECH's *D. armandi* belongs to the species described by OBERTHÜR. Both figures show a conspicuous forked fold in the cell of both wings.

D. armandi Oberth. (19b) is a medium-sized, white, faintly yellowish butterfly with dark veins and *armandi* short internervular streaks at the distal margin, the hindwing beneath being rather more deeply yellow in the basal area. — OBERTHÜR's type was found on the highest point of the Pe-hoa-chow in North-West China.

For the reasons given above we are obliged to treat the butterfly figured by LEECH as a separate species, which we call **alticola** (19b ♂). Whether it will be necessary to erect a separate genus for this *alticola* insect, we are not able to decide with certainty for lack of material. However, if the structural differences above pointed out from the figures should turn out to actually exist, *alticola* would have to be placed into a separate genus, for which we propose the name *Leechia*. The colour of *alticola* is dirty yellow above and beneath, the upperside however being so strongly shaded with fuscous that there remain only yellowish spots situated proximally in the marginal cells; the veins dark, the margin bearing, besides, short dark internervular streaks above and below. The ♀ is lighter at the wing-margins. Antenna very short, being only about half the length of the cell of forewing; palpus projecting far beyond head. — This species occurs in Central China (Chang-Yang).

5. Genus: **Delias** Hbn.

The species of *Delias* differ from *Pieris* in the forewing having 3 instead of 4 subcostals. Almost all the species are bright-coloured, mostly on the underside. The genus has, in the Palaearctic Region, only one species and several local forms of Indian species. The erection of the genus *Piccarda* Grote for *eucharis* Drury and allies appears to us unnecessary, the more so as the distinguishing characters given are

unimportant or even incorrect. The larva of *D. aglaia* L. feeds on *Nauclea cadamba*, that of *D. eucharis* Drury on *Loranthus longiflorus*. The larva of *D. aglaia* is flesh-colour, bearing on each segment 3 rather long yellow bristles, the head being dark. The pupa has pointed tubercles at the sides and is of a dark colour. The larva of *D. eucharis* is brownish, bearing small bluish white spots at the sides, the thoracic legs, head and anal prolegs being dark. The pupa is yellowish with black spots.

belladonna. **D. belladonna** F. (19c ♂). The range of this species reaches from North India to West China (Omei-Shan and Mupin), flying in the Palaearctic Region at altitudes of from 3 to 4000 ft. in July and August. This fine butterfly is black, bearing a discal and a submarginal row of whitish spots on both wings, a large, sharply defined, bright yellow spot at the costal edge of the hindwing and yellow dusting at the hindmargin of this wing. The underside is lighter coloured, the whitish markings are better defined, being replaced by yellow spots on the hindwing, the forewing also bearing 3 small yellow subapical spots. The ♀ has the ground-colour somewhat paler and the light markings are rather larger.

sanaca. **D. sanaca** Moore is an inhabitant of the western Himalayas, but is said to have also been found in Tibet (Kunawur). This species flies in India in May and June. The butterfly keeps shy of sunshine, flying only in shady places, especially underneath horse-chestnuts; it is a very fast flier. Of the same size as *subnubila*, the forewing being greyish black with white markings in the cell, on the disc and at the distal and hind margins. Hindwing yellowish white, deeper yellow distally at the abdominal margin, the veins being dark; cell broadly margined with fuscous; at the distal margin shadowy halfmoons, the margin itself being narrowly fuscous. Underside with more extended light markings; the hindwing pale yellow except a row of large white discal spots, the veins being fuscous and the dark submarginal halfmoons broader than above. The ♀ is somewhat darker above and beneath.

subnubila. **D. subnubila** Leech (19e ♂) is a local form of the much lighter coloured *sanaca* Moore from the western Himalayas. Paler than *belladonna*; upperside at the distal margin with whitish halfmoons, which are almost round beneath; on the disc and in the cell there are broad pale streaks; the widened pale yellow streaks of the underside of the hindwing are edged with white. Occurs in West China (Mupin, Huang-mu-chang and Pu-tsu-fong), in July and August. — In Central China (Chang-Yang) there flies in June and July *adelma* Mitis (19e ♂), which is a darkened form of *subnubila*.

patrua. **D. patrua** Leech (19b ♂), which flies in Central China (Chang-Yang) in June and July, is distinguished by the total absence of the yellow basal costal streak from the upperside of the hindwing. The light submarginal spots are but small and the discal spots streak-like, being narrow; the yellow markings of the hindwing beneath are also very much reduced, the yellow basal costal spot being on the contrary well developed. — In *lativitta* Leech (19c ♂), from West China (Ta-tsien-lu and Mupin), the light markings are much more distinct; the forewing bears a broad white stripe at the inner margin and the hindwing has also above the yellow basal costal stripe, which is however much narrower than in *belladonna* and *sanaca*.

stollii. **D. stollii** Btlr. (= *antonoe* Stoll) (19d), from "China", is most likely only an insignificant local form of *D. (Piccarda) hierte* Hbn. from India and Indo-China. The ♂ is white above; the forewing has black-streaked veins and bears an indistinct submarginal band of black spots, the hindwing having a reddish flush. The underside of the hindwing bears a marginal row of red spots and the inner area is chrome-yellow except some white submarginal spots. The ♀ is much darkened above, being blackish brown.

6. Genus: **Pieris** Schrk., Cabbage-Whites.

As already stated above, *Pieris* differs from *Delias* in having 4 subcostal branches. While *Aporia*, *Metaporia* and *Mesapia* have the wings very thinly scaled, they are thickly covered with scales in *Pieris*, being chalky. Upperside white, with few black markings, only occasional specimens being yellowish and some mountain and arctic forms darkened; underside white or yellowish, with black or yellowish green markings. Most species are common, some being noxious to cultivated plants. Larva feeding on herbs. — In the Palaearctic Region represented by a few species only, but abundantly developed in the Tropics.

brassicae. **P. brassicae** L. (19d, spring-form). ♂ white above, with the apex of the forewing and a spot at the apex of the hindwing black; the forewing beneath white, with 2 black discal spots, the hindwing yellow, being dusted with black atoms. In the ♀ the black markings rather more strongly developed; it

has moreover 2 large roundish black spots on disc and a diffuse streak-like spot at the hindmargin of the forewing. Basal area of wings darkened by black dusting. Underside not different from that of the ♂, but many specimens bear an indistinct blackish spot at the apex of the hindwing. — The summer-form is rather larger, and the underside of the hindwing much lighter yellow, being also less dusted with black; the yellowish tint of the upperside of the hindwing, which is frequently found in the ♀ of the spring-form, appears to occur but rarely in the summer-form. Therefore a special name is justified, and we propose to call the summer-form **lepidii**. — There occurs, rarely, an aberration which is uniformly shaded with smoky grey (found near Paris and Dresden), named by OBERTHÜR **obscurata**. — Distributed over the whole Palaearctic Region, with the exception of the high North and East Asia, in some places modified into local forms, as follows: — **chariclea** Steph. (20a), from the Azores (spring-form), is distinguished by the darkened underside of the hindwing. — **catoleuca** Rüb. (19e), from Asia Minor (Taurus, Syria, etc.), is a summer-form; larger, the black spots also larger and the underside of the hindwing much lighter. — **wollastoni** Bthr. (19e), from Madeira, but also occurring at Smyrna in March and April, is greenish grey on the underside of the hindwing. — **cheiranthi** Hbn. (19e), from the Canary Islands, is very large and the ♀ has larger, confluent, black spots, the upperside of the hindwing being yellowish; the underside of hindwing in both sexes yellow with blackish atoms, the black spots of the underside of the forewing being very large and confluent (♂ ♀). — **ottonis** (new name for the pre-occupied name *brassicoides* Stgr.), from Fergana, is the Central-Asiatic spring-form; the underside of the hindwing is strongly darkened and dusted with greenish black. — ab. **nigronotata** Jachont. is dotted with black above in the centre of the forewing, being found near Nishni-Novgorod in May and June. — Also a form with bright yellow upper- and underside has been found (in Silesia): ab. **lutea** nor. — **nepalensis** Doubl. (19e) is not restricted to India (Nepal), but occurs also in Tibet; it is likewise a large form; the black markings are wider, and the hindwing beneath is yellowish and dusted with black. — The larva of *brassicae* is bluish green with black dots and yellow dorsal and lateral stripes; the venter is grey with black dots, the head light grey with black dots and black margin, the legs being somewhat paler than the underside of the body. The pupa is yellowish green with black spots and dots; the head terminates in an obtuse process, and there are several small tubercles on the back. The larvae feed on cabbage (*Brassica*), garden-cress (*Lepidium*), etc. The conical yellow eggs are deposited in large numbers on the underside of the leaves. The larger percentage of the larvae does not develop into butterflies, being infested by a parasite (*Microgaster glomeratus* L.), the maggots of which leave the full-grown caterpillar, pupating upon the same (so-called caterpillar-eggs); a large percentage of the pupae is destroyed by another small Ichneumon-fly (*Pteromalus puparum* L.), which does not leave the empty pupa before spring; also some larger Ichneumons infest the larvae and pupae. The caterpillars, as already mentioned, are not readily eaten by birds, being poisonous for them, which is evident from fowls having died after being fed with such caterpillars. Appearing in 2 broods, in especially warm years even in 3.

P. deota Nicév. (= *roborowskii* Alph.) (20a), from Ladak, the Pamir highlands, the Issyk-kul, Lob-nor, etc., is somewhat smaller than *brassicae*, which it resembles. The black apical and distal marginal area of the forewing is narrower, extending however to the lower median branch; in centre of wing a small, linear, black spot or several dark spots; at the distal margin of hindwing there are black spots separated by the white tips of the veins. Underside of forewing with the apex and distal margin grey and 3 discal spots black; of hindwing strongly dusted with grey, bearing dark distal marginal spots and obsolescent dark discal ones. In ♀ all the black markings more strongly developed.

P. canidia Sparrm. (= *gliciria* Cr.) (20b) occurs in the whole of China, Corea, Turkestan and the Pamir as well as in India, on the islands of Hainan and Hongkong, the peninsula Kau-lung opposite Hongkong, and on the Loo Choo Islands. A very variable butterfly, there occurring specimens which deviate much in size as well as pattern. Therefore several forms have been distinguished: — **claripennis** Bthr., a light form in which the grey dusting of the forewing above is reduced, the black discal spots being absent: the hindwing beneath has the lower half of the cell and the space below the cell dusted with grey, and bears a broad yellow costal spot. — **sordida** Bthr. on the other hand is the form which is much darkened in consequence of the extension of the black markings; the underside is strongly yellowish, with little grey scaling, bearing an orange-yellow basal spot on the hindwing. — **palaearctica** Stgr. (20a), from Fergana and Bucharra, is a small, sparsely marked, form.

P. krueperi Stgr. (20b) occurs in Greece, Asia Minor, Persia and other districts of Western Asia. This species differs from its allies in possessing on the forewing a black subapical costal spot and several, well separated, black distal marginal ones. In the summer-form, which is name-typical, the underside is white with yellowish margins, while in the spring-form, **vernalis** Stgr. (20b), the larger proximal portion of the hindwing beneath is greenish grey. — The Central-Asiatic spring-form, **verna** Gr.-Grsh., is white.

mahometana, beneath, but bears dark markings. — The Pamir form, **mahometana** Gr.-Grsh., is above margined with black and beneath much darker. In the ♀ the black spots are enlarged and partly confluent.

devta. **P. devta** Nicér. (20b), from Ladak, Kaslgar and Samarkand, is white above with a reddish tint: forewing with the costal margin from base to apex of cell dark, a blackish costal subapical spot posteriorly produced into a point, a large roundish black spot on disc between the 1. and 2. median branches, and small blackish, wedge-shaped spots at the tips of the veins; on hindwing a small black spot at apex, blackish dots at distal margin and a grey shadow in the centre and at the base. Underside similar to upper, all dark markings more strongly developed; on hindwing the base and disc greenish and a spot at base brownish. In the ♀ the dark markings enlarged, otherwise this sex not differing from ♂. STAUDINGER and REBEL regard *devta* to be a summer-form of *krueperi*, while DE NICÉVILLE and MOORE consider it a distinct species.

rapae. **P. rapae** L. (29c). The summer-form is to be regarded as name-typical for this species. Its black markings are generally well-developed, the form being also larger than the spring-form **metra** Steph. (20c). In the latter the black markings are less developed, and the hindwing beneath is deeper yellow and more dusted with blackish. Among the individuals of this form the following aberrations occur: **immaculata** Ckll., the upperside strongly yellowish, the black markings almost or entirely absent, the base of wings dusted with grey. — **flavescens** form. nov. Upperside strongly yellowish, the dark apical marking indicated, but the black discal spots well developed, underside of hindwing and costal and distal margins of forewing of a beautiful yellow: occurs perhaps only in the ♀ sex. — To which brood **novangliae** Scudd. belongs, we have not been able to ascertain: this form, also mostly occurring only in the ♀, is canary-yellow; rare in Europe, more plentiful in North America. — **flavida** Petersen has a yolk-coloured upperside, the hindwing beneath and the tip of the forewing being also strongly yellow; in Finland, Kurland, etc. — **debilis**. Only slightly different from *immaculata* is **debilis** Alph., the apical marking of forewing being light grey or quite absent and in ♀ all the black markings strongly reduced. — Among the summer-brood the following forms occur: **messanensis** Zell., specimens with very large black spots and strongly developed apical marking. — In ab. **deleta** Strand the apical spot is very indistinct, being dusted with white, nearly as in *dubiosa*, the spring-brood: occurs in southern Norway. — Whether **dubiosa** form. nov. (20c) belongs to *rapae* or is a distinct species cannot be decided with certainty from the meagre material at present at disposal; somewhat larger than *krueperi*, more narrow-winged, the black apical markings united, but traversed by thin white veins, a black spot between 1. and 2. median vein on forewing and another at apex of hindwing, the lower discocellular of forewing thinly black; underside of forewing white, its apex and underside of hindwing pale yellow, the inner area sparsely dusted with black, at apex of hindwing a black obsolescent spot, last segment of palpus black, with few white hairs: appears to be restricted to the southern portion of the Region (Andalusia and Asia Minor). — **leucosoma** Schaw. is, as suggested by the author, the third brood (which occurs only in exceptional cases); thorax and abdomen white: beneath, a lemon-yellow streak in cell of forewing, hindwing pale yellow without dark dusting; width of the black apical marking of upperside variable, wings conspicuously rounded, especially the hindwing. — Specimens of the summer-brood with the upper- and underside of a dark brown and the median spots united to a band have been named **fasciata** by TRTT; this form occurs probably only in the ♀. — The following local races of *rapae* have been described: **crucivora** Btlr. (20d), from Japan, as large as Central European *brassicae*, the black markings strongly developed, hindwing below with a yellow costal streak. — **orientalis** Oberth. (= *mandschurica* Spr.) (20d), from Dauria, North China and the Amur, is as large as *crucivora*, the black markings of the upperside are less developed and the underside is less yellow. — **similis** Krulik. (from the same localities?) has the upperside of forewing darkened with grey, the black spots being small; the ♀ light yellowish. — **minor** Costa, from Toscana, is only a small form of *rapae*. — In **leucotera** Stef. the dark apical markings have almost or entirely disappeared and there is a brownish grey stripe in the cell of the hindwing beneath; flies in Central Italy in April and May. — **kenteana** Stgr., from Kentei, is a ♂-form with 2 small discal spots on the forewing below, the apex of forewing and the hindwing, beneath, somewhat yellowish. — **erganoides** Stef., from Toscana, is, as *ergane*, without black markings beneath, the apical spot of ♂, on upperside, is narrow and emarginate; the ♀ resembles above the ♀ of *ergane*, but the forewing — as also in ♂ — is broader (— an *ergane*-form?); flies in March and April. — In ab. **carruccii** Rostagno the upperside is white, having only a grey shade at apex of forewing; the underside almost without markings, the apex of forewing being beautifully chrome-yellow and the hindwing orange-yellow; in Italy. — In **viluiensis** form. nov. the dark markings are feebly developed or entirely absent; in the ♀ the dark basal area of the upperside is much more extended than in Central European specimens (almost as in the ♀ of *crucivora*), the discal spots, moreover, are only whitish grey, but this form is not larger than the name-typical *rapae*; underside of both sexes slightly yellowish, with dark scaling; from the Wilui R. (OTTO HERZ). — Egg of *rapae* yellow, pear-shaped, with longitudinal ribs and transverse folds: deposited singly. Larva velvety, dull green, with a thin yellow dorsal line, sides paler, with a narrow yellow stripe

in which are situated the black stigmata; abdomen beneath yellowish green; head brownish green; on various kinds of cabbage and on Reseda. Pupa yellowish, green-grey or brownish, with 3 yellow stripes (SPULER).

P. manni *Mayer* and *rossii* *Stef.* are treated by us as forms of a separate species in accordance with the observations of Count EMILIO TURATI communicated to us by letter. The larva is not yet known, but the shape of the pupa appears to afford sufficient proof of the specific distinctness of the insect. The pupa is not greenish as the *rapae*-pupa, but whitish with a reddish tint, being without dark dots and other markings. The spring-form *manni* differs from *rapae* gen. vern. *metra* in the underside being much lighter, and the black markings, especially above, being much more extended. — The summer-form **rossii** *Stef.* (20d) is beneath not much lighter than *manni*, and also above the black markings are only slightly reduced, though being dusted with white. The species occurs in Italy, the Tyrol, South-Western Europe, according to ELWES also in Tura, according to the material before us in the Taurus, and probably also in other districts of Asia.

P. ergane *Hbn.* (= *narcaea* *Frr.*) (20d), from South-East Europe and Asia Minor, is beneath devoid of black markings in ♂ and ♀. The seasonal forms appear to differ only slightly; however, we have not been able to ascertain anything certain on that point. — **longomaculata** *Rostagno* is yellowish white above, the black spots of forewing are deeper in colour, larger, prolonged, the forewing beneath is straw-colour, with chrome-yellow apical spot, the hindwing beneath being also chrome-yellow. — In ab. ♀ **magnimaculata** *Rostagno* the black spots are still more developed than in *longomaculata*, while in ab. ♂ **semimaculata** *Rostagno* the upperside of forewing, except the dark apical spot, is entirely white. These 3 forms have been observed in Central Italy. — Larva dull blue-green, head bluish green, the whole body dotted with numerous small black white-hairy warts, mouth-parts pale brown, the stigma-line represented on each segment only by a yellow spot, in which is situated the dark-brown-edged light brown stigma, thoracical legs coloured like the body, claws light brown, prolegs with light brown soles (SPULER).

P. cisseis *Leech* (20e) is a very rare species from Chang-yang. Upperside white, with yellowish tint, the rather broad black apical marking extends to the 1. median vein, between the 2. and 3. median veins a large, black, sharply defined spot which is connected with the black distal margin by a dark shadow, a smaller and paler black spot between 1. median and the submedian vein, another rather broad, streak-like, spot on the discocellulars. Hindwing without markings, apart from some shading in the basal area. Underside of forewing white, the apex yellowish, without black apical marking, the black spots situated between submedian and 1. median, 2. and 3. median, and on the discocellulars are present; hindwing beneath pale yellow, without markings.

P. melete *Mén.* (21b), from the Amur, Ussuri, Himalaya, Corea, China and Japan, is a very variable species. The name-typical summer-form is large (rather larger than *brassicac*), the black markings being well developed; hindwing beneath with a short yellow basal costal streak. — **mandarina** *Leech* is the North Chinese summer-form; larger than *melete*, the apical spot larger, and the discal spots strongly developed; the ♀ washed with fuscous, the veins broadly blackish; in both sexes the veins black beneath. — Of the spring-brood the following 5 forms are known: **aglaope** *Motsch.* from Japan; only as large as *napi*, *aglaope*, the ♂ white, apart from the apical marking, only the hindwing with slightly blackened veins; the ♀ however has above large black, almost square, spots. — **megamera** *Bthr.* from North Japan; a large form with reduced markings, the ♂ above with narrow, non-continuous, apical marking and strongly obsolescent discal spots, the ♀ with better developed markings, the discal spots of forewing being especially well developed; the hindwing beneath yellow in both sexes. — **dulcinea** *Bthr.* from North-East Corea; very similar to *megamera*, upperside milky white with more strongly developed dark markings; underside milky white instead of yellow. — **veris** *Stgr.* (21b), from South-Western China, is smaller than *melete*, ♂ white above, except the not sharply defined blackish apical marking and the narrowly fuscous veins; the ♀ with broadly black veins, the apical spot represented by a costal streak, the black discal spots being reduced; this form is especially characterized by the sharply defined and broad black vein-strips of the underside; the yellow costal spot of the hindwing beneath is also sharply marked. — **erutae** *Pouj.* from East Tibet: larger than *napi*, ♂ above greenish white, with a black discal spot on forewing, the veins of both wings slightly blackened, being beneath more or less edged with brownish; ♀ with more rounded wings, the veins more broadly black, the apical spot of forewing above very large, the two black discal spots also large, on hindwing a black costal spot, underside as in ♂, but the vein-streaks broader. — Larva resembling that of *daphidice*; feeds on *Arabis hirsuta*. The butterfly is very common.

P. ajaka *Moore* (20g) is treated as a distinct species by MOORE, while LEECH, ELWES and *ajaka*. DE NICÉVILLE consider it a form of *melete*. It is an Indian insect which however crosses the southern

boundary of the Palaearctic Region in Tibet (Kunawur) and Kashmir. About the size of *brassicae*, but more narrow-winged, pure white above with black markings, yellowish beneath, especially on the hindwing, which bears a yellow costal stripe. — The spring-form, *ajanta form. nov.*, is much smaller, being about as large as *rapae*, slightly yellowish above, with the markings much smaller and pale blackish.

melaina.

P. melaina spec. nov. (20♂) from Tibet. ♂ above light yellowish white, the proximal edge of the black apical area almost straight down to the 3. median vein, being shallowly emarginate between 3. and 2. median vein, where there is a diffuse black submarginal spot, which is united with the black distal marginal band by black atoms, the veins thinly black, the base of the forewing and nearly the basal half of the costal margin blackish; hindwing with the same ground-colour as forewing, at apex an elongate blackish spot, the veins thinly black, at the distal edge more broadly black, the base blackish. Underside of forewing white, yellowish at apex, the blackish vein-streaks moderately broad, a short black line extending from apex of cell backwards, an interrupted blackish submarginal line; hindwing pale yellow, the blackish vein-streaks moderately broad. Upperside of ♀ more or less yellow, with the blackish markings much widened, the ground-colour of the forewing being reduced to spots, hindwing less distinctly marked; markings of underside as in ♂, but the ground-colour deeper yellow.

extensa.

P. extensa Pouj. (21a), from Tibet, is smaller and, above and beneath, less variegated than *eurydice* Leech from West and Central China. Both are considered by LEECH forms of one separate species, while STAUDINGER and REBEL treat them as belonging to a local form of *melite*.

tadjika.

P. tadjika Gr.-Grsh. (20e). Upperside white, with obsolescent blackish apex to forewing and a row of black spots between the 3. median vein and the hindmargin; at apex of hindwing an elongate black spot, base of wing darkened. Underside of forewing white, apex and costal margin darkened, the black spots as above, but somewhat smaller; hindwing beneath light yellow, with blackish atoms and a very obsolescent apical spot. The ♀ has the forewing dusted with grey, the black spots are enlarged and the hindwing is yellowish. Patria: Pamir highlands and Southern Fergana.

napi.

P. napi L. (21b). Spring-form: upperside white with black markings; underside of forewing white, apex yellow, veins fuscous, more or less broadly so, usually 2 small discal spots; hindwing beneath more or less yellow, the veins themselves of the yellow ground-colour, but on both sides edged with greenish grey. Among this form there occur more or less commonly aberrant individuals: ab. *nana nov.*, a very small ♂-form with the forewing above slightly yellowish; the apex shows no interrupted black area, but only a greyish darkening at the extremities of the veins; besides the dark base of wing no other markings above; underside of forewing white, the apex pale yellow, the veins in the anterior portion of the wing grey, otherwise no markings; underside of hindwing light yellow with dark-edged veins. — As ab.

impunctata.

impunctata form. nov. we designate those ♂♂ which have on the upperside no other markings than the normal black apex to the forewing and the fuscous wing-base, and from which also the discal spots of the

verna.

underside of forewing are almost or entirely absent. — ab. *verna* Strand, from Southern Norway, is distinguished by the hindwing beneath being more strongly dusted with fuscous, especially at the veins, and by the black apical spot of the forewing above being smaller and interrupted by the veins at the edge of the wing; the forewing more pointed than in *napaeae*. — In the neighbourhood of Vienna there occur

interjecta.

among the spring-brood ♀-forms worthy of note: *interjecta form. nov.*, like the following a transition to *bryoniae*, the vein-streaks of the forewing somewhat broadened, but not very prominent, the ground-colour

radiata.

of the upperside slightly yellow. — ab. *radiata nov.* (21c), still less yellow than *interjecta*, but the forewing above much more extendedly and diffusely darkened, the discal spots indistinct, being united with the vein-streaks, the hindwing on the contrary with sharply marked black costal spot and well defined streaks along the veins, these streaks running like rays from the cell to the distal margin; the dark markings on the

napaeae.

forewing below feebly developed. — The summer-form *napaeae* Esp. (21d) is on the whole somewhat larger, the black markings are more sharply defined above, but the underside is lighter, the dark vein-streaks of the hindwing especially much less developed, being sometimes nearly absent. Also among this

sulphurea.

form there occur more or less well defined aberrations: ab. *sulphurea* Schöyen (21c), ♀♀ with normal pattern, but sulphur-yellow upperside. — *meta form. nov.* (21c), ♀♀ with a slightly yellow tint on the upperside, the black markings on the distal portion of the forewing, less so on the hindwing, being very

virilis.

prominent though diffuse. — As a contrast to this form we have ab. *virilis form. nov.*, ♀♀ which — as the name implies — resemble the ♂♂ very closely: the upperside is white, except the blackish apex of forewing and a basal darkening of little extent, as well as a small black costal spot on hindwing; beneath, the forewing white with a very slight yellow tint at the apex, the hindwing very pale yellowish, the veins

sulphureo-

tincta.

being only feebly edged with fuscous. — As a separate form ab. *sulphureo-tincta* has been described by REUTER, being likewise a ♀-form, with the upperside dirty yellow and the hindwing beneath light yellow. — All these forms, though one or the other is more frequent in one district than in the other, occur

throughout the distribution-area of this species: Europe, Central, West and North Asia, North Africa and the adjacent islands. However, certain districts (the higher mountains and higher latitudes) harbour special, endemic, forms: — **intermedia** *Krulik.*, from South Russia, South Siberia, West Asia and the Altai Mts., *intermedia*. forms a transition to **bryoniae** *O.* (21c), which inhabits the Alps, Northern Scandinavia and the mountains *bryoniae*. of Asia Minor; the ♂ of the latter is rather more narrow-winged than *napi*-♂♂, not bearing any markings on the forewing above except the blackish apical and basal areas; the ♀ has a yellowish ground-colour, which is however more or less suppressed by the great extent of the dark scaling situated along the veins. Among the ♀♀ there occur specimens in which the discal spots and the vein-streaks of the forewing are strongly obsolescent, there being consequently no prominent marking; we name this form ab. **obsoleta** *nor.*; *obsoleta*. individuals in which the yellowish ground-colour, especially on the forewing, is almost entirely suppressed by the greater extension of the dark scaling may be named ab. **concolor** *nor.* — In arctic Norway there *concolor*. occurs ab. ♀ **immaculata** *Strand*, the black spots of the forewing above being completely, or nearly, *immaculata*. absent. — The form **kamtschadalis** *Bang-Haas* i. l., from Kamchatka, is in ♀ somewhat paler than *bryoniae* *kam-* and the discal spots of the forewing are less sharply marked, the hindwing beneath being much paler. — *lschadalis*. As **sabellicae** *Steph.* (= *nigro-venosa* *Selys*) are to be regarded those sharply marked specimens in which *sabellicae*. the spot situated between the 2. and 3. median vein is merged together with the apical area. — In June and again in August there flies in Tuscany **meridionalis** *Rühl.*; a larger form, less marked with black, the *meridionalis*. hindwing below being almost unicolorous and the veins only very slightly edged with fuscous. — The form **orientis** *Oberth.* (21d), from the Amur, Central China and the island of Askold, is much larger than *orientis*. European specimens; in the ♂ the hindwing beneath is not chrome-yellow but chamois-colour with a slight admixture of greenish; the ♀ resembles the *bryoniae*-♀ very closely, but the ground-colour is not yellowish but white. This butterfly is on the wing in May. — **heptapotamica** *Krulik.* is very similar to *orientis*, but *hepta-* much smaller, beneath however not being different from *napaeae*; flies in June and July in the province of *potamica*. Semiretshje (Russian Asia) together with *napaeae*. — **sifanica** *Gr.-Grsh.*, from Amdo, is nearly as large as *sifanica*. *orientis*; in ♂ the veins are broadly edged with greenish black beneath; it has not yet been ascertained if *sifanica* is really different from *orientis*. — The North American forms *hulda* *Edw.*, from Alaska, and *frigida* *Scudd.*, from Labrador, will be dealt with among the American Pierids. — Larva of *napi* dirty green, densely short-hairy, with a yellow stripe above the legs, small white tubercles and black dots, stigmata black edged with yellowish; feeds on cabbage and Reseda. Pupa greenish yellow, with black spots and dots. Egg pear-shaped, greenish, deposited singly. Appears in 2, sometimes 3 broods.

P. ochsenheimeri *Stgr.* (21d). Upperside white with black markings as shown in the figure. *ochsen-* Beneath white, the veins of forewing narrowly, of hindly more broadly edged with grey-greenish, the *heimeri*. markings as above, but less developed and the apical spot of forewing absent. ♀ similar to strongly marked *napi*-♀♀, but the markings diffuse. Patria: South Fergana and Namangan.

7. Genus: **Leucochloë** Röber, *gen. nov.*

This genus differs from *Pieris* in the subcostal having 3 branches, from *Delias* in 2 of these veins branching off proximally to the angle of cell and in the antennal club being nearly button-shaped. Only 2 Palaearctic species. — We find it necessary to introduce a new name for this genus. Type of the Hübnerian genus *Synechloë*, in which genus *daplidice* has hitherto been placed, is *callidice*; however, *daplidice* is not congeneric with that species. *Chloridice*, which hitherto also stands in *Synechloë*, doubtless also does not belong there, agreeing in neuration much better with the genus *Euchloë*.

L. daplidice *L.* (21f). This species occurs throughout the Region, being absent only from the *daplidice*. high North. It flies in 2 broods. The ♀ differs from the ♂ in the greater extension of the black markings, especially on the hindwing, which is almost white in ♂; *daplidice* is the summer-form, **bellidice** *O.* *bellidice*. (= *belemida* *Hbn.*) (21f) being the usually somewhat smaller and beneath much darker green spring-form. — Specimens in which the otherwise white portions of the wings are darkened by a strong admixture of black scaling belong to ab. **anthracina** *Schultz.* — **raphani** *Esp.* (21f), from South Europe, *anthracina*. Asia Minor and West Asia, is a summer-form with yellowish instead of green markings on the underside *raphani*. of hindwing. — In **albidice** *Oberth.* (21f) the markings of the underside are not only very pale, but also *albidice*. more or less obsolete; from Algiers. — **persica** *Bien.*, from Persia, is smaller, the underside has greenish *persica*. yellow markings, the veins are pale yellow; the ♀ is darker, but has always a strong yellow admixture. — ab. **flava** *Oberth.*, from Biskra, belongs to the spring-form, above yellow in ♂, light green in ♀. — **moorei** *form.* *flava*. *nor.*, from Tibet and Kashmir, is very large, strongly marked, the light green markings being much extended *moorei*. beneath, the hindwing bearing a deep yellow basal costal streak. — Larva bluish grey, with 2 yellow longitudinal stripes on each side, head yellow, venter blue grey; feeds on the seeds of Reseda, Turritis,

Sisymbrium. Sinapis and Alyssum. Pupa green, brownish or grey, with yellowish white lateral stripes on the abdomen. Flies in spring and again in July-August.

glaucanome.

L. glaucanome *Klug* (= *vipassa* *Moore*) occurs in Arabia, East Africa, South Persia, Egypt, Kashmir and Tibet. Above very similar to *daphidice*, but smaller, hindwing beneath with large white marginal spots. —

iranica. **iranica** *Bien.* (summer-form) (20 f) is larger and has only slight greenish markings at the distal margin and on the disc of the hindwing. — Larva light green, thickest in centre, with yellow longitudinal stripes and black dots, head light green with black punctures.

8. Genus: **Belenois** *Hbn.*

Subcostal with 4 branches, 2 of them proximally to apex of cell, middle discocellular much longer than in the previous genera; antennal club large, elongate-ovate. Only 1 species in the Palaearctic Region. The larvae live gregariously on various plants, large numbers, often hundreds, being found on a single bush. The butterflies congregate often in swarms. Emerging from the pupa sometimes already after 5—6 days.

mesentina.

B. mesentina *Cr.* (= *aurota* *F.*, *lordaca* *Walk.*) (21 d, e). This species, which inhabits Africa, Arabia and India, occurs also in the south of the Palaearctic Region, Syria and Persia, and presumably also in Kashmir and Tibet. Above white with black apical markings, a black spot at apex of cell of forewing and smaller black markings at the distal margin of hindwing; in the ♀ the apical markings are widened, also the hindwing has larger marginal markings, bearing also some small black spots in the centre. Underside yellowish white, with the markings as above but more feebly developed, the hindwing bearing a dark discal band. In the tropics split up into several local races. — The egg semiconical, shining yellow, deposited on the upperside of a leaf, a number close together, but not touching each other. The adult larva measures about 3 cm; cylindrical, somewhat incrassate towards head, green, fine-hairy, with a broad, chocolate, white-dotted stripe on the sides and a narrower yellow stripe above the legs, head brownish; feeds on various species of *Capparis*. Pupa grey, with pale spots.

9. Genus: **Synchloë** *Hbn.*

Antennal club large, distinctly contrasting with shaft, concave like a spoon; neurulation hardly different from that of the previous genus, the distinctive character of the genus being rather the pattern which differs essentially from that of *Belenois*, as can be seen from the figures. *Parapieris* *Nicér.* is synonymous with *Synchloë*.

callidice.

S. callidice *Esp.* (21 e) occurs in the southern Alps of Europe, in the Caucasus, Asia Minor, Persia, South-West China, Tibet, Kashmir and the north-western Himalayas; in the last-named district the species is extremely common, and here appears to be the original home of the insect. There are several local races. In the name-typical form, from the Swiss Alps, the Pyrenees and the Caucasus, the ♂♂ are white above with slight black markings on forewing, while the ♀♀ have very well developed marginal and submarginal markings on fore- and hindwing. The underside has greenish markings, which are arrowhead-shaped on the hindwing, the point of the spots being directed basad (i. e. in the opposite direction as in the *Metaporia-chrysidice* species). — **chrysidice** *H.-Sch.*, from the mountains of Asia Minor and Persia, is more uniform in colour beneath. — **orientalis** *Alph.* (= *kalora* *Gr.-Grsh.*, *chrysidice* *Stgr.*) (21 e), from the mountains of Central Asia, has above more black and beneath less greenish markings, and **kalora** *Moore*, from the north-western Himalayas, Tibet and Kashmir, is beneath much more marked with green, the black markings above being more extended than in *callidice*, but less so than in *orientalis*.

dubernardi.

S. dubernardi *Oberth.* (17 f). Both sexes above almost the same in pattern: black distal margin, a black discocellular spot and another black spot in the 3. marginal cell, the hindwing being less extended black at distal margin. Forewing below with the larger inner portion white, the distal portion yellowish, the veins broadly edged with black, there being a blackish discal band between the 3. median and the submedian. Hindwing yellow, with broadly black-edged veins, with which submarginal spots are contiguous, there being also a yellow basal streak. Flies in May and July in West China; the ♂♂ are common, the ♀♀ much rarer.

chumbiensis.

S. chumbiensis *Nicér.* (20 e ♂), from Tibet, closely resembles *dubernardi* above, but differs, besides the wing-shape, in the lighter underside of forewing and the darker one of hindwing, the light-coloured veins contrasting strongly with the ground.

kozlovi.

S. kozlovi *Alph.* (17 f), from Nan-Shan, resembles in ♂ above the ♀ of *dubernardi*, but the ♀ differs very much from that species: upperside yellow, with strongly developed black-brown markings, the hindwing

beneath darkened except the distal margin, the veins not being edged with black. — To solve the question if the 3 forms above described belong to one species or must be considered as separate species, a much larger material is necessary than is at present to hand.

10. Genus: **Appias** *Hbn.*

Of this large genus, which has numerous species in the Indo-Australian Region, about 10 in Africa and 2 in South-America, only one Indian form crosses, in West China, the boundary of the Palaearctic Region. The insect mentioned here-after belongs to the large group of white *Appias*- (*Tachyris*-) species. The genus exhibits an abundance of diverse forms, containing not only many species belonging to the present group, but also species with blue, yellow or olive-brown ground-colour. In neuration *Appias* is closely allied to the *Pieris*-type; the ♂♂, however, possess a characteristic sexual distinction in 2 brushes of stiff hairs placed on the underside of the abdomen near the anal aperture, serving secondary sexual purposes. The *Appias* are very fast fliers. The ♂♂ congregate in large numbers at puddles, the edge of brooks and other moist places on the ground, sucking the liquid and essentially contributing by their large numbers of individuals to the entomological character of the districts inhabited by them. In India swarms of these insects have repeatedly been observed. The sexual difference of the species of *Appias* is often extraordinary, for instance blue or red ♂♂ having white or yellow ♀♀, and white ♂♂ white or yellow ♀♀ with extensive dark markings. From this remark it will also be noticed that the ♀♀ are dimorphic.

A. paulina *Cr.* (20g) appears to be rare in the Palaearctic Region, hitherto only one specimen *paulina*. having been found at Ta-t sien-lu in West China, being obtained in July. ♂ above white with feeble silky gloss, only at apex and base often blackish, especially in Indian specimens; forewing beneath white with yellowish apical area, the underside of hindwing being light yellow without markings. ♀ likewise white, with black apical, marginal and submarginal markings and on hindwing a row of black marginal spots; underside white with slight silky gloss and feeble markings corresponding to those above.

11. Genus: **Euchloë** *Hbn.*

Differs from the following genus *Anthocharis* in the forewing having only one subcostal proximally to apex of cell and in the middle discocellular being very short or absent; *pyrothoë*, which we have to place here on account of the neuration, deviates not only in aspect but also in the 2. subcostal branching off either at apex of cell or shortly beyond, moreover, the 5. subcostal is absent; *chloridice*, too, stands isolated in this genus on account of the neuration, but is better placed here than in any other genus; the erection of special genera for these 2 species, we think, would be out of place, considering the scope of the present work. The species of *Euchloë* are exclusively Palaearctic and North-American, only one species, *falloui*, extends southward into Somaliland; the true home is North-America, where the majority (6) of the species occurs. These insects appear in 2 broods. *Phyllocharis* *Schatz* is a synonym of *Euchloë*.

E. chloridice *Hbn.* (= *rusciae* *Esp.*) (20f) inhabits South-Eastern Europe, Asia Minor, Persia, *chloridice*. South and East Siberia, West Asia, Tibet, Ladak and South-West China. The name-typical (spring-) form has dark green markings beneath. — The summer-form **aestuosa** *Stgr.* (20g) is beneath lighter in colour *aestuosa*. and has less markings. — **albidice** *Stgr.* (= *chloridice* *Christ.*) (20g), from Persia, is in the ♂ almost devoid *albidice*. of black markings above.

E. belemia *Esp.* (= *glauce* *Frr.*) (22a). Above white with blackish, white-spotted, apex and large *belemia*. blackish discocellular spot; underside of hindwing grey-green with sharply defined silvery white stripes, the apical area of forewing being similarly marked. — The summer-form **glauce** *Hbn.* (22a) has on the *glauce*. hindwing below broader, whitish, irregularly defined light bands with a yellowish admixture. — At Philippeville (Algiers) occurs the end of May a large form with yellowish white ground-colour, strongly developed apical marking and very large black central spot, the underside being more strongly green than in *glauce*; we designate this insect **distincta** *form. nov.* — The opposite development is observed in an *distincta*. aberration from El Kantara (middle of May) with the markings of the upperside obsolete, the white bands of the hindwing below much widened and the green bands strongly tinged with yellow: ab. **evanescens** *evanescens*. *nov.* — The summer-form from Palestine shows enlarged white spots in the apical area of the forewing above and strongly reduced yellowish green bands on the underside of the hindwing: **palaestinensis** *palaestinensis*. *form. nov.* — In Tunis occurs **desertorum** *Tur.*, a dwarfed form with the green bands of the hindwing *desertorum*. below reduced in width. — The species has so far been found only in South Spain, North Africa, the Canaries, Asia Minor, and Syria.

- falloui*. **E. falloui** Allard (22a). This species differs from the preceding in the shortened and obsolescent apical marking, which contrasts with the isolated and strongly developed central spot, and in the regular green and white bands of the underside. Flies in May in South Algiers (Biskra), extending southward to Somaliland. Seasonal forms of this species have not yet been observed.
- seitzi*. **E. seitzi** spec. nov. (20f) was caught by Dr. A. SEITZ the middle of May at Biskra together with *falloui*. The black marginal area reaches to the 1. median vein: the hindwing is yellowish, the silvery white bands of its underside are narrower and partly shorter, the green markings darker (without yellow but with grey admixture), being also somewhat differently placed, and the apical marking of forewing extends (as above) to the 1. median vein. This species is apparently still rarer than *falloui*.
- belia*. **E. belia** Cr. (= *crameri* Bth.) (22a). Above white with black apical markings and black middle spot to forewing. Hindwing beneath silvery white with regular yellowish green markings. — The summer-form **ausonia** Hbn. (= *belia* Esp.) (22b) is lighter beneath, and the ground-colour of the hindwing is not silvery, but merely white. This species (apart from the local forms described below) occurs in South *ansonis*. Europe, France, North Africa, Asia Minor and Armenia. — **romana** Calb. (22b), from Italy, forms the transition from *belia* to *ausonia*; the dark markings above are paler and the hindwing beneath has larger *simplonia*. white spots. — **simplonia** Frr. (= *marchandae* Hbn.) (22b), from the Wallis, Piedmont, the Pyrenees, and several Central Asiatic mountains, is considered a distinct species by Dr. ARNOLD SPÜLER: large, the middle spot on forewing above joined to the black of costal margin, also the underside of hindwing somewhat differently marked; the larva is said to differ from that of *belia* in being dotted with black and in the *kruegeri*. stigmata not being edged with white. — The summer-form, **kruegeri** Tur. (22b), from Sicily, has a broader greyish black apex to forewing, the hindwing below being sharply marked with dark green and white. — *trinacriae*. **trinacriae** Tur. (22c), likewise from Sicily and also summer-form, differs in the apex of forewing being strongly spotted with white and in the white spots of the hindwing below being strongly developed. — *matutia*. **matutia** Tur. (22c), also from Sicily, has, in contrast to the previous, only small white spots in the black apical area of forewing, the black middle spot being very large and the white spots on the hindwing *taurica*. below few in number and small. — **taurica** form. nov. (22c), from the Cilician Taurus (southern Asia Minor), has the apex of forewing above dusted with whitish and the spots of the hindwing beneath *uralensis*. yellowish green. — **uralensis** Bartel (22c), from the Ural and the Crimea, has large white spots on the underside of the hindwing and some admixture of yellow: forms a transition to *simplonia*. — In *pulverata*. **pulverata** Christ. (= *daphalis* Gr.-Grsh.) (22c), from Transcaucasia and Central Asia, the white spots in the apex of *orientalis*. forewing are confluent, while the hindwing beneath is green with numerous small silver-spots. — **orientalis** Brem. (= *tagis* Trybom), from North-East Siberia and Kamchatka, is smaller, "the base of wings blacker, below the apex of forewing is darker with distinct white longitudinal stripes before the fringe in cellules 3, 4, 5 and 6, the hindwing is likewise darker and not so strongly dusted with yellow than in *belia*, being interrupted by more numerous minute white dots and streaks, especially at inner margin near base, the spots from apex to anal angle are united to a scarcely interrupted band, the spots before the fringes more prolonged" (BREMER); STAUDINGER and REBEL consider *orientalis* a distinct species; flies in July. — Among *ochracea*. this form occurs **ochracea** Trybom as a yellow aberration. — At Batna (Algiers) flies, in May, a small form with reduced black markings on the forewing above, very broadly dark base and darkened hindwing (in consequence of the markings of underside shining through), the hindwing beneath very dark green with extremely slight yellow admixture and reduced white spots: **melanochloros** form. nov. — On the slopes *melano-* of the Darro (Andalusia) flies ab. **alhambra** Ribbe: forewing more pointed, the black costal spot prolonged *diloros*. blackwards, underside of hindwing very green, the white spots small and less numerous, sometimes *alhambra*. completely wanting. — Egg elongate, tapering above, brown-yellow, finally leaden-grey, with ribbed sides. Larva similar to that of *cardaminis*, greenish, with 3 stripes and white stigmata; on Cruciferae, especially *Sisymbrium irio* and *Barbarea vulgaris*. Pupa strongly tapering at both ends, brown with small black dots, sometimes not developing for two years (SPÜLER).
- daphalis*. **E. daphalis** Moore, from Central Kunawur, is presumably a separate species. Only the ♂ known. Above white, forewing minutely dusted with black at costal margin and apex, a large black spot at apex of cell; hindwing traversed by irregular pale green bands, with a faint apical stripe, a small spot at apex of cell and minute black fringe-dots. Forewing below with blackish dusting at costal margin, the spot at apex of cell with white centre, apex dusted greenish brown, minutely irrorated with silvery white; hindwing yellowish brown marked with numerous large and small silvery white spots. Somewhat smaller than *belia*. Flies at rocks in early spring (and probably a second brood in summer); not common.
- tagis*. **E. tagis** Hbn. (22d), from Portugal and South Spain, is very similar to *belia*, but the white spots of the underside of the hindwing are more sharply defined; flies from February till May. — *bellezina*. **bellezina** Boisd. (= *bellesina* Dup., *belledice* Hbn.) (22d), from South France, has on the underside of the

hindwing more white spots. — **insularis** Stgr. (= *tagis* Rbr.) (22d), from Sardinia and Corsica, has the apex *insularis*. of the upperside of the forewing lighter and the white spots of the underside of the hindwing smaller. — **mauretanica** form. nov. (= *pechi* Oberth.) (22d), from Algiers, is smaller than *tagis*, the white spots in the *mauretanica*. dark apex of the upperside are larger and united, the underside of the hindwing being dark green with rather small white spots. — The larva is dark apple-green, there being a white stripe along the feet with a bright-red one above it; from February till May on *Biscutella ambigua* and *Iberis pinnata*. Pupa angular, shorter than that of *A. cardamines*, dark flesh-colour, with a brown dorsal stripe, the wing-cases being edged with the same colour.

E. venosa Btlr., from West Tibet, is as large as *belia*; similar to *daphalis*, but the apex of the *venosa*. forewing darker, the white apical markings therefore being more prominent; the black spot at the apex of the cell larger and the markings of the underside of the hindwing shining through more distinctly. The underside very different from that of *daphalis*: forewing snowy white, with the costa spotted with black, the black spot at the apex of the cell centred with white, apical area dark olive-green, white-spotted as in *simplonia*, hindwing dark olive-green with pale yellow veins and silvery white spots, nearly as in *simplonia*. The ♀ differs above in the apex being darker and the markings of the hindwing shining through still more distinctly from beneath, and in the underside being brighter green and having the ends of the veins orange-yellow on the hindwing.

E. pyrothoë Er. (22e). Upperside white with narrow blackish apical spots, a large orange-red *pyrothoë*. apical spot and black median spot, on the underside the entire hindwing and the apical area of the forewing being yellowish green with band-like silvery white markings. The ♀ has the dark apical area of the forewing above much broader, there being a small orange-red spot in the posterior portion of this area. Patria: South-Eastern Russia, Kirghiz Steppe, and Central Asia.

12. Genus: **Anthocharis** B.

This genus is characterized by two of the five subcostal veins branching off before the apex of the cell, by the upper radial being only little united with the subcostal, and by the central discocellular being rather long. In all the species the ♂♂ have at least the apical portion of the forewing orange-red or yellow. Only one species inhabits also the northern districts of the Palaearctic Region, all the others are found in the south of the Region, also some species occurring in North America, but not one species extends into the tropics. In contrast with most species of the preceding genus, the *Anthocharis*-species have only one brood. The butterflies occur in spring.

A. tomyris Christ. (22d). Upperside yellowish, with blackish apex, the median spot, which is very *tomyris*. large in ♀, being also blackish, fringes red; underside of hindwing grey-green with the median spot and a costal spot white, the base of the forewing being yellowish. Occurs in Turan.

A. pechi Stgr. (20g), from Algiers, is white above, the apex of the forewing being slightly blackish; *pechi*. at the apex of the cell there is a large blackish spot; the underside of the hindwing is uniformly greenish yellow, with a yellow central spot.

A. charltonia Donz. (= *levaillantii* Luc.) (22e), from North Africa and the eastern Canary Islands, *charltonia*. has the upper- and underside yellow, with the apex black indistinctly spotted with white, and with large black median spot; the underside of the hindwing grey-green, with dispersed light dots. The ♀ differs in the tip of the forewing being more rounded and the apical area broader. — **penia** Frr. (22e), from northern Asia *penia*. Minor and Kurdistan, is lighter yellow, the median spot is obsolete beneath and the underside of the hindwing is more green. — **mesopotamica** Stgr. is brighter yellow, the apical area bears distinct yellow spots, *meso-* and the underside has an admixture of yellow. — **transcaspica** Stgr. (22e), from Turan and Northern Persia, *potamica*. *transcaspica*. is smaller, with more pointed wings, the ground-colour being whitish, and the forewing beneath having a large black central spot. — Dr. A. SEITZ observed in Algiers a *charltonia*-♀ depositing its eggs on the leaves of radish.

A. lucilla Btlr., described from the Western Himalayas, probably occurs also in the Palaearctic *lucilla*. Region. Upperside gamboge-colour, the black discocellular spot larger and square, the apical area blackish brown, its posterior angle obtuse, while its proximal edge is incurved and washed out; the yellow band in the apical area as in *charltonia*; underside of hindwing yellow, the white spot at apex of cell large and edged with grey, there being no light spots on the disc. Somewhat larger than *charltonia*.

A. bieti Oberth. (22ef), from West China (Ta-tsien-lu), has a white upperside, a black apical area, *bieti*. which is broader in the ♀, bearing in ♂ an orange apical spot; underside similar to that of *cardamines*: the distal margin pointed below the apex. — **decorata** form. nov. (22f), from the Kuku-nor, is smaller in both *decorata*. sexes, the fringes being very long, the black apical area of the forewing of the ♂ broader, the orange-yellow spot larger and contiguous with the black area, the underside, especially of the hindwing, more

sharply marked. In the ♀ the dark apical area reduced to 2 small subapical costal spots and a roundish patch standing between the 2. and 3. median veins.

cardamines.

A. cardamines L. (22f) occurs throughout Europe, Asia Minor, and Northern Asia, extending into China, in several geographical forms. In the ♂ of the name-typical *cardamines* the orange-red apical patch does not reach much further than to the black discocellular spot, the rest of the upperside being white with the exception of the narrowly black apical margin, the proximal area of the forewing beneath and the underside of the hindwing being likewise white, the latter with greenish ("parsley"-) markings, which are rather variable in extent. In the ♀ the orange-red apical patch is wanting, but the black apical marking is much wider and the black discocellular spot larger, otherwise the ♀ similar to the ♂. Among *turritis*, this race, erroneously called "Stammform" by German writers, there occur the following aberrations: *turritis* O. (= minor *Cock.*) (22f), which is almost confined to the south of the distribution-area, has a reduced orange patch, reaching only to the black median spot. — *hesperidis* *Newham*, a dwarfed form. — *alberti* *Hoffm.*: the orange patch more fiery, the black markings more prominent, the forewing beneath sulphur-yellow proximally, the underside of hindwing more strongly marmorated with green, bearing black dots. — *lasthenia* *Mill.*: the orange patch normal, the black median spot absent, the black apical and marginal spots present, the *ochrea*, base of wings entirely white, the hindwing beneath spotted with very light greenish yellow. — *ochrea* *Tutt*: *immaculata*, the hindwing almost entirely yellow, principally a ♀-form. — *immaculata* *Pabst*: without black median spot quadri- to the forewing. — *quadripunctata* *Fuchs*: all the wings with a black median spot above and below, this *punctata*, spot on the forewing above large and streak-like, anteriorly rounded off, truncate behind, the spot of the hindwing above thin and roundish, grey-black, beneath very large and deep black, situated within the green *phoenissa*, markings. — Of local forms we have to mention: *phoenissa* *Kalchb.*, from Syria, like ab. *turritis*, but purer *thibetana*, white beneath. — *thibetana* *Oberth.*, from West China, has the orange patch as in *turritis*, but the veins of *sajana*, the hindwing above are bordered with sulphur-yellow. — *sajana* *Bang-Haas* i. l., from East Sajan: orange patch enlarged, the basal area of the forewing above yellowish, being deeper yellow beneath, the markings *extensa*, of the underside of the hindwing more regular in shape and lighter. — *extensa* *form. nor.*, from China (Nanking), leads over to the next form, being a transitional link; almost the whole forewing orange-red, hardly one-fourth of the wing being light yellow, the orange deeper than in the other forms, but not so *speciosa*, dark as in *bambusarum*. — Whether *speciosa* *form. nor.* (22g), from Southern Styria, is a local or individual form, we are at present not able to decide; very large, the orange patch fiery, distinct black spots on the discocellulars and at the distal margin of the hindwing, the green markings of the hindwing beneath almost *orientalis*, regularly band-like. — *orientalis* *form. nor.*, from Bucharra, very large, the orange patch of a deep tint and almost as large as in *sajana*, upperside of hindwing darkened in consequence of the strong development of the greenish markings of the underside, slightly yellowish; forewing beneath deep sulphur-yellow in the proximal portion of the cell, the yellowish green markings of the hindwing strongly widened, the white ground-colour being much reduced. — In Asia Minor (Kara-Hissar) a pretty aberration has been found which *crocea*, has a lemon-yellow apical patch to the forewing, the patch being of the same size as in *turritis*: ab. *crocea* *form. nor.* — The whitish green eggs are deposited singly on leaves. Larva blue-green, with minute black dots, a whitish dorsal line on the first and fifth somites, and a white side-stripe, of which the dorsal edge is washed out, venter grey-green, head dark green with black dots; feeds in June and July on *Turritis glabra*, *Arabis*, *Sisymbrium*, species of *Cardamine*, etc. Pupa smooth, anteriorly slender, being produced into an obtuse dark process which is strongly curved back; green or brownish, with a white side-stripe, and thin reddish streaks; fastened with the head upwards (*SPÜLER*).

bambusarum.

A. bambusarum *Oberth.* (22h), from Tse-Kiang in China, is somewhat larger than *cardamines*, the whole forewing above and beneath is uniformly dull orange-red; the apex of forewing less broadly dark and not black, but greenish, the black discocellular spot less distinct than in *cardamines*, the hindwing very similar to that of *cardamines* above and beneath.

gruneri.

A. gruneri *Il.-Sch.* (22g), from Greece, Southern Turkey, and Asia Minor, is smaller than *cardamines*, but otherwise similar: the black apical markings broader in the ♂, the ground-colour of the upperside *armeniaca*, strongly yellowish. — *armeniaca* *Christ.* (22g), from Asia Minor and Mesopotamia, is more whitish above, *homogena*, and the orange-red apical patch proximally dark-edged. — ab. *homogena* *Rühl-Heyne* is an intermediate *diluta*, form. — Near Angora flies *diluta* *form. nor.*, which is distinguished by the less developed greenish markings of the underside of the hindwing, and in the ♀, besides, by the dark apex of the forewing beneath being almost completely without markings. — In Syria, where this insect does not appear to be plentiful, there occurs a special form: small, upperside pure white, orange patch reduced, reaching only to the black median spot and having no dark proximal edge: underside of hindwing with much extended white markings; *eros*, we propose for this form the name **eros**.

damone.

A. damone *Boisd.* (= *eunomia* *Frr.*) (22g), from South Italy, Sicily, the southern Balcan, Asia Minor and Syria, is in the ♂ lemon-yellow above and below, with a narrowly black apex, large deep orange-red apical patch, which is more or less dark-edged proximally, and with a large black median spot to the forewing; the underside of the hindwing deeper yellow, with grey-greenish markings. The ♀ is white above

and on the underside of the forewing, and has a broader blackish apex to the upperside of the forewing. — **pallida** *form. nov.* is the name for the form occurring in Mesopotamia; ♂ above somewhat paler yellow, the dark apex of the forewing is strongly mixed with red, the orange patch is less fiery, being dark-edged only in the cell, the black median spot is smaller, less prominent, the ground-colour of the hindwing beneath is lighter yellow, and the dark markings are more united to isolated patches. In the ♀ the black median spot of the forewing is smaller on both sides and less sharply marked, the underside of the hindwing being lighter yellow.

A. eupheno *L.* (= *douei* *Pier.*) (22h), from North Africa, is above very similar to the preceding, *eupheno*, but the orange patch is smaller and proximally more strongly edged with dark, the black median spot disappearing in the dark edge of the orange spot; however, the underside of the hindwing lighter yellow and differently marked, as shown in the figure. The ♀ is without the orange patch, having reddish yellow only in the apical area. — **androgyné** *Leech*, from Morocco, differs only in the ♀ in the stronger development of the reddish yellow apical spot. — Larva green, with yellow and black dorsal markings, very similar to that of *euphenoides*, on *Biscutella* (SPULER).

A. euphenoides *Stgr.* (= *eupheno* *Esp.*, *callenphenia* *Butl.*) (22h) is distinguished in both sexes only *euphenoides*, by the colour and markings of the underside of the hindwing, as can be seen from the figure. In the ♀♀ the colour of the apical area of the upperside of forewing is very variable, for there occur also specimens with rather large reddish yellow patch. — ab. **lecithosa** *Tur.*, hitherto only found in South France, has no orange patch in the ♂, but, like the ♀ of this form, a sulphur-yellow apical spot. — Larva greenish, with yellow and black dorsal markings, white lateral stripes and large black dots, head green; in autumn on *Biscutella*-species; it is a so-called cannibal-caterpillar. Pupa light brown, also green, very strongly incurved (SPULER).

13. Genus: **Midea** *H.-Sch.*

The structural differences of this genus from *Anthocharis* are very slight: the 2. subcostal originates closer to the cell, the 4. and 5. subcostals form a very narrow fork, and the praecostal is feebly bent outward. The shape of the wings, which is somewhat variable also in *Midea*, cannot serve as a distinguishing character, because *Anthocharis bieti* is the same in outline. The genus has only one representative in East Asia and several in North America.

M. scolymus *Btlr.* (23a), from West and Central China and Japan; the apex of the forewing produced and falcate; white above and below, with dark apical marking and black median spot on the forewing above, and a black spot at apex of hindwing; the ♂, moreover, has a moderately large orange spot in the apical area of the forewing, occurring occasionally also in the ♀ = ab. **virgo** *form. nov.* The butterfly *virgo*, appears in one brood and is common in swampy places. The larva feeds on cress.

14. Genus: **Zegris** *Rbr.*

This genus is characterized by the very strongly clubbed antennae and the bushy palpi, but especially by the shape of the larva and pupa and the manner of pupation. It contains only 3 species, of which 2 inhabit the Palaearctic Region, while the third occurs in North America.

Z. eupheme *Esp.* (= *erothoë* *Er.*, *tschudica* *H.-Sch.*) (23a), from South-Eastern Russia, Armenia and the Alatau, is above white with dark apex to the forewing, bearing an orange-red spot, the black median spot of the forewing being halfmoon-shaped. The orange spot is usually smaller in the ♀, being sometimes absent. The underside white, the forewing having a yellow apex and a black median spot, the hindwing being greenish yellow, with white spots. Specimens in which these spots are prevalent belong to ab. **tschudica** *H.-Sch.* (23a). — **menestho** *Mén.* (= *erothoë* *Frr.*) (23b), from Asia Minor and Western Kurdistan, has the underside of the hindwing more yellow, being also somewhat larger. — **meridionalis** *Led.* (= *eupheme* *Rbr.*) (23b), from Central and South Spain, is still larger, the almost uniformly yellow underside of the hindwing having grey-greenish markings. — Larva thick, cylindrical, densely hairy. Pupa stout, with in a dense cocoon, in which one finds, however, still a remnant of the thread characteristic for pupae of Pierids.

Z. fausti *Christ.* (23b), from Turan and Fergana, is smaller than *eupheme*; upperside white, with light brick-red, proximally black-edged, apex to the forewing and large black median spot; underside white, with reddish apex and black median spot on the forewing; the reticulate yellowish green markings of the hindwing much extended. Apex of forewing much more broadly edged with black in ♀, the orange spot being small or entirely absent.

15. Genus: **Baltia** Moore.

The butterflies of this genus belong to the smaller members of the family. In venation there is hardly a difference from the South American *Andina Stgr.*, the species of *Baltia* resembling also in aspect *Andina huanaco Stgr.* The members of both genera inhabit the highest mountains. As compared with the previous genera the neuration of *Baltia* is peculiar in as much as both radials of the forewing branch off from the subcostal nervure, the cell therefore being closed by the lower discocellular alone. Palpus projecting far beyond head, rough-hairy. Antenna with distinctly marked club. So far only 2 to 4 species are known, being represented by 3 to 5 forms. According to the neuration and the structure of the palpi and antennae, as well as according to the pattern and size, *Baltia* belongs into the neighbourhood of *Euchloë*, and not into the relationship of *Aporia*.

- shawii*. **B. shawii** Bates (23b). The ♂ is very similar to *B. butleri*, but the black markings are rather more strongly developed, the underside bearing dark spots in place of the marginal and submarginal striolation. In the ♀ the black marginal and submarginal band reach to the hindmargin. Patria: Pamir, Southern Fergana, Ladak, and in the Indian area the North-Western Himalayas, 15000—18000'.
- butleri*. **B. butleri** Moore (23b). In the ♀, as in the ♀ of the preceding species, the black bands extend to the hindmargin, and the black streak-like marginal spots of the forewing join the submarginal band. Hindwing darker than in ♂. Nan-Shan, Amdo, South-Western China, Kashmir, 15000—18000'. — In the form **potanini** Alph., from Mongolia, the ♂ is larger, being devoid of the black subapical band; the ♀ dark yellowish. — According to the author *B. sikkima Fruhst.* is a distinct species, while ELWES maintains that it is not separable from *shawii*. Occurs in Sikkim, i. e. not in the Palaearctic Region, at elevations of from 12000 to 15000'. — The form of *shawii* figured by GR.-GRSHMALLO in ROMANOFF'S Mémoires sur les Lépidoptères IV, t. 10, fig. 2a, b, from Turkestan, has been named by MOORE **B. baitalensis**. For lack of material we are not able to say, if this is really a special form or species.

16. Genus: **Teracolus** Swains.

This genus, which has been monographed several times during the last ten years, is composed of *Teracolus*, *Idmarns* and *Callosune*, formerly considered distinct. This separation into three genera was solely based on the external aspect of the ♂♂, not on structural differences. *Teracolus* is one of the most difficult genera as regards the separation of the species, as is sufficiently evident from the great discrepancies in the results attained by the various monographers (BUTLER, MARSHALL, E. SHARPE). Seasonal as well as sexual dimorphism in an extremely high degree occurs almost generally. In addition we find an extraordinary variability according to locality, so that many species are composed of 20—30 often widely different forms. Only very long series of specimens and some knowledge of the ethiology render it possible to group the forms fairly correctly. — The *Teracoli* belong to the smaller butterflies, being at the highest of medium size. Their ground-colour is white or yellow, the apex of the forewing being sometimes orange or scarlet, in some species hyacinth-blue, and mostly edged with black. The ♀♀ have the black markings mostly enlarged. — The antenna is rather short, somewhat curved, the club gradually widening, not being strongly developed. The forewing has 4 subcostals, of which 2 branch off before the apex of the cell; the upper radial is free, and the praecostal is curved outwards. — The *Teracoli* inhabit Africa south of the Sahara (only a single species occurring in North Africa), as well as Anterior Asia, the peninsula of India and Ceylon, being absent from swampy districts with luxurious vegetation. Their favorite haunts are inhospitable, rock-strewn, hot, dry districts, and arid steppes. They fly there restlessly over the plains in the burning sunshine, or sail up and down the rocks, now and again visiting a flower for a moment, with the wings half open as in *Anthocharis*, while they close the wings when sleeping. Many species are of an astonishing abundance. Dr. A. SEITZ, for instance, caught 18 *T. pleione* at a bush of *Capparis droserifolia*, the other individuals of this species, which fluttered around the bush in great numbers, not being frightened away by their mates being caught. However, the inaccessibility of the flight-places and the often unbearable heat of the sun at the always shadeless localities render the chase of these insects extremely weary. About 150—200 forms of *Teracolus* are known, which can be united to hardly as many as 50 species.

- fausta*. **T. fausta** Olivier (23c) occurs in Syria and Persia, being represented by local forms also in South Arabia, Afghanistan, and North-West India. Upperside reddish yellow, in ♀ somewhat lighter, with black distal marginal markings on both wings, black subapical markings and black median spot on the forewing; underside grey-yellowish with slight dark markings. Specimens from which the black middle spot of the forewing is entirely or nearly absent, the other black markings also being reduced, we name ab. **immaculata**. — Very light-coloured individuals from Beirut (♂ almost white, with the veins pale orange, ♀ white-yellow with *louisia*. a pale orange-yellow tint) have been described by NEUBURGER as ab. **louisia**.

T. calais *Cr.* (= *dynamene Klug*, *carnifer Bthr.*) (23d) is a local form of the Indian *amata F.*; it *calais*. occurs in South Persia, Arabia and Africa. Upperside flesh-colour with black marginal and submarginal markings, the median spot and a basal costal stripe on the forewing and the costal margin of the hindwing being likewise black. Underside dark sulphur-yellow with small black markings. The ground-colour of the ♀ is much lighter above and beneath and the dark markings are more extended. — Larva pea-green, paler beneath, a dark shade over the back. Some individuals have two dark white-dotted spots behind the head, others bear light longitudinal stripes. The head may be green or brown. On *Salvadora persica*. Pupa either green or yellow-brown, shaded with black. The eggs are deposited in clusters of 20 to 70, the larvae remaining together for a long time, being often infested by *Tachina*. CH. NURSE bred the differently coloured larvae and pupae from the same cluster of eggs.

T. phisadia *Godt.* (23d). Upperside of forewing salmon-colour, with broad black distal marginal band, *phisadia*. in which there are spots of the ground-colour; black median spot large, rounded; basal area darkened. Upperside of hindwing yellowish white, with broad black marginal band which occupies nearly half the wing. Underside sulphur-yellow, with some black submarginal spots in the posterior area, and on the forewing a black median spot. Patria: Arabia and North-Eastern Africa. — **palaestinensis** *Stgr.*, from *palaestinis* South Palestine, differs in the underside being brownish. — Larva pea-green; when young with 2 black spots behind the head, and on the 2. segment a white spot, which is edged with dark in adult specimens; two similar spots in the middle of the back and one on the 11. segment. Feeds on *Salvadora persica*.

T. pleione *Klug* (= *miriam Fldr.*, *chrysomelis Bthr.*, *eucheria Mab.*) (23c). Upperside orange-yellow, *pleione*. with blackish apical and marginal markings, blackish median spot, the hindwing of the ♂ being broadly white posteriorly and the costal margin of the forewing likewise white. ♀♀ with white upperside we designate as ab. **tethys** (23c). — Larva brownish when young, later pea-green, somewhat rough, but not *tethys*. really hairy; a dorsal longitudinal line pale, disappearing before pupation; two rows of small black lateral spots, which vary in distinctness. On *Capparis droserifolia* and *Cadaba glandulosa*. Pupa creamy, spotted with green, the wing-cases strongly bulging out. The insect is frequently infested by two species of Ichneumons, and the butterfly is preyed upon by a spider, which lives on the food-plant and in the webs of which dozens of dead butterflies are found hanging (SEITZ). — Arabia, Abyssinia and Somaliland.

T. दौरа *Klug* (= *dalila Fldr.*). Upperside white with small black marginal spots and a large, *daira*. proximally black-bordered, apical patch; underside white with yellow apex to the forewing and reddish subapical band; cell of forewing sulphur-yellow; a black spot on the lower discocellular of both wings, being proximally edged with yellow on hindwing. — The winter-form **nouna** *Luc.* (= *demagore Fldr.*) (23d) is *nouna*. reddish yellow-white beneath, and the black proximal border to the orange patch is absent. The ♀ either resembles the ♂ completely, or may have even more black than the specimen here figured. Patria: Arabia, North Africa, Nubia, Sudan, Abyssinia, Somaliland. — Larva similar to that of *P. rapae*; ground-colour green, with brown dorsal line, which is distinct only on the head and at the anus, two dirty yellow side-stripes from the head to the 3. pair of legs; head, legs and anal prolegs green, the whole larva finely hairy. Pupa dirty yellow, with a brownish tint towards head, with distinct dorsal line, along each side of which there is a row of small black points; duration of the pupa-stage of the summer-brood about 14 days (K. ANDREAS). In North Africa there occurs only the form *nouna*.

T. eupompe *Klug* (= *theopompe Fldr.*, *anteupompe Fldr.*) (23e) is found on the Sinai-peninsula, in *eupompe*. Arabia, East Africa and on the Senegal. Upperside white, on the forewing with narrowly black costal and distal margins, large apical carmine patch, which is broadly edged with black proximally, and on the hindwing with black distal marginal spots. Underside yellowish white, with small black median spots, a not sharply defined red subapical band, and black-brown subapical spots, which are prolonged to rays in the ♀. Upperside of ♀ much darker, with obsolescent reddish subapical streaks. The specimens here figured are from Nubia.

T. chrysonome *Klug* (23c). Upperside of forewing dull orange-yellow, with white base, black *chrysonome*. apical and submarginal markings and black median spot; hindwing greyish yellow, with black veins. Underside of forewing orange-yellow, with yellow apex, the hindwing being sulphur-yellow with more or less distinct markings. In the ♀ the hindwing above similar in colour to the forewing; beneath the forewing is proximally orange, yellow at apex, the hindwing being sulphur-yellow, with 4 rows of brownish markings. The patria of this form is South Palestine and the northern districts of East Africa.

T. semiramis *Gr.-Grsh.*, from South Persia, where it flies in February, is rosy red above, the *semiramis* anteradial area of the hindwing being orange, the costal and anal edge of the hindwing densely dusted with blackish green; distal margin deep black, apex of forewing with 3 large and 2 small bluish green spots, hindwing as in *phisadia* very broadly edged with black, the black median spot elongate, joined to the black costal border. Underside of both wings pale orange, still paler at apex, greenish sulphur at

costal and distal margins, sparsely dusted with brown, before distal margin 2 larger and 2 smaller blackish brown spots, no median spot: hindwing greenish sulphur-yellow, sparingly dusted with brown. The ♀ not different from the ♂. Somewhat larger than *eupompe*. — We know this insect only from the description.

eris. **T. eris** *Klug* (23e). This species, which inhabits the whole of Africa south of the Sahara, extends into our faunistic area in that portion of Arabia which belongs to the Palaearctic Region. Upperside white, with grey-brownish apex which bears reddish white spots; a broad black border to the posterior portion of the distal margin and along the entire hindmargin, as well as at the costal margin of the hindwing. In the ♀ the dark markings are paler, there being, moreover, a black median spot on the forewing. The underside is dirty white, with small blackish submarginal spots on the hind portion of the forewing.

17. Genus: **Ixias** *Hbn.*

This genus is closely related to *Teracolus*. The chief difference in neurulation consists in the upper radial of the forewing being confluent with the subcostal for about one-fourth. The *Ixias* are mostly larger butterflies. The majority of the species has a yellow or white upperside with broad black apical marking and in the ♂ a large orange apical patch. The species are restricted to the Indo-Malayan subregion, only one extending into the Palaearctic area.

pyrene. **I. pyrene** *L.* (= *aenippe* *Cr.*, *evippe* *Dru.*, *anexibia* *Hbn.*, *sesia* *K.*, *pirenassa* *Wall.*) (23g) is widely distributed in India, occurring also in the south of that portion of China which belongs to the Palaearctic Region. Upperside bright yellow in ♂, white or yellowish in ♀, with a broad black apical and distal marginal marking to the forewing, the hindwing of the ♀ having a less wide black distal marginal band; in the ♂ a broad reddish yellow subapical band with narrow black proximal border. Underside yellow with more or less dark markings, especially submarginal eye-like spots on the hindwing. Such specimens *rhexia.* belong to the dry-season form. — The wet-season form **rhexia** *F.* (= *pirithous* *F.*) (23g) is larger, being more strongly marked with black and having a broader, deeper red subapical patch. — *I. pyrene* is a very variable butterfly, a whole number of forms having received names; the forms, however, are not constant.

18. Genus: **Terias** *Swains.*

This genus is not only distributed throughout the tropical countries, but occurs also in some countries north and south of the tropics, for instance China, Japan, Arabia and North America. Its chief development obtains in South America. The species of *Terias* are small or at the most medium-sized butterflies with the ground-colour mostly yellow, in some species white. The palpi are moderately long, with the apical segment pointed. Antennae with the club gradually incrassate. Subcostal four-branched, two branches before the end of cell, the third and fourth branches forming a short fork at the apex of wing. Hindwing either rounded, or angulate at the second median vein, praecostal absent. — Larva slender, moderately tapering at both ends. Pupa smooth, carinate at the sides, boat-shaped, somewhat compressed, without lateral tubercles, the head very acuminate.

laeta. **T. laeta** *B.* (= *jaegeri* *Mén.*) (23e) is very common in China, Japan, South Korea and the North-Western Himalayas. The butterfly flies in September, hibernates, and appears again in March — like our *Gon. rhamnii* and the species of *Vanessa* —, apparently not copulating before spring. The rather leaf-like underside affords the insect good protection on the leaf-covered ground of the woods. The insects appear to feel very safe in their environment, for they have to be flushed in order to make them fly, otherwise it is difficult for the collector in spite of their abundance to find them. Apex of forewing somewhat produced and sharply pointed; distal margin of hindwing obtusely angulate at apex, in centre and at anal angle. Upperside deep lemon-yellow; apical area of forewing blackish brown. Underside of forewing yellow, dusted with brownish at costal and distal margins: hindwing yellowish brown, with numerous brown small *bethesba.* spots and 2 or 3 narrow dark transverse bands. ♀ hardly different. — The summer-form **bethesba** *Jans.* (= *biformis* *Preyer*) is very different; underside not leaf-like, but simply yellow; forewing above with the black marginal band broader, reaching to the hindmargin, the dark margin of the hindwing being very narrow. The wings are not acuminate and angulate at the inner angle, but rounded. — The form *laeta* remains only for 7 days in the pupal stage, the butterfly, however, lives seven to eight months (inclusive of the long winter), *bethesba* on the contrary lives only a short time. The specific identity of the two forms has been proved by breeding by PRYER and LEECH. The larva feeds on *Cassia mimosoides*. — The various seasonal forms of this species are somewhat variable, specimens of the winter-form *laeta* with the *subfervens.* underside reddish sand-colour belonging to **subfervens** *Btlr.*

If *T. hobsoni* *Btlr.* belongs to *laeta* or to the following species *hecabe*, or is a distinct species, has *hobsoni*. not yet been ascertained. Upperside canary-yellow, the apex of forewing and the distal margin of both wings being more or less broadly margined with blackish brown. Underside canary-yellow or paler, being dusted with dark and bearing more or less developed spots. Patria: China or Formosa.

The second abundant East Asiatic species of *Terias* is *T. hecabe* *L.* (= *sinensis* *Zuc.*, *anemone* *hecabe*. *Fldr.*, *hecabeoides* *Mén.*, *aesiope* *Mén.*, *multiformis* *Pryer*) (23 f). This species likewise occurs not only in two very different seasonal forms, but the forms vary also considerably. *T. hecabe* flies from May, being the spring-form. The ground-colour of the upperside varies from sulphur- to light lemon-yellow, also the shape of the blackish brown distal marginal band of the forewing is very different, being sometimes very narrow, though always reaching to the hind angle. — Quite different is the winter-form *mandarina* *Orza* *mandarina*. (23 f), which is above usually much lighter yellow; the dark band of the upperside occupies at the most the apical area, being often represented only by small spots situated at the costal margin near the apex. Appears in August, hibernates, and disappears in April. While *hecabe* varies strongly also in the development of the dark markings of the underside, there being sometimes large brownish patches, *mandarina* has always few markings beneath. Some of the individual forms of *hecabe* have received special names, the most remarkable forms being: *mariesii* *Btlr.*: ♂ deep lemon-yellow, ♀ sulphur-yellow, six forms being described *mariesii*. by BUTLER. — *hybrida* *Btlr.* and *connexiva* *Btlr.* are said to be characterized by the different shape of *hybrida*. *connexiva*. the dark margins. All these forms, however, are not constant, the distinctions given for each form applying only to typical specimens. The great variability is illustrated to a certain extent by the figures given by P. C. T. SNELLEN in "Midden Sumatra" Plate I and II. — Larva short-hairy, grass-green, with darker dorsal stripe and whitish stripe above the legs; on *Aeschynomene sesban*, *Lespedeza juncea*, "Madras-thorn" and leguminous plants. Pupa of the usual shape, yellowish green, with dark dots.

If *T. blanda* *B.* (23 f), which occurs also in Japan, is to be regarded a distinct species, or if it is *blanda*. likewise only a form of *hecabe*, has not yet been ascertained. Upperside sulphur-yellow, with narrow and more regular black distal margin to the forewing, the band not extending along the hindmargin, and with very narrow and diffuse marginal band to the hindwing, the underside being light yellow with dark specks at the costa of forewing; otherwise not different from *hecabe*.

T. senegalensis *B.* (23 e), which occur in the larger portion of Africa and in Arabia, certainly is *senegalensis*. also only a form of *hecabe*. Wings narrower, the dark marginal band of the forewing reduced, the hindwing almost without a dark border; ♀ light sulphur-yellow to yellowish white.

T. venata *Moore* (23 f) occurs in North China according to BUTLER, inhabiting also a large portion *venata*. of India. Upperside deep yellow, being strongly dusted with black in the posterior half, the blackish brown border being rather broad on both wings. Underside yellow, with few dark specks.

19. Genus: *Catopsilia* *Hbn.*

This genus is distributed through all tropical countries, extending beyond the tropics only in a few districts, being most highly developed in South America. *C. philca* *L.*, the fine *Amyntia menippe* *Hbn.*, usually considered a *Catopsilia*, and similar species rival the most beautiful butterflies in size and beauty. The ♂♂ possess as a secondary sexual distinction a broad thick covering of scales on the distal portion of the wings, also scent-brushes and scaled grooves situated near the base of the wings. The palpi project only little beyond the head, the end-segment being very small, often concealed under the scaling. The antennae are rather short, without distinctly marked club, the tip being truncate or incised. The forewing is triangular, possessing a long cell, a four-branched subcostal, two of the branches originating before apex of cell, the other two forming a long fork, the fourth branch terminating in the distal margin. The hindwing is rounded, but in some species the distal margin is obtusely angulate in the middle, while in others the anal angle is produced into a kind of tail. — All *Catopsilias* are extremely common butterflies, which occasionally congregate in swarms. They are often the first butterflies which fly to the ships lying in tropical ports. They fly mostly fast, but are easily caught, when sucking at flowers with the wings firmly closed.

C. florella *F.* (= *pyrene* *Swains.*, *minna* *Led.*) (23 g) inhabits the whole of Africa south of the *florella*. Sahara, as well as Syria, Arabia and Egypt. ♂ above greenish white, with very small dark apical marking and dark median spot on the forewing; yellowish white beneath, with uniform light sparrow-hawk pattern, which is only absent from the posterior portion of the forewing; both wings with a reddish median spot; head, eyes and antennae reddish. The ♀ is yellow, with reddish brown spots at the distal margin and a large black median spot on the forewing; underside yellow with reddish sparrow-hawk pattern, on forewing one, on hindwing two, united, discocellular spots, which are reddish with silvery centre. — Larva light

green, rough, finely dotted with black; at the sides an interrupted, but very distinct, black stripe, below which there is a broad orange band; on Cassia. Pupa very similar to that of *Gonepteryx*, green. — The butterflies are very common, great masses of them occurring sometimes here or there; they fly fast, but are not shy.

crocale. **C. crocale** Cr. (= *jugurtha* Cr.) (24a) is widely distributed throughout Indo-Australia and a very common insect; however, it is apparently rare in Central China, from where it has been recorded by LEECH. The ♂ is greenish white above, with the bases greenish yellow, there being no markings except *flava.* a narrow black costal and distal marginal border. The ab. **flava** Btlr. is entirely yellow above and beneath, the underside being very similar to the upper and without any markings. The ♀♀ vary strongly; there are specimens which resemble the ♂♂, and also others in which the dark colour prevails, there occurring all intergradations between these two forms. The underside of the ♀♀ varies from yellowish to brownish, with *pomona.* very slight dark markings. DE NICÉVILLE states that he has ascertained by breeding that **pomona** F., which thereto had been regarded as a distinct species, is a form of *crocale*. In *pomona* there are, beneath, brownish submarginal markings and on the hindwing silvery discocellular spots; in some ♀♀ the brownish markings are enlarged to patches. — The larva has the skin granulate (chagreened), being grey-green above; above the stigmata a steel-blue line, dorsally to which there is a white stripe that changes into yellow on the four anterior segments; below the stigmata the skin is light green, the venter being bluish green; each segment bears 6 folds, the whole larva being finely punctured with black. Pupa light green; head prolonged into a point, the back provided with a hump; a yellow lateral stripe extends from end to end. The larva feeds on Cassia alata L. (DE NICÉVILLE).

20. Genus: **Gonepteryx** Leach.

This genus is characterized by the peculiar shape of the wings. The apex of the forewing is falcate, curved, being sharply pointed, and the hindwing is angulate below centre of distal margin. The last of the 4 subcostals terminates in the tip of the wing. The palpi extend only little beyond the head. The antennae are very short and strong, being gradually incrassate, therefore without distinct knob, but they are club-shaped, the tip being truncate or provided with a short point. The distribution of the species of *Gonepteryx* is peculiar. The Palaearctic Region has the largest number of species, and therefore has to be considered the true home of the genus; North India has only few species, which are near relatives of *rhamni*; besides these countries only South America has a few, but gigantic, representatives of the genus. The whole of Africa south of the Sahara, Indo-Australia and the large North American area have no representative of the genus, there occurring only a solitary immigrant from the south in the subtropical districts of North America. In the magnificence of the colour of the wings the exotic forms do not come up to the Palaearctic species.

aspasia. **G. aspasia** Mén. (24b), from the Amur and Ussuri, Korea, Turkestan, and Japan, is larger than *rhamni*; upperside of forewing light orange-yellow, hindwing sulphur-yellow with moderately large red-brown middle spots, the marginal spots are very small, the underside is very light yellow. The ♀ greenish white. — *acuminata.* **acuminata** Fldr., from North and Central China, has the apex of the forewing somewhat prolonged; the upperside of the wings is sulphur-yellow, with larger orange-red central spots, the marginal spots of the forewing are more developed, sometimes forming an uninterrupted border from the apex to the 2. median vein; the underside is rather more greenish. The ♀ greenish white. — Larva on Rhamnus dahurica. *G. aspasia* commences to fly in June, being a mountain-insect, while *rhamni*, which occurs in the same districts, prefers the valleys.

farinosa. **G. farinosa** Z. (24b), from West Asia (the occurrence in North Africa is very doubtful), is conspicuously larger than specimens of *rhamni* from Central Europe or even South France; the scaling of the ♂ is thick, chalky, being lighter above and below on the distal portion of the wings, the whole hindwing, moreover, being somewhat lighter in tint than the forewing; the yellow central spots are more indistinct, being often absent from the forewing, especially in ♀♀; the latter still paler than *rhamni*-♀♀. The specific distinctness of *farinosa* has often been doubted, without sufficient reason we think, for *farinosa* occurs together with *rhamni* and *cleopatra* (for instance in southern Asia Minor).

rhamni. **G. rhamni** L. (24b, c) inhabits the whole Palaearctic Region with the exception of the most northern districts and the Canaries, occurring also in North India as a slightly modified local form; the statement in KIRBY's catalogue that *rhamni* is also found in California is certainly erroneous. Upperside of ♂ lemon-yellow with orange-yellow central spots and very slight brownish marginal spots; underside sulphur-yellow to pale ochre, the proximal portion of forewing lighter, the median spot brownish, that of hindwing with pale centre, the marginal spots somewhat more distinct than above, the hindwing, moreover, bearing blackish, mostly linear, submarginal specks. Antennae and palpi reddish. — A very remarkable aberration *progressiva.* is **progressiva** Geest found near Freiburg i. Baden; this specimen (♂) has the same ornamental patch on the forewing as *cleopatra*-♂. — In the southern districts of the area (Algiers and southern Asia Minor) there flies a

larger and much richer yellow form, which also is purer beneath: **meridionalis** *form. nov.* — In North India, and doubtless also in the adjacent districts of the Palaearctic Region, there occurs **nepalensis** *Doubl.* *nepalensis*. (24c); upperside rich yellow, with rather larger and more brightly coloured central spots and more distinct marginal dots, which form an uninterrupted line at the apex of forewing. — **amurensis** *Graes.* (24c) is a pretty, large, very rich yellow form from the Amur and North and Central China, sometimes being of a slight orange-red tint; the orange-red central spots very large; the brownish marginal dots distinct, forming an uninterrupted line in the apical portion of the forewing. The ♀ has a strong greenish tint. — TUTT, moreover, distinguishes the following aberrational forms: **intermedia**: ♀ greenish yellow, the angles of the wings being especially bright in colour; **cleodoxa**: orange middle spot of forewing very small or obsolete, or merged into the ground-colour. — A very pretty aberration, which may be regarded as the first step towards the development of *ab. progressiva*, has been found near Löbau in Saxony; this specimen has a narrow orange-red submarginal band on all wings; we name this form *ab. filia*. — There is considerable difference in colour between specimens from North Germany and individuals of southern origin (f. i. Trieste), especially on the underside, in both sexes: but as the interjacent countries doubtless harbour intermediate forms, special names for these various forms are not justified. — The species flies in North Germany from the end of June and hibernates, copulation not taking place before spring. — Larva dull green, lighter at the sides, with a dull white longitudinal stripe above the feet, spiracles dark green, head green; feeds on various species of Rhamnus (Buckthorn), but doubtless also on other plants (f. i. probably on *Vaccinium*), the butterfly occurring commonly also in localities where Rhamnus does not grow. Pupa with very strongly convex breast, angulate, green, with a light yellow stripe on each side. Egg conical, with four distinct stripes.

G. alvinda *Blanch.* (24c), from Tibet, has in the ♂ the forewing lemon-yellow, the light hindwing contrasting strongly, being yellowish white; underside very light, only the basal portions of the forewing slightly suffused with sulphur-yellow. ♀ almost white above, yellowish beneath, only the posterior part of the forewing pure white.

G. cleopatra *L.* (24d) occurs in South Europe, North Africa, Asia Minor, Syria (also near Jerusalem as *taurica*), and Madeira, as well as — if the record is not erroneous — in northern East Asia (Wladiwostock). The name-typical *cleopatra*, from Southern Europe and North Africa, has the upperside of the ♂ lemon-yellow, the larger proximal part of the forewing being orange-red: the hindwing has a more or less large orange-red middle spot, the costal margin of the forewing and the anterior portion of the distal margin bearing small reddish spots. The underside is pale lemon-yellow, the markings being the same as in *rhamni*. Head, palpi and antenna red. The ♀♀ more or less yellowish white, sometimes with a sulphur-yellow tint, the underside being more yellowish than in *rhamni*-♀♀. Among this form occurs singly *ab. virgo* *Röber* (24d): ♂♂ with the forewing orange-red, having a slight violet gloss. — **italica** *Gerh.* (= *massiliensis Foulquier*) is the summer-form according to Dr. STAUDINGER and Dr. REBEL, being characterized by the sulphur-yellow underside. This colour, however, occurs also among specimens caught in spring, according to our material. Moreover, we doubt that any *Gonepteryx*-species has more than one brood in the Palaearctic Region. For in southern Asia Minor (Taurus) the species *rhamni*, *farinosa* and *cleopatra taurica*, which occur there all three, commence to fly at the same time of year as *rhamni* in Central Europe; the occurrence of a second brood, however, in the southern districts of the area would necessarily occasion a change in the time of appearance. — **taurica** *Stgr.* (= *antonia Btlr.*) (24d), from the Taurus, Syria and Palestine (Jerusalem), has in both sexes a lighter coloured upper- and underside; in the ♂♂ the orange colour of the upperside is much less developed. — **maderensis** *Fldr.*, from Madeira, has the forewing entirely orange-red in the ♂. — The specimen of *cleopatra* from Wladiwostock, already mentioned above, differs in several respects from the other known forms: apex of forewing hardly noticeably produced, the margin of the hindwing also not being acuminate at the 2. median, but only angulate; the orange of the forewing is intermediate between that of *cleopatra* and *taurica*, the underside being much paler. If this specimen should belong to a constant local form, this race might be named **orientalis** (24d). — Larva rather more blue than in *rhamni*, with a more distinct white side-stripe; on Rhamnus alpina, cathartica and alaternus. Pupa dirty green, with a yellow stripe on each side accompanied by red dots.

G. amintha *Blanch.* (24e), from Tibet, differs from the other species in the shape of the wings (compare the figures). The upperside of the ♂♂ varies from deep lemon-yellow to orange-yellow; the middle spots are large and intensely coloured, the brownish marginal dots being united to form a line in the anterior portion of the forewing and mostly also in the posterior part of the hindwing. Underside of ♂ and ♀ greenish white, the larger posterior part being sulphur-yellow in the ♂. The ♀ is white above, with a very slight yellow tint, being feebly sulphur-yellow at the base and distal margin.

G. cleobule *Hbn.* (24e), from the Canary Islands, has the forewing of the ♂ deep orange-yellow, with small lemon-yellow spots at the distal margin and reddish brown fringe-spots; hindwing lemon-yellow, with a strong orange-yellow tint and large orange-red middle spots as well as brown-red marginal dots. Head, palpi and antenna reddish. Underside of forewing reddish yellow, of hindwing greenish yellow.

The ♀♀ are evenly light orange-yellow above, with orange-red middle spots also on the forewing, the underside being lighter than in the ♂♂.

It is very difficult to separate correctly the *Gonepteryx*-species of the *aspasia-alcinda*-group, which is abundantly proved by LEECH's entirely abortive attempt to do so (in Butterflies from China, Japan and Corea). We shall therefore not maintain that our exposition is correct in all points.

21. Genus: **Dercas** *Boisd.*

Though this genus is closely related to *Gonepteryx*, it differs in appearance as well as in structure. The most conspicuous characteristic is the shape of the forewing, the apex of which is not only acute, but more or less strongly produced. The whole distal margin of the forewing is denticulate in *verhuellii*, while in *enara* only the anterior portion bears short teeth; the distal margin of the hindwing of *verhuellii* is produced into a tooth in the middle, the inner angle being sharply angulate, the margin being simple in *enara*. The cell of the forewing is short and very much widened, the 2. subcostal branching off exactly at upper angle, the 4. subcostal terminating in the costal margin. The antennae are short, being only gradually widened into a feeble, indistinct, obtuse club. The palpi are short, being densely scaled. — Of the 3 species of this genus 2 occur in North India and China, the third flying in Sumatra and Borneo.

verhuellii.

D. verhuellii *Hoer.* (= *lycorias* *Doubl.*) (27 e) occurs in North India and China. The upperside is lemon-yellow in the ♂, being paler in the ♀; the apex brown, a middle spot and a submarginal band reddish yellow; hindwing with brown marginal dots. The underside is paler, both wings bearing an elongate, pale-centred middle spot.

enara.

D. enara *Swinh.* (= *olens* *Stgr.* i. l.?) (27 e) is common in Central and West China, flying at moderate altitudes. It is a local form of the North Indian *wallachii* *Doubl.* (= *uranias* *Btlr.*, *decipiens* *Nicé.*). Apex of forewing acute, but hardly produced, the distal margin being anteriorly slightly denticulate, smooth behind. Upperside rich sulphur-yellow, deeper in tint towards the margins; the costal portion of the brown apical marking edged with ferruginous yellow, a stripe of the same colour extending as far as the t. median vein. Underside lighter, with pale-centred middle spot, small brownish speckles at costa of forewing, both wings bearing a brownish line from the apex to the middle of the hindmargin and small irregular spots in the basal area.

22. Genus: **Colias** *F.*

This genus is unmistakably characterized by its external appearance, and by the total absence of the praecostal nervure, which character it shares only with the externally quite different genus *Terias*. The butterflies are mostly of medium size, but some species are to be counted among the larger butterflies. Antenna rather short, with the club gradually incrassate, but distinct. Apex of forewing rounded off; forewing with 4 subcostals, the 1. originating far proximally to the apex of cell; upper radial branching off from the subcostal vein, therefore the upper discocellular absent.

The main area inhabited by the genus is Central Asia, which is the home of the larger proportion of the species. In North America, on the mountains of tropical South America, and in the plains of the southern part of South America there occur several species, in Africa only two (subspecies of *edusa* and *hyale*), in Indo-Australia, however, apart from the Himalayas and the faunistically similar Nilghiri Mts., there does not fly a single species. Some species extend far north (f. i., *C. boothii* as far as the 75°), and on Tierra del Fuego one of the finest and largest species is found (*imperialis* *Btlr.*). Some species occur in two broods, but probably most species have only one brood. Sexual dimorphism is well developed in several species, as well as dimorphism of the ♀♀, this sex often appearing in a pale and in a bright yellow or orange form. The butterflies are fast and untiring fliers. The ♂♂ of many species have as a secondary character a small sharply defined sex-mark of thick chalky scaling situated at the costa on the upperside of the hindwing.

marcopolo.

C. marcopolo *Gr.-Grsh.* (25 a), from the South-Eastern Pamir, is one of the smaller species. Upperside of ♂ pale sulphur-yellow, with a not very broad greyish black distal marginal band and a non-conspicuous large yellow spot on the hindwing, but without black middle spot on the forewing. Underside of forewing dirty yellow, with greyish green distal margin; hindwing darker greyish green, with whitish middle spot. The ♀ is yolk-colour above and below, the distal marginal band being broader and having the inner edge diffuse, the forewing bearing yellow submarginal spots. — The form with brighter yellow upperside, narrower dark distal margins and a black middle spot on the forewing above and below, may

nicolopolo.

be named ab. (?) **nicolopolo** (25 a).

palaeno.

C. palaeno *L.* (= *philomene* *Hbn.*, *lapponica* *Stgr.*, *werdandi* *H.-Sch.*) (25 a). Upperside of ♂ pale yellow with blackish brown distal margins, pale-centred dark middle spot to the forewing and light middle spot to the hindwing; fringes red. Underside of forewing pale yellow with white-centred dark middle spot, the costal and distal edges being red; hindwing yellow, strongly dusted with fuscous, the large middle spot being mother-of-pearl colour, and the fringes red. The ♀ has a white ground-colour above, the underside

of the forewing being white proximally, yellow at apex, the hindwing being somewhat paler in the ♀ than in the ♂. Inhabits Scandinavia and North Russia. Among this so-called original form there occur ab. **schildei** Stgr., which is more yellow and has the marginal band narrower, and ab. **cretacea** Schilde, ♂ and ♀ of which are chalky white above and bluish grey beneath. — In North Germany and Livonia, in the Riesen- and Erzgebirge, etc., there occurs **europome** Esp. (= palaeno O.) (25a, b). This form is somewhat larger, the ♂ lemon-yellow above, being below deeper yellow, as is also the ♀. The ♀♀ with yellowish upper and more strongly yellow underside are ab. **illgneri** Rühl. — **europomene** O. (25b), from the European Alps, is somewhat smaller than *europome*, the marginal band being somewhat narrower and the underside slightly darker. Specimens of this local form, from which the middle spot of the upperside of the forewing is absent and in which the upperside of the hindwing has a greenish tint, have been described by CARADJA as **caffiltschi**. At the same localities there occur further: ab. **herrichi** Stgr. (= *werdandi* H.-Sch., *philomene* Dup.), ♀♀ with yellow upperside; ab. **ochracea** Geest, ♀♀ with golden or ochreous upperside; ab. **reducta** Geest, ♀♀ with large white submarginal spots; and ab. **herrichina** Geest, ♀♀ with milky yellow upperside, being a transition from ordinary ♀♀ to *herrichi*. — **orientalis** Stgr. inhabits Siberia and Amurland; very similar to *europomene*, being dark greenish on the underside of the hindwing. — **aias** Fruhst., from Japan, is the largest form of *palaeno*, the marginal band of the forewing being very broad and the underside rich green. — **pelidnides** Stgr. and **pelidne** Boisd., from North America, will be dealt with among the American Pierids. — Larva sea-green, velvety, bearing minute black dots; a lateral stripe bright yellow edged with black beneath, below the same the white black-edged spiracles; underside and abdominal legs dull green, thoracical legs yellowish, head green; in May on Bog-Vaccinium. Pupa greenish yellow, the back being strongly convex. The butterfly occurs from the end of June till early July on peat-bogs, not being rare (SPULER).

C. werdandi Zett. (25b, c) is the Scandinavian subspecies, of the North American *C. nastes* Boisd. and occurs also on Nova Semblia. The upperside very pale white-yellow, the distal margin greyish black and narrow, there being proximally to this band a submarginal row of obsolescent contiguous greyish black spots, middle spot of forewing large and black, the fringes being pale red. Underside of forewing dirty white, the middle spot centred with white, before the distal margin a row of blackish cuneate spots; underside of hindwing greyish green, the whitish or yellowish middle spot edged with red, the broad marginal band much paler and the whole distal edge rosy red. The ♀ has light submarginal spots and darkened hindwing. The following aberrations are found among *werdandi*: ab. **sulphurea** Lampa, sulphur-yellow specimens; ab. **immaculata** Lampa, ♂♂ with submarginal macular band on the forewing; ab. **chriestiernssoni** Lampa (25c), individuals with ochreous or light golden ground-colour; ab. **radiata** Thureau (25c), specimens in which the marginal band is missing, but in which the submarginal spots extend streak-like to the margin; ab. **insignata** Thureau (25c), almost without markings, only the middle spot of the forewing and the dark dusting at the veins being present; specimens of *werdandi* from which the black middle spot of the forewing is completely absent may be called ab. **anastigma** nov. — *Col. nastes* and *rossii* will be dealt with among the American Pierids. The species is locally not rare.

C. cocandica Ersch. (25d), from Fergana, Issyk-kul and the Tian-shan, is in the ♂ greenish yellow above, dark-scaled, with black marginal and submarginal bands, and black middle spot on the forewing, the fringes and antenna being reddish. The underside of the forewing is greyish yellow, the apex being dusted with yellow, the middle spot and the small submarginal spots being black, and the costal and distal edges red; hindwing dark yellowish green, with broad yellowish distal margin, the reddish-edged middle spot being mother-of-pearl colour and the edge of the entire wing red. The ♀ is dark yellowish white above, being paler beneath than the ♂ and bearing stronger markings. — ab. **galba** Gr.-Grsh. is a yellow form of the ♀; — ab. **hybrida** Gr.-Grsh. is much less yellow, being presumably a hybrid between *cocandica* and *eogene*. — **maja** Gr.-Grsh., from Boro Choro and the Alps of Korla, is larger, and lighter in colour, the ♂ being less green, and the ♀ almost white. — **grumi** Alph., from the Nan-shan, is lighter, the hindwing beneath being blue-grey, not greenish. — **tamerlana** Stgr. (= *obscura* Aust.) (25d), from the Eastern Tian-shan, is large and very dark. — **mongola** Alph., from the South-Eastern Altai and North-Western Mongolia, is very similar to *tamerlana*, differing especially in the light band in the costal area of the hindwing being wider and more whitish. — **elwesi** nom. nov. (to replace the preoccupied name *leechi* Elw.), from Ladak, is lemon-yellow in the ♂.

C. melinos Ev. (25d), from the Altai, Sajan, Kentei, and Amurland, is slightly yellowish white above, the greyish black marginal band often divided by pale-scaled veins, the greyish black submarginal band more or less developed, the black middle spot of the forewing large, and the yellowish middle spot of the hindwing diffuse and rather indistinct. The ♀ is impure white above, with the blackish markings more strongly developed. The ♂ is impure white on the underside of the forewing, the apex being light yellow and the black middle spot centred with white; hindwing light yellow, with dark speckles, the reddish-edged middle spot being the colour of mother-of-pearl; the ♀ deeper yellow at the apex of forewing and on the whole hindwing; the fringes reddish above and below in both sexes. — **herzi** Stgr. (= *melinos* herzi).

Herz (25 d), from North-East Siberia (Wilui), has less developed dark markings and the underside is paler. — *vitimensis*. **vitimensis** *Aust.*, found on the Witim (at its confluence with the Lena), is larger, being pure white without yellowish tint; the underside of the hindwing grey-greenish in ♂ and grey-yellowish in ♀.

phicomone. **C. phicomone** *Esp.* (25 e), from the Alps, Pyrenees, and the mountains of Hungary, is yellow above in ♂, with very dark scaling, the entire coloration having a dark greenist tint; the margin dark, the yellow submarginal spots more or less developed, but often partly absent; middle spot of forewing black, of hindwing yellow or reddish; costal and distal edges of forewing and the entire edge of hindwing rosy red; head and antennae red. Forewing beneath white, more or less yellow at apex; hindwing yellow, proximally dark scaled, the middle spot often double, mother-of-pearl colour, with red edge, which is sometimes produced distad into a streak. The ♀ impure white above, with reduced but more sharply defined dark markings; *geesti*. underside paler. — ab. **geesti** *Neuburger* is uniformly black, apart from the yellow submarginal band and *elegans*. the yellow middle spot of the hindwing. In ab. **elegans** *Schultz* the forewing is uniformly grey, the submarginal spots being scarcely visible, and the red middle spot of the hindwing above is enlarged. — Larva stout, cylindrical, dark green, velvety, finely punctured with black; a white lateral stripe bearing the black spiracles which are situated in yellow spots; venter and legs green; head globular, yellowish green, with minute hairs; feeds on various species of vetch in May and June. Pupa acuminate at both ends, convex posteriorly on the back, dark green with a dull yellow lateral stripe. The butterfly is on the wing in June and August. Occurs sometimes in two broods.

montium. **C. montium** *Oberth.* (25 f), from South-Western China, Nan-shan and Tibet, is perhaps only a well marked form of *phicomone*. The ♂ is yellow above, the inner portion of the forewing not being darkened and the yellow submarginal spots being rather sharply defined. The underside, especially of the forewing, is more yellow, the hindwing, moreover bearing, yolk-coloured subapical spots and posteriorly black submarginal ones. The ♀ is lighter above, the hindwing is darker proximally, and the light distal margin contrasts with the disc.

sieversi. **C. sieversi** *Gr.-Grsh.* (25 e), from the Sarafshan and the North-Western Pamir, is in the ♂ yellow above and below, with greyish black distal margin, slightly darker submarginal band and black middle spot to the forewing, the distal marginal marking of the hindwing being vestigial. Underside of forewing yellow, with a black pale-centred middle spot and small blackish submarginal spots; hindwing dusted with dark scaling, the middle spot being mother-of-pearl colour, edged with reddish. Fringes reddish. The ♂ is white above and below, being slightly yellowish; distal marginal markings strongly reduced.

alpherakii. **C. alpherakii** *Stgr.* (25 e. f), from the Sarafshan, Southern Fergana, the North-Western Pamir and Eastern Buchara, is lighter or deeper yellow above, with well developed and sharply defined black marginal and submarginal markings and black middle spot on the forewing; the hindwing with reduced marginal marking, sometimes without any, the light-coloured middle spot being very feebly developed; upperside of forewing sometimes more or less dusted with black along the veins. Underside light yellow, with large black middle spot, and more or less developed black submarginal spots posteriorly on forewing; hindwing dusted with dark on the inner area, this scaling sometimes extended to the margin, the middle spot being whitish. The ground-colour of the ♀ is lighter, the black markings are less developed, being very diffuse especially at the distal margin of the forewing; the black middle spot, however, large. Beneath, the apex *roschana*. of the forewing bright yellow and the hindwing dusted with grey greenish. — **roschana** *Gr.-Grsh.*, from Roshan in the North-Western Pamir, is smaller, and the hindwing has a dark distal marginal band.

sifanica. **C. sifanica** *Gr.-Grsh.* (25 f), from Amdo and the Kuku-nor, is pale sulphur-yellow above in ♂, with darkened base, diffuse dark marginal and submarginal markings and black middle spot. Antenna red. Underside with lighter ground-colour than upper, but dusted with dark, the dark markings very feebly developed, the middle spot of the forewing being black with white centre, and that of hindwing white. The ♀ impure white above, the dark markings more sharply defined, the hindwing being yellowish. The proximal portion of the underside of the forewing is white; the hindwing has a larger and a smaller white middle spot, the ground-colour being lighter than in the ♂, dusted with grey greenish scaling. A darkened form of this species is being sold as *nebulosa*, but is not identical with the following species. In this form *tancrei*. from the Kuku-nor, which we name ab. **tancrei** (25 f), the black markings are more developed and the proximal area of the forewing and hindwing is so strongly dusted with dark that there remain only narrow streak-like spots of the yellow ground-colour.

nebulosa. **C. nebulosa** *Oberth.* (26 f), from South-Western China, is much darker than *sifanica*; the forewing without middle spot, but with light spot at the distal margin; the hindwing almost uniformly black, with large, conspicuous, light yellow middle spot, and light ray-like spots on the veins. We regard *nebulosa* as a distinct species.

christophi. **C. christophi** *Gr.-Grsh.* (= *wiskotti* *Stgr.* ♀) (25 g), from Fergana, the Sarafshan, and the Alexander Mts., has quite an exceptional aspect among *Colias*, the costal basal area having a peculiar reddish brown colour, and the submarginal spots of the forewing being extraordinarily large and almost white, forming a continuous band which is traversed by the narrowly black veins. The hindwing is dark, feebly greenish,

with white middle spot and a band of white submarginal spots. The underside is grey-green, with black middle spot on the forewing and a white one on the hindwing. The ♀ differs only in the somewhat larger light submarginal spots on both wings. The specimens from the Alexander Mts. have the reddish brown area of the forewing brighter and the underside more yellowish.

C. ladakensis *Fldr.* (= shipkee *Moore*), from Eastern Ladak. is rich sulphur-yellow, with black middle spot; the yellow markings situated at the distal margin are similar to those of *cocandica*, the fringes are chequered with red and yellowish.

C. hyale *L.* (= palaeno *Esp.*) (25 g) occurs throughout the Palaearctic Region, with the exception of the Polarregion and the Canary Islands, having developed into several local forms. In name-typical (Central-European) *hyale* the upperside of the ♂ is more or less light lemon-yellow, with the black marginal and submarginal bands more or less complete on both wings; the black middle spot of the forewing large, in centre of hindwing an orange-yellow double spot; base of wings more or less dusted with black. The underside is bright yellow, being somewhat lighter on the forewing, with small marginal and larger submarginal red-brown spots; the middle spot of the forewing black with pale centre, the hindwing bearing a double spot which is mother-of-pearl colour, encircled by a double ring of red-brown; fringes above and beneath, as well as head and antenna red-brown. In the ♀ the ground-colour of the upperside and the proximal area of the underside of the forewing is white, being slightly yellowish. There occur the following aberrations among the name-typical subspecies: ab. **uhli** *Korats*, specimens without yellow submarginal spots; ab. **flava** *Husz*, ground-colour light yellow, the yellow marginal spots often very large, forming a well-defined band, the hindwing being without black submarginal spots; ab. **inversa** *Alph.*, the yellow form of the ♀; ab. **apicata** *Tutt*, specimens in which the yellow submarginal spots are missing, except the apical spot; ab. **obsoleta** *Tutt*, specimens from which the dark markings of the hindwing are nearly absent; — **intermedia** *Tutt* has only the marginal row of black spots, the submarginal spots being wanting; — **unimaculata** *Tutt* has only one instead of two orange spots in the middle of the hindwing; — **pallida** *Tutt* are individuals with dull middle spot to the hindwing; ab. **emarginata** *nor.* are specimens which entirely lack the black marginal spots of the hindwing, the black marginal and submarginal spots of the forewing at the same time being reduced; — in **nigrofasciata** *Gr.-Grsh.*, apparently found only in South Russia, the dark margin is very broad and has no spots; — *RIBBE* found in the Sierra d'Alfacar (Andalusia) an aberration which he calls **alfacariensis**: ♂ lighter yellow, the underside of the hindwing being more greyish yellow, ♀ above greenish white, similar to *edusa* ab. *helice* but with smaller black markings, the underside also being very similar to that of *helice*; — in **simplex** *Neuburger* the black apical marking on the upperside of the forewing is small; — ab. **radiiformis** *Schultz* (= *radiata* *Geest*) has prolonged ray-like submarginal spots on the upperside of both wings and of the underside of the hindwing; — ab. **junior** *Geest* are ♂♂ with the middle of the upperside of the forewing golden yellow; — in **atava** *Reutti* the upperside is completely dusky, only the black middle spot of the forewing and the light middle spot of the hindwing being distinctly contrasting. — From Europe only one local form is known: **sareptensis** *Stgr.* (25 g), from South Russia, Persia, and Central Asia; in this form the ♂♂ are very rich yellow; the ground-colour of the ♀♀ is light yellow, and the submarginal macular band is broader and longer; *STAUDINGER* believes this form to be a hybrid (cross with *erate*). — In the eastern part of the Region there occur: **alta** *Stgr.* (26 a) in South Fergana, a large form with a broad black marginal band; — **poliographus** *Motsch.* (= *simoda* *Orza*) (26 a) in China and Japan, a usually larger form, being sometimes gigantic, the ♂ deeper yellow, the ♀ also more yellow, the black marginal markings being strongly developed in both sexes. Among this form there occur as aberrations: **hera** *Gr.-Grsh.* (26 a) are yellow ♀♀, and **chrysocoma** *Gr.-Grsh.* golden yellow specimens. — *elwesii* *Bthr.*, *subaurata* *Bthr.*, and *pallens* *Bthr.* are likewise aberrations, which are not sharply defined; — lemon-yellow ♂♂ and similarly coloured ♀♀ belong to ab. **elwesii**; — ab. **subaurata** is very similar to *elwesii*, but the light submarginal spots are better defined and the ground-colour is slightly shaded with grey; — ab. **pallens** differs from *hyale* "especially in its lesser size (among East Asiatic specimens), narrower forewing and the pale submarginal spots". — Also in India and Africa there occur local forms of *hyale*. — In Central Europe this species has two broods; the butterflies are on the wing in spring and again late in the summer, the insect not being rare at suitable localities, though by no means one of the commoner butterflies. In East Asia, on the contrary, it is very common, being there much more variable; this district therefore appears to be the true home of the insect. The butterflies are difficult to catch on account of their fast, continuous and erratic flight. During the nuptial flight the insects prove themselves to be real artists in flying. — Egg bottle-shaped, whitish, with yellowish brow stripes. Larva bluish green or grass-green, velvety, there being on the back two rows of blackish dots which are traversed by two thin yellow longitudinal lines, above the legs a yellow or reddish longitudinal side-line, head dark green; on species of Vetch, Trefoil and such-like plants; the autumnal larvae without black dorsal spots. Pupa green, with yellow lateral lines (*SPULER*).

C. erate *Esp.* (= *nerieni* *F. d. W.*) (26 b) occurs in South Russia and the whole Palaearctic portion of Asia. Both sexes are deep yellow, the ♂ being broadly margined with black, not bearing light sub-

marginal spots, the ♀ having large yellow submarginal spots. The underside is somewhat deeper yellow than in *hyale*, but otherwise very similar to that of this species. — At Sarepta, and in Armenia and Central Asia *chrysodona* Boisul. (= *helichta* Led., *beckeri* Gerh., *edusoides* Krulik.) (26b) has been observed; presumably a hybrid between *erate* and *edusa*. The upperside of this form is orange-yellow in the ♂♂, being only slightly paler in the ♀♀. — Of *erate* there occurs also a white ♀-form, *pallida* Stgr. — In Central Asia there occurs *hyaleoides* Gr.-Grsh., a smaller form, with narrower distal marginal band, which bears some spots also in the ♂; it has not yet been ascertained, if this form is an aberration or a seasonal variety. — *chryseis* form. nov. (26b), from South Russia, presumably is also a hybrid; the ground-colour of the upperside is a beautiful golden yellow, the underside of the forewing being nearly the same; however, the apical marking of the forewing above does not agree with that of any species which might come into consideration, only the complete, though narrower, distal marginal band of the hindwing points to *chryseis* being the product of a cross between *erate* ♂ and *edusa* ♀. — We propose the name *diana* form. nov. (26b) for very similarly marked specimens from South Russia which are light yellow; they are presumably hybrids between *erate* and *hyale*. — *C. erate* is common, but difficult to catch on account of its fast flight.

erschoffi. **C. erschoffi** Alph. (= *aurora* Alph.) (26c), from the Tian-shan district, is a pretty yellow species, in which also the ♂ bears a complete row of submarginal spots, the sexes therefore being very similar; the hindwing is greenish yellow, with sharply defined yellow submarginal band and a large reddish yellow middle spot which has a light centre and is distally produced into a point. — Strongly golden yellow specimens are named ab. *tancrei* Aust. — The orange-red ♀-form may be named ab. *clara* nov. — The species flies from the middle of May till July and August, at elevations of 5000 to 7000 feet.

berylla. **C. berylla** Fawcett (= *nina* Fawcett) (26c), from Tibet, is greenish yellow in the ♂, with a moderately broad, yellow-spotted marginal band, black median spot on the forewing and a yellow one on the hindwing; hindwing darkened. Underside yellowish green, with black middle spot on forewing, a white one on hindwing, a band of yellow submarginal spots on both wings, and black submarginal spots on the posterior portion of the forewing. The ♀♀ vary in ground-colour from lemon-yellow to light orange, the hindwing being strongly darkened; the light submarginal spots rounded or elongate, often reaching to the margin; underside more strongly green, sometimes much darkened.

romanovi. **C. romanovi** Gr.-Grsh. (26c) occurs in Southern Fergana. Its golden red colour renders it one of the finest species of the genus. The broad black marginal band of the forewing of the ♂ is usually without spots, but bears sometimes a row of contiguous ill-defined yellow subapical spots, there being also yellowish submarginal spots on the hindwing; this form is the ab. *maculata* of dealers (26c). In the ♀ the ground-colour is paler, the slightly yellow-spotted marginal band being broader and the hindwing darkened, the large orange-red middle spot contrasting sharply. The underside is yellow, the proximal portion of the forewing light orange-red, the submarginal spots of the forewing, which are sometimes absent, are blackish, while those of the hindwing are brownish; the forewing bears a large, pale-centred middle spot and the hindwing a large red-edged double spot of the colour of mother-of-pearl.

staudingeri. **C. staudingeri** Alph. (26d), from the district of the Tian-shan, is rather variable. The nymotypical form from Kuldja is beautifully golden red; the marginal band of the ♂ is narrow, being obsolete at the apex, while it is broader in the ♀, bearing yellow spots in both sexes. The underside of the hindwing is greenish yellow in the ♂, reddish yellow in the ♀, the forewing being feebly red in the ♂, strongly red in ♀, with small dark markings. — *pamira* Gr.-Grsh. (= *pamiri* Rühl), from Southern Fergana, is larger and has a broader black margin. — *maureri* Stgr., likewise from South Fergana, is much smaller, the distal margin being spotted with yellow also in the ♂, the sulphur-yellow submarginal spots being large in the ♀. Presumably a distinct species. — *C. staudingeri* flies from the end of June till July and August at elevations of from 7000 to 12000 feet.

felderi. **C. felderi** Gr.-Grsh., from Amdo, is light orange-red, with black margin, which is traversed by the yellow veins at the apex of the wing, and with black middle spot; the hindwing has a yellowish band before the black distal margin. The underside, which has nothing distinctive, is without submarginal spots.

regia. **C. regia** Gr.-Grsh. (26d), from Southern Fergana, is magnificently golden red, with a very feeble violet sheen in the ♂ and a stronger gloss in the ♀; the black marginal band not very broad, dusted with yellow, the middle spot of the forewing black, that of the hindwing red and inconspicuous. In the ♀ the black distal margin is somewhat broader, bearing yellow spots at the apex of the forewing, the hindwing having small red obsolescent spots in the posterior portion of the band. The underside of the ♂ is beautifully greenish yellow, with few markings, a black middle spot on the forewing and a brownish-edged one of mother-of-pearl colour on the hindwing; the underside of the hindwing darker in the ♀, the forewing being proximally beautifully golden red.

eogene. **C. eogene** Fldr. (26c), from Kashmir, Ladak, the Pamir and Southern Fergana, is a very variable species. The name-typical form has the ground-colour pale golden red, the distal marginal band being rather broad, traversed in the ♂ by yellow veins only in the apical area of the forewing, and spotted

with reddish yellow in the ♀. The ♀ has the hindwing darkened, not much being left of the golden red ground-colour besides the large middle spot. Underside of ♂ yellow, proximally on the forewing orange-red; the ♀ greenish yellow on the hindwing, the forewing being proximally more strongly orange-red. — The white form of the ♀ bears the name **cana** Gr.-Grsh.; — **erythas** Gr.-Grsh., from the Eastern Pamir and Southern Fergana, is lighter in colour, the marginal band being narrower; — **elissa** Gr.-Grsh. (= *flavescens* Rühl), is still more yellow than *erythas*, but otherwise hardly different; — **arida** Alph. (26 e), from the Lob-nor and Kuku-nor, is paler than *eogene*, the apex of the forewing being more rounded; among this form there occur as aberrations **auritheme** Gr.-Grsh.: ♀♀ with yellow-spotted distal margin, and **wanda** Gr.-Grsh.: light-coloured ♂♂; — **stoliczkana** Moore, from Ladak, Southern Amdo and Southern Fergana, is a small form of *arida*, with the colouration of *edusa*; — *leechi* Gr.-Grsh. and *miranda* Fruhst. inhabit Sikkim, therefore being outside the Palaearctic Region.

C. dubia Fawcett, from Tibet, is about as large as *sulitelma*; the upperside is ochre-yellow, the costal margin of the forewing being greenish yellow, the distal margin of both wings blackish, bearing yellow wedge-shaped spots, the black middle spot of the forewing diffuse and the ochre-yellow middle spot of the hindwing large. The underside is green, the proximal portion of the forewing ochre-yellow, the submarginal spots brownish, at their distal side on hindwing small yellowish spots; middle spot brown on forewing, white edged with reddish on hindwing. In the ♀ the ground-colour of upperside paler, the dark margin of forewing broader, bearing small rounded yellow spots, the hindwing being darkened and bearing a large ochre-yellow middle spot and yellowish submarginal spots which vary in size.

C. thisoa Mén. (26 e), from Armenia, Persia and the Tarbagatai district, is light orange-red in the ♂, being somewhat darker in the ♀, with moderately broad black distal margins, which are spotted with yellow in the ♀; the black middle spot of the forewing variable in size; the large orange-red middle spot of the darkened hindwing of the ♀ very conspicuous. Underside of hindwing yellow in ♂, greyish yellow in ♀, with the usual *Colias*-markings, the proximal area of the forewing being more or less pale orange-red. — **aeolides** Gr.-Grsh. (26 e), from Southern Fergana and the west-side of the Issyk-kul, has a narrower distal marginal band and is more greenish beneath, being connected with *thisoa* by intergradations. — Flies at altitudes of from 7000 to 9000 feet from June to August; not rare.

C. viluensis Mén. (= *chilkana* Aust.) (26 f) is pale orange-yellow, with rather narrow blackish distal margin, light-centred middle spot on the forewing and very large, reddish-brown-edged middle spot on the hindwing. Underside pale yellow; hindwing dusted with greenish, the distal margins being pale blackish, the middle spot of the forewing having a light-coloured centre and the large white middle spot of the hindwing being double and edged with black; ♀♀ red or white, hindwing sometimes almost black. Patria: North-Eastern Siberia. — **dahurica** Aust., from Dauria (South-Eastern Siberia), has a paler ground-colour and more pointed forewing; the ♀ is said to be similar to the ♀ of *chrysotheme*.

C. lada Gr.-Grsh., from Amdo, is deep yolk-colour, with rather narrow black distal margin, the middle spot of the forewing small; ♀ with strongly darkened hindwing, the posterior portion of the distal margin being conspicuously yellow.

C. hyperborea Gr.-Grsh., from North-East Siberia (the valleys of the Lena and Jana), is golden red or golden yellow above in the ♂, having rarely a bluish gloss: costal margin of forewing and inner margin of hindwing sulphur-yellow, distal margin of forewing broadly blackish brown, dusted with sulphur-yellow, the "sex-mark" at the costal margin of the hindwing large, elongate, reddish, the black middle spot of the forewing elongate, often large, the middle spot of the hindwing large, golden red, fringes of forewing rosy red, of hindwing often sulphur-yellow. Underside of forewing light golden red, paler at the inner margin, greenish sulphur-yellow at the costal and distal margins, very little dusted with black, hindwing greenish, the silvery middle spot thinly edged with red-brown. The ♀ is darkened above by greenish or blackish scaling, the distal marginal band bearing 7 sulphur-yellow or yellow spots; hindwing darkened, the distal marginal band with large sulphur or golden yellow spots, which often form a band; fringe and costa of forewing rosy red. The underside of the hindwing yellowish greenish, the veins being bluish, the middle spot silvery, small, and thinly edged with red-brown. — Flies in June and July.

C. sulitelma Auriv. (= *hecla* Stgr., *boothii* H.-Sch., *citrina* Stgr.) (26 f) is the North-European form of *hecla* from Greenland. The upperside is pale orange-red: the marginal band is narrow and without spots in the ♂, being broader and strongly spotted with yellow in the ♀; middle spot of forewing black, that of hindwing orange-yellow, inconspicuous in ♂, but sharply marked in ♀, the hindwing of the ♀ being darkened. Underside of hindwing yellow in ♂, darkened by fuscous scaling, greenish grey in ♀, with conspicuous white or reddish middle spot, the proximal portion of the forewing reddish yellow. — ab. **sandahli** Lampa is a light ochre-yellow form; in Norway (Alten) there occur also specimens with the ground-colour sulphur-yellow: ab. **sulphurea** nov. — **orientalis** Gr.-Grsh., from South-Eastern Siberia, is larger, and the ♀ has larger sulphur-yellow marginal spots; this is perhaps a separate species. — *C. sulitelma* is common in some localities.

aquilonaris.

C. aquilonaris *Gr.-Grsh.*, from the valleys of the rivers Olenek and Jana (North-Eastern Siberia), is perhaps a local form of *hecla*. Upperside of ♂ golden yellow, with black-brown distal margin, the middle spot small, often almost absent, middle spot of hindwing large and red, costa and fringes of forewing rosy red; underside of forewing golden yellow, lighter at the distal margin, dusted with black, the submarginal spots blackish, small or nearly wanting; hindwing ochre-yellow, dusted with blackish, greenish at base, the double middle spot silvery white, broadly edged with reddish brown. The ♀ above shaded with greenish black at the costa and base of forewing, the broad black-brown distal margin bears small sulphur-yellow spots: hindwing darkened, blackish in middle, the sulphur-yellow submarginal spots small, the middle spot large, golden yellow; the underside olive- or ochre-yellow, middle of forewing light golden yellow, the hindwing sparsely dusted with brownish and greenish scaling. — Has been found about the middle of July.

chrysotheme.

C. chrysotheme *Esp.* (26 f), from Lower Austria, Bohemia, Hungary, Asia Minor, Armenia, and the Altai and Kentei Mts., is light or dark orange-yellow above, the moderately broad black marginal band is traversed by the yellow veins in ♂, the large black-brown middle spot of the forewing is mostly pale-centred, the hindwing has a large orange-red middle spot. The ♀ has the black marginal band broader and spotted with yellow, the hindwing being darkened. The underside is beautifully yellow, the proximal portion of the forewing being reddish, the submarginal spots of the forewing black, those of the hindwing brown, the middle spot of the forewing large, pale-centred, that of the hindwing double, mother-of-pearl colour, with

sibirica.

dark edge. — **C. sibirica** *Gr.-Grsh.* (26 g), from Siberia (occurring as aberration also in Europe), is paler, the ♂ has a broader marginal band, and the ♀ enlarged sulphur-yellow submarginal spots. The specimen figured

schuguwowi.

was found near Vienna. — ab. **schuguwowi** *Krulik.* is a ♀-form from South Russia with the ground-colour

hurleyi.

pure sulphur-yellow: — the form with whitish ground-colour, corresponding to *helice*, is named ab. **hurleyi**

wernerii.

Aign.; — ab. **wernerii** *Geest* is a form with strongly enlarged middle spot on the forewing. — Egg cylindrical, conical, sharply acuminate, feebly carinate, first whitish, later yellow. The young larva feebly hairy, dirty green, head blackish, after the 1. moult strongly setose, lighter green, with distinct white side-stripes, after the 2. moult more yellowish green, with darker head, after the 4. moult (adult) clothed with short bristles on the flattened head and on the body, beautifully sap-green, with sharply marked white side-line, in which the likewise white spiracles are situated, and which is divided by a usually interrupted bright red longitudinal line that is partly dilated to spots; gut shining through dark green: face, legs and venter more yellowish green; hibernating, sometimes till August, on *Vicia hirsuta*. Pupa greenish yellow, the tips of the veins of the wing-cases bearing darker dots and the abdomen having a usually continuous lateral row of black dots; emergence after 14 days (SPULER).

fieldii.

C. fieldii *Mén.* (26 g), from East and North India, Central and West China, etc., is very similar to *croceus*, but of a more fiery colour, not rarely with violet gloss: the underside with more dark markings.

leucania.

We name the white form of the ♀ ab. **leucania** *nov.* Apparently not rare.

*croceus**(edusa).*

C. croceus *Fourcr.* (= *edusa* *F.*, *hyale* *Esp.*, *helena* *H.-Sch.*) (26 g). With the exception of the most northern districts, this insect occurs throughout Europe, North Africa, the Canary Islands, Madeira, Western Asia, Persia, etc., being, however, very rare in North Germany. According to the rule of priority we have to deal with this species under its oldest name. *Croceus* is most likely a local form of *cleeto* *L.*, which is distributed all over Africa and described already in 1763. Upperside orange-yellow, the marginal band broad, traversed by the yellow veins in the ♂ and bearing yellow spots in the ♀; middle spot of forewing large, black, that of hindwing large, orange-red, little prominent in ♂, while it is very conspicuous in ♀ on account

striata.

of the darkened hindwing. Underside with the ordinary *Colias*-markings. — In ♂-ab. **striata** *Geest*, from

helicina.

Germany, the dark marginal band sends out rays towards the middle of the wing; — ab. **helicina** *Oberth.* is a

aubuissoni.

♀-form with whitish yellow upperside: — ab. **aubuissoni** *Caradja*, from South Europe and Asia Minor refers

helice.

to ♀♀ in which the hindwing above is grey and bears a large deep orange middle spot; — ab. **helice** *Hbn.*

pyrenaica.

(= *hyale* var. *Esp.*) (27 a) is the ♀-form with white ground-colour: — ab. **pyrenaica** *Gr.-Grsh.* is a very

faillae.

small form from the Pyrenees, Andalusia, North Africa, Sicily, etc.; — ab. **faillae** *Stef.*, from Sicily, is a

poveli.

♂-form in which all the veins are conspicuously yellow within the black marginal band right to the margin;

velata.

— ab. **poveli** *Aign.* is the name for ♀♀ without spots before the distal margin: — ab. **velata** *Ragusa*, from

caerulea.

Sicily, are specimens in which the black marginal band is shaded with greenish scaling, "appearing covered

with a veil": — ab. **caerulea** *Verity* is a ♀-form in which the underside is light sky-blue (?), the upperside having a strong silvery gloss (?); has been found in North-Tuscany. — Larva dark green, with a white or reddish, yellow-spotted stripe above the legs, spiracles golden yellow, head blue-green: hibernates, feeding till June or July on *Cytisus capitatus*, Sainfoin and various species of Trefoil. Pupa green, with a yellow side-stripe, the wing-cases being edged with yellow and streaked with black (SPULER). The butterfly is on the wing at the end of August and in September in North Germany, where it is very rare, being common in the South, where it flies much earlier, e. g. in Algiers already early in July; the flight is remarkably fast.

myrmidone.

C. myrmidone *Esp.* (27 a) is so very similar to the preceding species, especially in the ♀, that one is in doubt where to place certain specimens. The ♂ is on the whole somewhat deeper orange-yellow than the *croceus*-♂, the forewing is broader, the marginal band is somewhat more densely dusted with

yellow and the veins traversing the same are not yellow. The ♀♀ are on the whole of a more fiery colour than the *croceus* ♀♀. The underside of both sexes is more intensely coloured than in *croceus*. — The ♀-ab. *flavescens* Garbowski has the ground-colour yellow, being a transition therefore towards the white ♀-ab. *alba* Stgr. (= myrmidone ab. H.-Sch.) (27 a). — ab. *helma* Geest, white ♀♀ with the centre of the forewing slightly orange-yellow. — There occur not rarely specimens with a violet sheen: ab. *micans* form. nov. — ♀-ab. *inumbata* Schultz, ♀♀ with the distal marginal band bearing no spots. — ♀-ab. *agnes* Piesc. is the form corresponding to ab. *helicina* Oberth. of *croceus*. — The main-form has about the same distribution in Europe as *croceus*, but it is certainly very rare in Northern Germany, if it occurs there at all, and is absent from Asia. — In Bosnia and Herzegovina it is represented by the geographical form *balcanica* Reb. (27 a), which is larger and more deeply coloured, the ♀ being very variable; the white ♀-form is ab. *rebeli* Schau.; ♀-ab. *semialba* Wagner are white ♀♀ of *balcanica* in which the middle of the forewing is orange-yellow. — *ermak* Gr.-Grsh., presumably from the south-eastern Ural, is larger, the forewing being broader and the middle spots of the underside larger. — Egg long, spindle-shaped. Larva green, with dark dorsal line and pale green lateral one; till May and June on *Cytisus biflorus* and other species of *Cytisus*. At first the young larva gnaws at the leaf in the middle, later it starts feeding at the edge (SPÜLER). Pupa green, with a yellowish stripe at each side, the sides of the abdomen bearing small dark dots; before the butterfly emerges, the reddish yellow colour shines through the wing-cases. In South Germany the butterfly is on the wing from the middle of July, occurring locally in great abundance.

C. caucasica Stgr. (= myrmidone var. ? Led., aurora var. anna Gerhard) (27 b), from Armenia, is larger and more deeply orange-red than *myrmidone*, the distal margin being more broadly black; on the underside, which is similar to that of *myrmidone*, the very large central double spot of the hindwing is prominent. The ♀ is mostly yellowish white, rarely orange-red, bearing small light submarginal spots. — *olga* Rom., from Armenia, is presumably an aberration of *caucasica*; the black distal margin is broader and more sharply defined, and the yellow dusting more evenly distributed: the ♀ is hardly distinguishable from *aurora*; — ab. *alba* Rühl (= *olga* ab. Rom.) (27 b) is the white form of the ♀.

C. aurora Esp. (= *sibirica* Led.) (27 b), from the Altai, Kentei, Amur, Ussuri and South-Eastern Siberia, is a beautiful dark orange-red species. The veins are thinly black, being yellow however in the black marginal band. The hindwing is somewhat dusky, being again lighter before the black distal margin; the costa of the forewing is yellow, the moderately large middle spot of the forewing pale-centred, the large orange-red middle spot of the hindwing contrasting with the ground. The underside of a beautiful yellow, with sparse markings, the black middle spot of the forewing pale-centred, and that of the hindwing the colour of mother of pearl, edged with brownish, being sometimes double. The ♀ has the ground-colour orange-red, or yellow, or white; the white ♀♀ are named ab. *chloë* Er.; in the marginal band there are bright yellow spots, which are often united on the hindwing to form a band. — *decolorata* Stgr., from Dauria, is a lighter coloured local form.

C. diva Gr.-Grsh. (27 b), from Amdo, is in the ♂ red-orange dusted with dusky, the sharply defined marginal band being black-grey, traversed at the apex by yellow veins, the middle spot of the forewing being black and that of the hindwing yellowish red. The ground-colour of the ♀ is red, yellow or white, the hindwing being sometimes all black except the submarginal spots and the middle spot. The underside is extremely pale greenish yellow, and almost without markings.

C. aurorina H.-Sch. (= *tamara* Nordm., *chrysocoma* Ev., *chrysocome* Frr.) (27 b, c) occurs in the mountains of Armenia. It is one of the largest species of the genus. The upperside of the ♂ is dusky orange-yellow, with moderately broad blackish brown marginal band which is traversed at the apex by yellow veins, the rather large middle spot of the forewing being blackish brown and that of the hindwing large and orange-red. The ground-colour of the ♀ is somewhat brighter red, the dark marginal band bearing large yellow spots, which on the hindwing form a proximally dark-edged band, the dark marginal band being obsolescent. — In *libanotica* Led., from Syria and Persia, both sexes have the ground-colour yellow. — *taurica* Reb. (27 c), from the Cilician Taurus, differs in the ♂ only in the paler underside; the ♀ however, of which the yellow and white forms seem to be equally frequent, is further distinguished by the remarkably broad yellow resp. white macular band of the hindwing, the spots posteriorly being completely merged together. — *heldreichi* Stgr. (27 c), from Greece and Morea, is smaller, darker orange, with a slight violet sheen; the white ♀-form from Morea is *fountainei* Aigner. — *transcaspica* Christ. (27 c), from Western Tura, is much less ochre-yellow in both sexes. — Flies in June and July, and does not appear to be common.

C. chlorocoma Christ., from Southern Armenia (Kasikoparan), is presumably a local form of *libanotica*; it is large, the ground-colour being greenish in the ♂, white in the ♀. Apparently very rare.

C. sagartia Led. (27 d), from Persia, has the ground-colour bluish-greenish in the ♂, the black marginal band of the forewing being broad and bearing yellow submarginal spots, the middle spot large; the hindwing bluish white, with a rather sharply defined black marginal band, before which there is a row of

yellowish spots, the middle spot also being yellowish. The ground-colour of the ♀ is lighter, the submarginal spots larger and bluish white; the middle spot of the hindwing yellow. The underside is yellowish in the ♂, bluish white in the ♀. — In ab. *pullata* *Neuburger* the black colour is more extended, the yellowish spots there-
daubii. fore having almost disappeared. — ♂-ab. *daubii* *Geest* has a green ground with yellow dusting; the bluish tint and the black marginal band of the forewing are completely absent, only the hindwing having a narrow
lisa. marginal band. — ♀-ab. *lisa* *Geest* is the white or slightly yellowish form. — *C. sagartia* is not a rarity.

wiskotti. **C. wiskotti** *Stgr.* (27 d), from the Saratshan district, is as beautiful as it is variable. In the nymotyp-
 ical form the upperside of the ♂ is greenish yellow with more or less orange-yellow dusting; the black
 marginal band, which occupies nearly half the wing, is traversed by the thin yellow veins, sometimes being
 strongly dusted with yellow; the hindwing, which is almost the same in colour and pattern as the forewing,
 bears a large yellowish or reddish middle spot which touches the black marginal band. The underside is
 yellowish or greenish, there being no markings besides the black middle spot of the forewing, the white,
 reddish-edged middle spot of the hindwing and the rosy-red distal edge of both wings. In the ♀ the upper-
leuca. side bears more or less light spots in the black marginal band. — ab. *leuca* *Stgr.* (27 e) is the white ♀-
separata. form. — **separata** *Gr.-Grsh.* (= *seres* *Gr.-Grsh.*) (27 e), from South Fergana and Eastern Bucharā, has the
 ground-colour of the ♂ greenish yellow, the ♀ being golden yellow with a narrower black margin; among
leucotheme. this form there occurs as a ♀-form ab. **leucotheme** *Gr.-Grsh.* with whitish yellow ground-colour and, on the
aurantiaca. hindwing, a marginal macular band. — **aurantiaca** *Stgr.* (27 e), from the same places as *separata*, has a
chrysoptera. golden yellow ground-colour in the ♂ and narrower black distal margin. — **chrysoptera** *Gr.-Grsh.*, from
draconis. the North-Western Pamir, is smaller, both sexes being golden yellow. — **draconis** *Gr.-Grsh.* (27 d), from the
sagina. south-west side of the Issyk-kul, is a larger form than *chrysoptera*. — **sagina** *Aust.*, from Eastern Bucharā,
alexandra. is smaller, below more green and spotted with black. — **alexandra** *Stgr.* i. l., from the Alexander Mts.,
 is intermediate between *chrysoptera* and *aurantiaca*; the veins are sulphur-yellow also in the orange portion
 of the wing. — *C. wiskotti* is common, but difficult to catch, flying very rapidly and persistently up and
 down the steep mountains of its home, rarely settling to rest; only during the cooler hours of the morning
 is it possible to obtain the insect.

23. Genus: **Leptidia** *Billb.* Wood-Whites.

The main characteristics of this genus, which stands quite isolated among the Palaearctic Pierids, are the very small cell of both wings, only measuring about one-fourth of the length of the wings, and the position of the subcostal nervule of the hindwing, this vein branching off far beyond the apex of the cell. The latter character, as well as the position of the subcostals and radials of the forewing prove the close relationship of this genus with the South-American genus *Dismorphia* *Hbn.* *Leptidia* is purely Palaearctic. North-America presumably was formerly inhabited by forms allied to both these genera. The species of *Leptidia* appear in two broods. The butterflies are especially met with at the borders of woods and on meadows in the woods, their flight being slow and unsteady. The larvae are slender, tapering at both ends, and short-hairy, feeding on Papilionaceae, especially Vetch and Lotus. The pupa is elongate, angular, and slender.

sinapis. **L. sinapis** *L.* (= *sartha* *Rühl*) (27 f). Upperside white, with black apical spot, which is absent from
 the ♀; underside feebly yellowish white, with shadowy darker apex to the forewing and similar markings in
lathyri. the middle of the hindwing; summer-form. — The spring-form **lathyri** *Hbn.* (27 f) has dark green markings
sartha. on the underside of the hindwing. — ab. **sartha** *Rühl* has the underside of the hindwing yellowish. — In
subgrisea. ab. **subgrisea** *Stgr.* the underside of the hindwing is neither greenish nor yellowish, but grey. — ab.
erysimi. **erysimi** *Borkh.* is white above and below. Occurs throughout the distribution-area except the Arctic Region. —
diniensis. The summer-form occurring in South-Europe, Asia Minor and Syria, is **diniensis** *Boisd.* (27 f), the underside
major. of which is entirely white. — In Croatia **ARNOST GRUND** has found the following forms: ab. **major** *Grund*
 (27 f), a large form of the summer-brood, the underside being white, with a yellowish tint only towards
croatica. the edges: ab. **croatica** *Grund* (27 f), a form of the spring-brood, the black apical patch being separated
flavescens. into stripes; and ab. **flavescens** *Grund*, a summer-form with the upperside feebly yellow. — In China
sinensis. (Shanghai) there occurs **sinensis** *Bthr.* (not known to us in natura); wings longer than in *sinapis*, fringes
 reddish brown; forewing dusky at the base, costa and apex reddish brown, a large, ovate, black subapical
 patch; underside white, fringes as above, anterior part of costal edge and the apex ochre-yellow, the centre
 of the wing and a large subapical patch greyish green, a white spot on the upper disco-cellular. Is perhaps
 a form of *amurensis*. — The butterfly does not occur everywhere, but is usually not rare at its flight-
 places. Egg yellowish white, cylindrical, ribbed longitudinally, very long. Larva green, with a bright-
 yellow longitudinal stripe above the legs; feeds on Lotus, Lathyrus, and various species of Vetch. Pupa
 ochreous, with a reddish yellow lateral stripe, within which the spiracles appear as white dots; wing-cases
 striped with reddish brown (SPÜLER).

amurensis. **L. amurensis** *Mén.* (27 g), from the Amur, North China and Japan, is especially characterised by
 the elongate forewing. The upperside is white, the ♂ having a larger blackish subapical patch, which is

absent from the ♀ or is much smaller and less well marked; the underside is white, with a yellowish apical spot on the forewing and grey shadowy markings on the hindwing. — The spring-form *vernalis* Graes. is *vernalis*. smaller, being darker beneath. — *vibilia* Janson, from North Japan, has more pointed wings than *amurensis*, *vibilia*. being similar to *duponcheli* in markings and colour. — *morsei* Fenton is apparently an aberration in which *morsei*. the subapical spot of the forewing above is less developed.

L. duponcheli Stgr. (27 g). from South France, the eastern districts of South Europe, Asia Minor, *duponcheli*. Armenia. and Persia, differs from *sinapis* in the marking of the underside, as shown in the figure. — In the summer-form *aestiva* Stgr. (27 g) the upperside is feebly, the underside more strongly yellow, the latter *aestiva*. being without markings.

L. gigantea Leech (27 g). from Central and West China, is considerably larger than the other species *gigantea*. of *Leptidia*. Upperside of the summer-form feebly yellowish white, with a blackish subapical spot; underside like upper, but the hindwing with the submarginal dark marking feebly developed. — In the spring-form *immaculata* Leech the black spot is absent from the upperside of the forewing, the upperside is somewhat *immaculata*. more yellowish, the veins are distinctly dark-scaled, and the markings on the underside of the hindwing are much stronger. — GROTE has erected the genus *Azalaïs* for this species, which we think was unnecessary.

Corrections and Additions

to the Palaearctic Pierids.

Pieris napi ab. *fumigata* Gillmer is evenly smoky grey above and below, the fringes and the costa *fumigata*. of the forewing are pale yellow, the veins being of the same colour in the distal half of the underside, while the proximal half is blackened and the veins are all black on the upperside.

Pieris minor Costa is to be considered a form of *ergane*, according to recent researches of Count EMILIO TURATI; there are likewise no black spots on the underside of the forewing. Another form. corresponding to *P. manni rossii*, will soon be described by Count TURATI under the name of **rostagni**. *rostagni*.

Euchloë belia ab. *philippsi* Rudolph, from Dalmatia, is a form of the spring-brood in which the *philippsi*. back apical marking extends into the cell, the costal margin and the middle of the hindwing moreover being dusted with black. — According to the observations of A. v. CARADJA *E. belia* flies in South France as *ausonia* again in September and October (i. e. as a third brood), and the larva feeds also on *Biscutella laevigata*.

Anthocharis cardamines ab. *lutea* Gillmer, a pure yellow instead of orange form, has been found *lutea*. near Regensburg; it is an aberration of the so-called typical form, while ab. *crocea* Rüb. belongs to *turritis*. — ab. *cinerea* Neunham has ashy grey instead of green markings in the apical area of the forewing beneath. *cinerea*.

Gonepteryx cleopatra mauretanica form. nov. has been discovered by Dr. SEITZ on June 2. 1907 *mauretanica*. in South Algiers (near Batna). It is characterized by the underside being of a peculiar whitish green tint contrasting sharply with the yellow colour of the middle of the forewing. This appears to be the prevalent form in South Algiers, *italica* also occurring there frequently, while the ordinary *cleopatra* is apparently absent.

Page 46 read **P. ab. crucivora** Boisd. instead of *Btlr*.

Euchloë belia matutia Tur. was found in Western Liguria (San Remo and Bordighera) from February till April, not in Sicily.

Alphabetical List

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3. Family: **Danaidae.**

The Danaids are a family which is very rich in species and almost entirely restricted to the tropical and subtropical districts of both hemispheres. They are nearly everywhere the most prominent forms of Lepidoptera, especially on account of their appearing in enormous numbers of individuals, also being dominating as compared with all other insects on account of their bright colours, which contrast with the environment.

The butterflies are mostly large, the wings being entire with smooth-edges, without appendages. The cell always is closed in both wings. The upper discocellular of the forewing is absent or very short. The foreleg is modified into a brush, especially in the ♂♂. The antenna is always gradually thickened, not being robust and having no distinct club. The scent-organs of the ♂♂ are well developed; these are variously formed grooves and folds into which sometimes enter brushes or tufts of long hairs, or they are velvety spots and discs. There are also characteristic white dots on the head and thorax of all the Danaids.

The larvae are smooth, variegated, bearing fleshy filaments on the thoracical segments and on the subanal rings; these appendages are not retractile like the fork in the neck of the Papilios, but the anterior pair is movable and is often used as an organ of touch, the larva examining with it the place onto which it is going to crawl. Most of the larvae of Danaids grow very quickly, developing into a short, stumpy chrysalis, which frequently is ornamented with magnificent ridges of gold and sparkling tubercles, or which has a golden glitter over the whole surface.

The butterflies have a very slow and awkward flight; they are gregarious, gathering often in large swarms or dancing in dozens about the tips of branches and shrubs or congregating in dense masses to rest on pendent branches, especially climbers. They are not at all shy and hardly endeavour to escape, it being sometimes scarcely possible to scare them away from flowering trees which are loaded with swarms of them. Like all protected Lepidoptera, they are very tenacious of life; their thorax is soft like rubber, containing an oily yellow liquid which occasions a nauseous, burning sensation on the tongue, when one bites through such an insect (HAASE).

The few genera of Old-World Danaids mostly contain a very considerable number of forms, which are so closely related to one another that dozens of them have often been treated as belonging to one species. The Danaids are doubtless quite a recent group, the development into species frequently is still incomplete, and their distribution-area becomes at the present period from year to year more extended inspite of the low grade of adroitness in flight which these insects possess.

The most notable development of the family is the purely Oriental genus *Hestia*, consisting of transparent white, black-marked forms of conspicuous size. These giants float like large Japanese paper-butterflies through the dense forests of the Oriental tropics, fluttering through the air with half-erect wings, often without moving these for minutes when chasing each other in amorous play. One sees them float up and down especially at small brooks in the woods; their slow swinging movements afford such a strange spectacle that even the uninterested people of the Eastern tropics have woven legendary lore around these Danaids.

1. Genus: **Danais** Latr.

Large brownish yellow or green butterflies, with black veins, the wings being large and stiff, the antennae thin, hardly incrassate at the tip, and the palpi short and erect. Tongue always well developed and strong. The butterflies when sucking hang clumsily at the flowers, mostly with closed wings, and with some caution may be caught with the fingers. — The larvae feed on Asclepiadeae; they are mostly ornamented with bright rings and have fleshy filaments on the sides of the 3. segment, and two more, shorter ones, on the 12. Pupa with golden ridges. — They inhabit all the hot countries of the globe, belonging there to the every day occurrences, showing preference for the flowering gardens and enlivening the streets of the towns in the tropics. The larger portion of the Palaearctic Region, however, harbours no representative of this genus, which penetrates into the Region only from the South and West. Many species have immigrated into the Palaearctic countries but during historical time.

Perhaps mainly in order to avoid losing oneself among the large multitude of forms so similar to each other, the old genus *Danais* has been split up in quite a number of genera, mainly based on differences in the secondary sexual characters. A more detailed account of these attempts at dividing the genus will be given (in Tome III) when dealing with the Danaids of the Indo-Australian Region.

D. chrysippus L. (28a). Honey-yellow, wings margined with black, the forewing with black apex *chrysippus*. bearing a white sinuous oblique band accompanied by white dots; costal area darker brown. On the Canary Islands and the opposite districts of Morocco, also in North-East Africa: Egypt, Tripolis; in the whole of

Syria, in Greece, Asia Minor, Arabia, Persia, Kashmir, South Turkestan, and Tibet: in West and Central China and on the most southern islands of Japan: besides, in the whole Aethiopian Region, South Asia and North Australia; *chrysippus* has also been observed in South Italy as a wanderer. The absence of the *cratippus*. insect from Algiers is very remarkable. — In the form *cratippus* *Fldr.* (28a), which frequently occurs in Anterior Asia and India, but not exclusively, the honey-yellow colour of the forewing is entirely replaced *alcippus*. by brown, with the exception of a patch at the anal angle. — In ab. *alcippus* *F.* (28a) the hindwing is *alcippoides*. white, except the margin and some yellow scaling at the base. In Syria and Asia Minor, as well as in most localities in Africa, among the nymotypical form, often commoner than the latter. — As ab. *alcippoides* *Moore* a form has been designated which occurs in the Palaearctic Region only on the Canaries and in the opposite districts of Morocco, but is frequent in other parts of Africa; it is a transition — from *alcippus* to nymotypical *chrysippus*, the hindwing not being all white except the margin, but only shaded with white on *dorippus*. the disc. — *dorippus* *Klug* (28b), a form which flies together with *chrysippus* in Syria and especially on the coasts of the Red Sea (elsewhere: all over Africa and in Western India), pairing with *chrysippus*, but no intergradations have ever been found; entirely honey-yellow, edged with black, the black and white *klugii*. apical area of typical *chrysippus* being absent. — *klugii* *Btlr.* (28b) is a *dorippus*-form in which the basal *albinus*. half of both wings bears a dark suffusion; in many places together with *chrysippus*, but rarer. — ab. *albinus* *Lanz* (28b) has the hindwing washed with white, standing about in the same relation to *dorippus* as *alcippoides* to *alcippus*; in North Arabia (also near Aden and in Africa). — Larva light; all the segments marked with black transverse lines of different thickness, between which there are yellow spots; the 3., 6. and 12. segment each bear 2 pointed, flagellate, fleshy appendages, the anterior ones being the longest; on Asclepiadeae, especially *Asclepias curassavica*. Pupa light green or clay-colour, somewhat transparent, with a black-edged transverse golden ridge across the black and golden points. The butterflies occur, where it is warm enough, all the year round at every conceivable place, even in the streets, being found in the mountains up to an altitude of 2000 m. In cooler districts they appear only in summer, but belong to the commonest insects while they are on the wing. The flight is flapping, at times somewhat sailing, always slow, straight on and very awkward. Also their rising from the ground and out of the grass is a clumsy proceeding, every specimen flying by being easily captured, if it does not accidentally work upwards out of reach. In the net, too, these insects move so little that they hardly ever tear the wings.

genutia. **D. genutia** *Cr.* (= *plexippus* *F.*) (28e). Similar to *chrysippus*, but the honey-yellow disc of both wings is traversed by thick black veins. — In Southern Kashmir and Central and West China, generally not frequent. But very common in the Oriental Region; in the southern Himalayas and in South China sometimes in abundance. — Larva black, with fleshy filaments on the 3., 6. and 12. segments; each segment with white and yellow transverse stripes and dots; on *Raphis*, *Passularia*, and *Ceropegia intermedia*: when young sitting mostly on the underside of a leaf. Pupa transparent green, with black dots on silvery and golden points.

D. genutia is an excessively common butterfly in many place of the Indian fauna. One sees often whole swarms whirling about like dry leaves, and at the resting places long rows of these insects are gathered on the pendent lianas, sitting sometimes so close together that the specimens touch one another. They have two periods of flight: in spring and again in the autumn, principally in October, when they are especially abundant: however, single individuals occur all the year round. — The ♂♂ have a distinct scent-pouch on the hindwing.

plexippus. **D. plexippus** *L.* (= *archippus* *F.*, *erippus* *Cr.*, *megalippe* *Hbn.*, *menippe* *Hbn.*) (28c). Larger than the previous: the honey-yellow wings traversed by dark veins as in *genutia*, but without the white sub-apical band on the forewing. — On the Canary Islands, not rare; elsewhere widely distributed in America and Australia and the islands belonging thereto. — The larva lemon yellow, densely ringed zebra-like with black; fleshy filaments on the 3. and 12. segments; on *Asclepias*. Pupa light green, somewhat transparent; transversely across the back a black-edged golden ridge.

The original home of this butterfly is America, which is inhabited from Canada to Patagonia by a number of local forms. In the extreme north of its distribution-area it appears only as a wanderer, not being able to maintain itself there, as the food-plant does not occur. I have always found the larva at large on *Asclepias* only, but young caught caterpillars accept as food also lettuce, thriving very well on such food. From North-America, where it is known under the name of "monarch", *plexippus* has become distributed towards the South-West beyond the Pacific Ocean to Australia.*) Old resident collectors have told me that *plexippus* was unknown there about the middle of the 19. century, and until quite recently one could observe that it became commoner every year. Towards east the butterfly, likewise during historical time, has reached the Canaries, belonging since to the Palaearctic Region.

*) Presumably the pupae have been introduced in trusses of hay.

Although the flight of *plexippus* is slow and awkward, it is nevertheless untiring, and sometimes the insect sails for long stretches holding the wings expanded without moving them. I very often saw *plexippus* at sea flying at a very considerable height, and observed that it could settle on the surface of the water with the wings expanded and rise again without difficulty into the air. Several times it has happened that single specimens reached Europe and were caught in Portugal and Great Britain, so that in future it may possibly become acclimatized in South Europe where *Asclepias* occurs.

D. septentrionis Btlr. (28d). Black, both wings marked with transparent light bluish green streaks *septentrionis* and dots. The ♂ has, between the 1. median vein and the submedian, a scent-organ which appears as a grey-brown silky spot above and as a projecting crescent-shaped fold beneath. In Southern Kashmir, rare, in April and again from July to October; common in West China, in the mountains up to 1500 m. — The larva is said to be similar to that of the following species and to feed on *Vallisneria spiralis*. This butterfly is distributed over a very large portion of the Oriental Region, being extremely common in many places, for instance Ceylon.

D. limniace Cr. (= *exotica* Gmel.) (28e). Similar to the preceding, the ground-colour less deep *limniace*. black, the Nile-green streaks and spots much larger, partly confluent. Scent-organ as in *septentrionis*. In Kashmir, common, but not every year, in May and again in autumn (Young). — Larve light yellowish green, with numerous black transverse stripes and yellow side-stripes; head and abdominal legs spotted with black; the filaments black and light green: on *Asclepias*. Pupa green, somewhat constricted behind the thorax, with raised golden dots.

Though *limniace* occurs in great abundance in Southern China (Swatow, Hongkong), the specimens from there being among the largest of this species, it apparently does not reach in China the Palaearctic boundary, entering our Region only in Kashmir.

D. melaneus Cr. (= *ephyra* Hbn.) (28d). Likewise similar to the previous forms, but the ♂ without *melaneus*. the crescent-shaped lobe on the underside of the hindwing, bearing instead a black velvety spot near the anal angle. Ground-colour in both sexes darker brown and the cellules of both filled in with vitreous light green. In West China, eastwards to Chang Yang, common, from May to October in several overlapping broods; flies in woods. The Palaearctic spring-specimens are partly essentially smaller than Indian specimens; many individuals are much larger than the one figured.

D. tytia Gray (= *sita* Koll.) (28e). The largest Palaearctic Danaid. Basal half of both wings for *tytia*. the greater part Nile-green; distal half of the forewing black, spotted with green, that of the hindwing cinnamon-red. In Kashmir, not rare in woods, all through the summer. In China everywhere; Japan, not rare; Askold (OBERTHÜR). — Larva dirty white, blackish above, with 2 dorsal and 1 lateral row of yellow spots; head black, spotted with grey, legs black; on *Marsdenia roylei*. Pupa pale glassy green, with golden yellow spots.

The butterfly occurs especially in woods, flying faster than most Danaiids and resting on quite thin, dead, pendant branches. The separation of the continental specimens from the Japanese ones is based on minor differences and hardly holds good.

2. Genus: **Euploea** F.

Rather large insects which are nearly all black-brown, having sometimes a magnificent blue gloss. The shape of the forewing is often different in the sexes, the hindmargin being in the ♂♂ of these forms strongly excurved. Antenna not strong, very gradually incrassate. Like all genera containing a very large number of forms, also the present one has been divided into numerous genera according to the development of the scent-organs of the ♂♂. The genus is almost exclusively an Indo-Australian one, very few forms occurring in Africa, and only one species extending into the Palaearctic Region. *)

The Euploeaes are among the most characteristic butterflies of the Oriental Region, playing the same part as the Neotropids in America. They are entirely confined to the warm districts, quickly diminishing in number from the Equator north- and southwards. Except in the outlying districts nearly all the species are extremely common where they occur. They congregate sometimes in large swarms, sometimes they migrate singly, the specimens flying along the roads in the woods almost at equal distances. The flight is slow, little progressing, awkward, but, as the name implies, not inelegant when the butterfly abandons itself to the wind and floats through the air. These insects have two periods of flight daily, the first from 9—12 and the other from 3—5 in the afternoon. They are busy visiting flowers, especially the blossoms of *Latania*, often covering the flowering trees like black clouds.

*) Of a second species, *Euploea vestigiata*, 2 specimens exist from the West Chinese province of Kwei-chow. However, the Euploeaes being much given to wandering, one may consider these individuals as stray specimens till further data become known about the occurrence in the Palaearctic Region. Moreover, the province Kwei-chow lies for the greater part in the Oriental, not in the Palaearctic Region.

midamus. **E. midamus** L. (= *linnaei* Moore) (28 e). The ♂♂ of this species, which is distributed over a large portion of India, are velvety black with a magnificent cyaneous gloss, which is especially intense in the live insect on the sparsely white-dotted distal half of the forewing. In the ♀♀, which have only occasionally some slight blue gloss, both wings are strongly marked with streaks and dots, the dull black ground-colour being much reduced thereby, which gives the insect a superficial similarity to a green-marked *Danaïs*. Central and West China, near I-chang and at the Upper Yang-tse-kiang, whence I received specimens from JANKOWSKI. In Kashmir, in the Kulu district, the species approaches the Palaearctic boundary, and stray specimens possibly may also occur in our Region, but certainly only as occasional visitors.

The larvae plump and fat, dull yellowish white, each segment with black lines and yellow bands. 3 of the 4 pairs of soft filamental appendages are placed on the anterior part of the larva, the 4. pair on the 12. segment: they are ochreous with black tip, which is sometimes curved backwards. On creepers, according to HORSFIELD also on a species of *Ficus*. Pupa short and stout, dorsally incurved, brownish yellow, with metallic golden gloss in many places and with blackish markings. The butterflies occur in spring and again in October, then being more common. Though the species is very abundant in India, it is relatively rare in the Palaearctic Region. They are ardent visitors of flowers, at which they are hanging with the wings always firmly closed. They may simply be swept off the flowers with the net, as they hardly attempt to escape, and they fly so badly that every specimen may be considered a sure catch, if it is in reach.

For this species and its allies, in which the costal area of the hindwing above is whitish and has a silky gloss, the genus *Trepsichrois* Hbn. has been erected.

Alphabetical List

of the Palaearctic forms of Danaidae with references to the original descriptions.

* signifies that the form is also figured in the place quoted.

albinus Dan. *Lang.* Iris IX, p. 130.

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alcippus Dan. *Fabr.* Enum. Spec., p. 50.

chrysippus Dan. *L.* Syst. Nat. (Ed. X), p. 471.

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melaneus Dan. *Cram.* Pap. Exot. I, p. 48. *

midamus Eupl. *L.* Mus. Utr., p. 251.

plexippus Dan. *L.* Syst. Nat. (Ed. X), p. 471.

septentrionis Dan. *Btlr.* Entom. Monthl. Mag. 1874, p. 163.

tytia Dan. *Gray.* Lep. Ins. Nepal., p. 9. *

4. Family: **Satyridae.**

This family, so extraordinarily rich in species and still more in individuals, has been united by HAASE with the Morphids and Brassolids to form the large group of Satyromorphae. In the shape and the habits of the larva, the structure of the pupa, and the coloration, pattern and manner of flight of the imago these 3 families approach each other as closely as in the neurulation, the antenna and the form and development of the legs. In contradistinction to these Satyromorphs there are the Danaomorphae on the one side and the Acraeomorphae on the other, a more detailed account of this division being given in the chapter dealing with taxonomy.

One peculiarity in the neurulation of the Satyrid wing is the cystoid dilatation of one or the other vein in the basal area of the forewing, bladder-like inflations of the principal nervures being visible either on the upper- or on the underside of the forewing. The arrangement of the veins is not essentially different from that of the Acraeomorphae, except that in the true Satyrids the cell is always closed in both wings, while in the former it is not the case throughout.

The antennae are mostly delicate, being gradually incrassate at the apex, sometimes however bearing a broad club (*Satyrus*), and are never above medium length. The palpi are flattened laterally, and densely covered with bristly hairs; also the eyes sometimes hairy; tongue strong. The anterior legs of both sexes modified into brushes, the two posterior pairs of legs strongly developed. Egg round, smooth or finely reticulate. Larva spindle-shaped, with rounded head, which occasionally is pointed or bears horns; body finely granulate or clothed with a short pile, without ramified thorns, the anal segment sometimes terminating in 2 points. They feed on Monocotyledons, such as grass, bamboo, palms, etc., being concealed in day-time, feeding at night. The pupa either is suspended by the cremaster or lies free on or in the ground; it is entirely or almost entirely immovable, the anterior end being obtuse and the abdomen curved ventrad.

The Satyrid butterflies are different in size, but very similar in shape. The forewing is as a rule sombre coloured, being above mostly brown, and has the usual outline i. e. triangular with convex costal margin, the hindwing being mostly ovate or circular. The forewing rarely bears projecting angles, which correspond to anal projections of the hindwing, giving the resting butterfly the form of a dry leaf, the pattern of which is imitated on the underside of the wings.

The Satyrids are not protected; no acrid fluids, no vegetable poisons absorbed with the food render them unpalatable for their enemies. They would therefore be the prey of these in still larger numbers, if a tumbling and quite irregular zigzag flight did not render it very difficult for the bird to catch the insect in the air, and if the body was not so very slender and moreover often strongly hairy as to make it hardly worth while to catch the insect. Young insectivorous birds, like the fly-catcher and red-start, often may be observed chasing species of *Epinephele*, but one will soon perceive, how difficult it is for the bird to catch the butterflies which continually tumble from one side to the other. This chase, however, appears to be only playing or practising, as at other times the birds leave the flying Satyrids entirely unmolested.

The Satyrids are almost generally only a short time on the wing, the period of flight hardly lasts some weeks. In the time of appearance the sexes differ very markedly, during the first 2 or 3 weeks of the flight-time the specimens being almost exclusively males, while towards its close there exist only females. Almost in every place where they have two broods, seasonal dimorphism obtains, there occurring also a kind of polychromatism in some genera, as for instance in *Melanargia*, of which one can find in the same locality specimens with yellow or pure white ground-colour, with variegated or unicolorous underside; on the whole, however, polychromatism is scarce among the Satyrids.

The Satyrids are usually very local, their flight-places being restricted to certain mountain-sides or certain localities in the woods; here, however, they are mostly in abundance, really rare Satyrids being hardly known. The local occurrence often depends on the distribution of the food-plant, which is often one single kind of grass, but also physical conditions are of great importance, as for instance the occurrence of certain trees, of chalky soil, etc. The plains are inhabited by very few species, by far the larger majority of the Satyrids being confined to the mountains, often to very definite mountain-ranges, many forms, as in Zygaenids, even being found but in one certain restricted locality, a phenomenon which, for instance, is not known to occur among the Pierids and Nymphalids.

The time of flight is not restricted to the hours when the sun stands highest, as in the case of the other butterflies. On the contrary, the Satyrids frequently are still on the wing late in the day, and certain genera, like *Lethe* and *Melanitis* contain decided night-insects, which take to the wing in day-time only when disturbed, flying about only after sunset to feed and mate. Such species come to the light of the collector's lamp. The sombre coloured species prefer as flight-places shady localities, such as deep rocky ravines, forest-roads densely covered by trees, and dense undergrowth. Whereas nearly all the other butterflies are on the wing only during sun-shine, many Satyrids, especially in the Tropics, prefer dull days, for instance *Ypthima* and *Mycalesis*.

1. Genus: **Aerophthalmia** Fldr.

The species of this genus are not large and have a very extraordinarily small and delicate body. The wings are relatively broad and rounded. The subcostal of the forewing is very strongly and evenly inflated from the base to beyond the first third. In this character the species resemble the next genus. They differ, however, in the first subcostal branch standing at the apex of the cell and in the subcostal and first radial of the hindwing being on a longer stalk. Very few forms of this genus are known, inhabiting the Malay Archipelago and the Philippines, and resembling each other very closely. Nothing is known of the larvae. Only 1 species occurs in the Palaearctic Region, being found by LEECH in Se-chuen in West China. The form of the body and wings points to a weak skipping flight.

thalia. **A. thalia** Leech (29 a). Dull dark brown; a white band runs from the costa of the forewing to the anal margin of the hindwing: at the apex of the forewing and at the anal angle of the hindwing a dark ocellus, which, on the underside, bears a white pupil and a yellow ring. Near Omi-shan and Pu-tsu-fong, in July.

2. Genus: **Ragadia** Westw.

Similar to the previous genus in size and delicacy of form, but the forewing much more pointed, the apex of the hindwing moreover being less rounded. The ♂ has on the hindwing beneath a prominent longitudinal fold which is situated at the lower margin of the cell at an elongate groove. The forms of *Ragadia* hitherto described are distributed over a large portion of South Asia, but are absent from the South Indian Peninsula, Ceylon and the whole of Anterior Asia, occurring in the Malay Archipelago and the Himalayan countries. HAMPSON, who regards all the forms as varieties of one species, possibly may go too far, although certainly some of the forms are only local races of others. — The Ragadias are fond of open clearings covered with second growth; here they skip about, resting with the wings half open on shrubs or on the ground.

latifasciata. **R. latifasciata** Leech (29 a). Similar to *crisilda* from Sylhet and *annulata* from Borneo. A white oblique band, pointed in front, extends from the apex of the forewing to the middle of the anal margin of the hindwing. Distally to this band there is a row of ocelli, which are especially prominent on the underside. — At Mupin, in July; appears to be rare (LEECH).

3. Genus: **Mandarinia** Leech.

The only species of this rather isolated genus is a medium-sized butterfly with a very strong body. The distal margin of the forewing is quite straight in the ♂, the apex being almost exactly rectangular. This shape of the forewing, the absence of a basal inflation from all the veins, as well as the very convex costal margin of the forewing separate this genus from the other Satyrids and point towards the Morphids resp. Amathusiids.

regalis. **M. regalis** Leech (29 a). Black-brown, with violet gloss, which is especially strong in live specimens. Forewing with cyaneous glossy oblique band, which is broad in the ♂, narrow in the ♀. — In Central and West China: local, and not plentiful.

4. Genus: **Mycalesis** Hbn.

Weaker and more delicate than *Mandarinia*. The antenna very thin. The eye naked or hairy. The wings of the Palaearctic forms dark brown with rudiments of a row of submarginal ocelli, of which now this now another is more conspicuously developed. The subcostal of the forewing is always inflated at the base, sometimes also the median nervure. The ♂♂ possess scent-organs, placed sometimes here sometimes there on the wings. A very large number of species are known from the warmer districts of Asia and Africa, and the genus has been split up into numerous genera, perhaps only for the sake of lucidity. But the species exhibit great similarity biologically and morphologically. It is noteworthy that strongly developed seasonal dimorphism obtains in a number of species, these insects having an ocellate underside during the rainy season, and a non-ocellate, leaf-like underside in the dry season (the winter).

The *Mycalesis* occur on roads and clearings, on rocks, in shrubs, etc.; most of them recall our *Aphantopus hyperanthus* in their external appearance. They flutter in a tumbling flight a few paces and then settle with firmly closed wings on a leaf or on the ground, with preference among dry leaves. They are nearly all very common where they occur, and are easy to catch, as they are by no means shy and fly always low. However their wings are very delicate, the margins as well as the scaling, the specimens taken home are therefore easily injured.

The larvae remind one of those of our *Epinephcle*; they are known of but few species. The caterpillars so far known are pale green when young, with dark head bearing two obtuse tubercles; after the last change of skin they are variegated with greenish and brown, the first 3—4 segments bearing light longitudinal lines, the others lateral oblique diffuse bands. Like many larvae they devour the egg-shell after hatching. They live on grass and feed at night, lying concealed in day-time. In the warmer countries the larva is full grown in hardly 3 weeks, in the most northern districts inhabited by this genus the caterpillar appears to hibernate (judging from the time of flight). They change into a transparent green or brown pupa which very closely resembles that of *Epinephcle*, being fastened by the long cremaster at a stalk or stone and hanging stiff downwards. The butterflies occur in warm countries throughout the year in numerous broods, which overlap; in northern East Asia I found the butterflies but from the middle of the summer till the autumn. In species with decided seasonal dimorphism the various forms do not alternate with each succeeding brood, as in our *Araschnia*, but one form flies exclusively till a certain month and from that time, in several broods, the other.

The species of *Mycalesis* are restricted to the Old World, extending in the east of the Palaearctic Region northward to Japan, Corea, and Central and West China. The genus also inhabits the mountains of Kashmir. They are absent from the western half of the Region, as they are not able to cross the desert-belt formed by the Sahara, Arabia and Iran. In biological respects they correspond to the genus *Euptychia* of the New World.

M. mineus. A widely distributed common Indian butterfly whose ♂ has on the underside of the hindwing at the submedian vein a brush of hairs situated in a yellowish silky patch. On the uniformly dark brown upperside there is a large ocellus proximally to the centre of the distal margin of the forewing. The first described form, **mineus** L. (29b), is the form occurring in India during the rainy season. It has *mineus*. on the underside of the forewing a small eye near the apex and a large one proximally to the middle of the distal margin; the hindwing bears a rather evenly curved submarginal row of ocelli different in size and extremely variable in number and shape; this yellowish brown marginal area which bears the ocelli is separated by a straight white line from the darker brown discal and basal areas of the wings. In East China, from the mouth of the Yang-tse-kiang southwards, as well as on the lower course of this river; from South China extending all over India into the Malayan districts. The Chinese specimens are smaller and somewhat duller than Central Indian ones, the ocelli forming a submarginal row on the hindwing are smaller, their light rings paler yellow, the row being often incomplete. — **confucius** Leech (29a) is a *confucius*. northern form with the underside more violet-grey and the submarginal ocelli smaller and sometimes strongly reduced. — In June (further south, at Hongkong, already in May) and again from July till autumn, in shady places and clearings, very common. — In India, where the species occurs in yet greater abundance, also a dry season form is found, which is entirely without ocelli, the underside having assumed the colour of dry leaves.

M. sangaiica Btlr. (29b). Similar to the preceding, but the eye of the forewing above much *sangaiica*. smaller, especially in the ♂; the underside less evenly coloured, the submarginal ocelli of the hindwing below reduced to small shadows sometimes still bearing pupils; the light line traversing both wings much duller. Mongolia and almost throughout China, not rare. — **parva** Leech (29b) is still somewhat smaller *parva*. than the corresponding sexes of *sangaiica*; the underside, especially on the hindwing, is paler grey and the submarginal row of ocelli edged with white proximally and distally; at Omei-shan in West China.

M. perdiccas Hew. (= *penicillata* Pouj.) (29b). Above similar to the preceding, but both wings *perdiccas*. much more rounded; most specimens possess on the upperside besides the large submarginal ocellus, a minute but sharply defined apical ocellus, and another less well-defined one above the anal angle of the hindwing. Underside strongly shaded with violet; all the ocelli reduced to dots or minute rings, except the submarginal one of the forewing. China, Corea and Japan; in summer and autumn, in many places flying together with *M. gotama*, but much rarer. In the specimens from the interior of China the violet gloss of the band of the underside often strongly reduced. — The form **magna** Leech is larger, and below *magna*. more russet, the upperside of the forewing bearing 3 distinct apical ocelli; in Western China. — The representative of *M. perdiccas* which extends furthest towards west is **sanatana** Moore, which occurs as *sanatana*. far as South Kashmir and differs from *perdiccas* in the row of ocelli being complete on the underside of the hindwing.

M. gotama Moore (29c). Both wings below with a large submarginal ocellus above the anal angle, *gotama*. the hindwing bearing in addition an anal ocellus. The species is at once recognizable thereby, though some species have occasionally small accessory dot-like ocelli. Japan; Corea. — Specimens from Shanghai in which the fringes are whitish and the narrow discal line is proximally strongly darkened, are **borealis** *borealis*. Fldr. — Very common, in June and again from August, in China and Central Japan, on wooded hill-tops, especially underneath Cryptomerias, in the so-called sacred groves of the Japanese.

unica. **M. unica** *Leech* (29c). The underside of both wings bears as in *gotama* a large ocellus besides a number of obsolescent ones; but on the forewing it is the apical ocellus which is the best developed. The discal line of the underside is very broad and curved, distinctly shining through on the upperside. — The single ♀ on which the species is based was found at Moupin in July.

lepcha. **M. lepcha** *Moore*. Easily recognized by the hairy eyes and the scalloped distal margin of the hindwing, the latter bearing in the ♂ a scent-patch at the base before the subcostal. Underside finely marmorated, distally grey. A very conspicuous very light discal band across both wings below, this band distinctly shining through above. Distally to this band both wings have very variable submarginal ocelli. The species appears to be uncommon in Kashmir, but is locally very common in India, being represented by a whole series of closely allied forms, such as *rudis* *Moore* from Bengal, *bethami* and *dauidsoni* *Moore*, *malsara* *Moore* from Sikkim, which hardly are to be considered specifically distinct.

serica. **M. misenus** *Nicé*. This Indian species is only represented in the Palaearctic Region by the form **serica** *Leech* (29c), which differs from nymotypical *misenus* in the reduction or complete absence of the apical ocellus of the upperside; the anal ocellus of the hindwing also is smaller or even may be entirely absent. — One of the larger species, from Omei-shan, found in July at an altitude of 1000 m. *)

5. Genus: **Lethe** *Hbn.*

Unicolourous brown butterflies, not below medium-size, one species very large. The body is strongly hairy; the thorax robust; the antenna very delicate, being hardly incrassate at the apex; the palpus long and porrect; eye hairy. The veins not inflated at the base, only the costal nervure somewhat incrassate at the base. The costal margin of the forewing strongly arched, the hindwing almost circular, the distal margin being sometimes scalloped, sometimes dentate, or even produced in the middle into a pointed lobe. The cell of the forewing is broad and does not quite reach to the centre of the wing, being truncate or rounded at the apex. The cell of the hindwing acuminate. Whereas the upperside is entirely or almost entirely without markings, the underside always bears discal lines or bands, and mostly also ocelli, which are similarly arranged as in *Mycalasis*.

The centre of distribution of this genus is the mountain-system of the Himalaya, where 80% of all the known forms occur. The forms are most numerous in North India, Sikkim alone being inhabited by 24 forms. They are all mountain-insects, except a single very widely distributed species, *L. europa*, which descends into the plains. From this centre of distribution their numbers rapidly diminish in all directions. Towards west *Lethe* extends as far as Kashmir, presumably penetretating into the Hindukush, which is not yet sufficiently explored lepidopterologically; in the east they reach to Japan and Amurland.

The larvae are spindle-shaped, greenish or brownish, often bearing pale lines. The head is produced into a horn which is vertical when the larva is feeding. They live on bamboo or grass. Pupa mostly green, anteriorly obtuse, fastened with the cremaster. The butterflies are on the wing in summer and autumn, in the warmer countries throughout the year. In day-time they mostly sit motionless among leaves flying only a few yards when disturbed. After sunset they become lively and fly briskly about. They imbibe the sap exuding from trees and drink at puddles, visiting also the bait made of sugar and beer, and coming to the lamp; I found *L. rohria* on the fresh droppings of a buffalo. Shortly after dark in clearings one may observe the ♂♂ sitting with the wings half open at the top of shrubs or branches and lying in wait for ♀♀ flying by: they rush at every insect hurrying past and return to their post of vantage after the chase.

schrenckii. **L. schrenckii** *Mén.* (29d). Dark brown, near the apex of the forewing and exteriorly on the disc of the hindwing ovate black spots standing in a lighter patch. These spots bear white pupils on the underside and are encircled by yellow rings. Throughout Eastern Asia, from Tibet to Yesso and Amurland, local, but rather plentiful, in July. A separate genus might be proposed for this species, which deviates rather strongly from the other species of *Lethe* and is at once recognized by its size. SCHULTZ placed it with *Pararge*; it has nothing to do with *Pronophila* with which it was classified by MÉNÉTRIÉS. The Continental specimens are a little smaller and darker than Japanese ones. The larva is not known. The butterflies occur in localities which are densely covered with undergrowth, and flee into dense thorny shrubs, in which they are difficult to catch without injuring them. On the wing they closely resemble the very large Asiatic form of *Satyrus dryas*, which flies at the same time in the same localities.

epimenides. **L. epimenides** *Mén.* (= *fentoni* *Bth.*) (29e). On the upperside resembling a small pale *schrenckii*, but the underside pale leather-yellow, the disc traversed by numerous brown lines. STAUDINGER distinguishes *epaminondas.* as **L. epaminondas** (29e) specimens which have the forewing more obtuse and broader, the upperside more

*) *Mycalasis perseus* *F.*, a common wide-spread Indian butterfly, approaches in Kangra, as well as probably also in China, the southern Palaearctic boundary; but it has not become known to me that the species extends into our Region.

uniformly brown, the grey admixture, which is especially distinct in the cell of *epimenides*, being absent, and which are devoid of the dark shading of the subcostal. With GRAESER he considers this form to be a distinct species, although it flies at the same time and localities as *epimenides*. The two forms appear to us to intergrade occasionally. Distributed from Central and West China to Japan, Corea and Amurland. The butterfly in July; more plentiful in the north of the distribution-area; it flies chiefly in woods of high trees settling with preference on the trunks of trees (GRAESER).

L. satyrina Bth. (= *naias* Leech, *stypax* Oberth.) (30a). Forewing very obtuse at the apex, dark brown, somewhat paler before the apex and distal margin: hindwing with lighter costal area and 2 black, pale-edged, ovate submarginal spots. The forewing beneath with 2 small apical ocelli, the hindwing bearing a row of 6 white-centred, yellow-ringed submarginal ocelli, the 2. and 3. being especially small. Throughout the valley of the Yang-tse-kiang, from Shanghai to beyond the Tibetan frontier, in summer; at Chang-Yang up to 6000 feet. — This species and the next one are in shape a transition to *Mycalesis*, where they indeed were placed by OBERTHÜR.

L. butleri Leech (= *turbilius* Oberth.) (30a). Larger than *satyrina*, the apex of the forewing not quite so obtuse; beneath lighter, the brown discal lines of the hindwing much more widely separated from each other. — From June to August, common in the Yang-tse-kiang valley, up to 7000 feet.

L. lanaris Bth. (= *dauidianus* Pouj.) (30b). One of the largest species of the genus. Apex of forewing more pointed than in the previous forms, the distal margin straight, erect. Beneath there are on the forewing 5 double-ringed ocelli in a perfectly straight row; the 1. and 5. of the 6 ocelli of the hindwing are large, the 3. and 4. being small and the 6. double. Not rare, from Ningpo throughout China as far as Se-chuen. Closely related to *L. marginalis* from Japan and North China, but the apex of the forewing more pointed.

L. oculatissima Pouj. (30a). A very variable species which is common all over Central and West China. The pale marginal area of both wings is constant, contrasting with the darker proximal portion of the wings and bearing two black spots on each, one at the apex, the other before the anal angle. The anal spot of the hindwing has always a pupil, exceptionally also on the forewing. Underside with a submarginal row of ocelli, there being 5 ocelli on the forewing and 6 on the hindwing; two irregular dark lines traverse the disc on both wings beneath. Moupin; Omei-shan. — **occulta** Leech is the eastern, Chinese, form from Chang-Yang; it is larger and the forewing beneath has a row of only 4 ocelli, the one nearest the apex being obsolete.

L. christophi Leech (29e). This rather large species is at once recognized by a large scent-spot situated below the centre of the hindwing, this spot having the appearance of a large glossy oily stain; otherwise the upperside does not bear any markings except a submarginal row of obsolescent black spots on the hindwing. Beneath the edges of the wings are brownish, there being 2 dark lines on the disc, which are partly straight, partly somewhat curved; on the hindwings a submarginal row of small ocelli, of which the 1. and 6. (double) are distinct, while the others are obsolescent. In the ♀ the wings are somewhat paler towards the distal margin. In July and August in Central and West China.

L. serbonis Hew. This Indo-australian species is represented in the Palaearctic Region only by the local form **dauidi** Oberth. (30b). It is one of the largest Palaearctic *Lethe*, being above all brown with dark, very faintly pale-edged, submarginal ocelli on the hindwing, the anal one bearing a pupil. The exterior discal line of both wings beneath is excurved below the cell. The forewing beneath has 2—3 obsolescent ocelli at the apex, the hindwing bearing a complete row of submarginal ocelli, of which the 1. and 6. are especially prominently marked; the marginal tooth of the hindwing is strongly developed. While in name-typical *dauidi* the exterior discal line on the underside of the forewing is only slightly curved distad, there occur specimens in which the line is produced into a large rectangular projection: ab. **angulata** form. nov. Also in other respects *dauidi* is so variable that one hardly meets with two identical specimens. The bars crossing the cell sometimes are united to form a ring, sometimes they are parallel; often there is, besides the 1. and 6. ocelli, another conspicuous ocellus on the hindwing beneath, etc. To give names to all such aberrations might be futile. We further mention but ab. **flavofasciata** Leech, which are ♀♀ with the exterior discal line distally broadly reddish brown, while normal ♀♀ resemble the ♂ except in the area of the wings being paler. Like *serbonis* in India, *dauidi* is a common insect in West China, being widely distributed and occurring up to 8000 feet. June, July.

L. laodamia Leech. Above exactly as in *dauidi*, only the ground-colour somewhat lighter brown, the black submarginal dots of the hindwing therefore more conspicuous. Beneath, especially in the marginal area, much paler, the forewing bearing a complete row of ocelli. A few specimens obtained by LEECH's collectors at Wa-shan and Omei-shan, in July at an altitude of 4—6000 feet.

L. camilla Leech (30c). Above almost exactly as *dauidi*, but the ocelli of the hindwing reduced to obsolescent dots. However, the ♂ bears before the anal angle a scent-spot with greasy lustre as in *christophi*,

the spot not contrasting so strongly as in that species. — Chia-ting-fu, Wa-shan, up to 6000 ft. Above this attitude there occurs the form **privigna** *Leech* (30c), of which the ♂ has a reduced scent-spot on the upperside, while in the ♀ the oblique band of the forewing is reduced.

baucis. **L. baucis** *Leech* (30c). The ♂ very similar to the preceding one on the upperside, but the forewing is more obtuse and bears a dull pale oblique stripe which extends from the costa towards the anal angle. The forewing beneath has a row of 3 complete ocelli and 1 subapical obsolescent one. In the ♀ the oblique line is replaced by a white band, there being also a row of 2—3 small white subapical spots parallel with this band. In the smaller ab. **procris** *Leech* the hindwing is more strongly angulate and the outer discal line of the underside more strongly excurved. — Widely spread over West and Central China.

dyrta. **L. dyrta** *Fldr.* (30d). Above dull brown, forewing with 2 white diffuse costal spots, the ♀ moreover bearing an oblique, broad, white band. On the very bright whitish marked underside of the hindwing the subapical ocellus is enormously enlarged, while the other ocelli of this submarginal row have changed into irregular black markings dusted with silvery. The entire underside strongly recalling that of *L. europa*. Tooth of hindwing long and acute. — West, Central and East China, also widely distributed in Northern India. Common, in April and again from June onwards. BINGHAM regards the South Indian *neelgheriensis* *Guér.* as another form of *dyrta*, which is quite possible. The larva with a process on the head directed forward and an anal process directed backward; green with dark dorsal and lateral stripes and yellowish subdorsal lines? on grass.

europa. **L. europa** *F.* (♂ = *arete* *Cr.*, ♀ = *heroë* *Cr.*) (30d, e). Large, brown above, ♂ with 2 white apical spots, ♀ with broad white oblique band in addition. Underside recalling that of *dyrta*; the submarginal ocelli of the hindwing merged together to a sinuate band bearing irregular spots dusted with metallic scaling. — West, Central and South China, South and North India to Malacca. Larva with erect horn on the head, body acuminate behind, green, paler beneath. Pupa regular, with angulate head, pale green, with 2 dots on the frons. The butterfly is common and occurs throughout the summer in the warmer districts; in day-time they fly only when disturbed, being restless at night. They imbibe the sap exuding from trees, drink at puddles on roads, and suck at fallen off fruit. When crawling on the stems of trees they move in jerks flapping the wings at the same time. The butterfly is hardly recognizable when sitting on the ground among dry leaves with the wings closed (A. JANET).

rohria. **L. rohria** *F.* (= *confusa* *Aur.*) (30e). Very dark above, almost black; forewing in both sexes with white oblique band and 2 white apical spots. Underside similar to that of *europa*, but the submarginal ocelli sharper and more regular. — The whole of China with the exception of the northern provinces, the Himalayan countries and the mountains of South and Northern India, extending to the Sunda Islands. Common everywhere in the area of distribution, and more on the wing in day-time than the other members of this genus. BINGHAM considers the above described *dyrta* *Fldr.* to be *rohria* *F.**)

verma. **L. verma** *Koll.* (30e). Rather variabel; above dark brown, the forewing bearing an oblique abbreviated band which is very broad in the ♀, while it is sometimes interrupted in the ♂; no white apical spots. Underside similar to that of *rohria*, the discal lines violet, with some silvery gloss. — In West China, Kashmir and many of the Himalayan districts belonging to the Oriental Region. Very plentiful, up to 9000 feet. In the Palaearctic districts in June and July, in India, where it is warmer, from April till November, at shady places, where the butterfly settles on the stems of trees, especially affecting Rhododendrons and Oaks (LANG).

coelestis. **L. chandica** *Moore* (31a). This common and, in India, wide-spread Himalayan butterfly is represented in China by the form **coelestis** *Leech*. The ♂ above is blackish brown with slight violet gloss, the ♀ being reddish brown with a white oblique band, which is separated into spots beneath, and with black submarginal spots on the hindwing. The underside is similarly marked as in *chandica*, but with a stronger lilac sheen, and the discal lines are somewhat differently shaped. West and Central China, as far east as Foochow, common.

diana. **L. diana** *Btlr.* (= *whitelyi* *Btlr.*, *consanguis* *Btlr.*, *fixeni* *Btlr.*) (31a). Very deep black-brown above, the marginal area of the forewing being hardly paler; beneath an oblique, outwardly white band is especially noticeable, also the very regular and distinct submarginal ocelli of the hindwing, the 1. and 5. ocelli being especially conspicuous. — Japan and Corea as far as West China; common according to LEECH, but I found it much less plentiful than *sicelis*. It occurs especially in shaded rocky ravines and hollow roads, and on the wing somewhat resembles a large *Erebia*. I found them fresh in August and already worn in September.

sicelis. **L. sicelis** *Hew.* (31b). Light earth-brown, above quite unicolorous (♂), or with an indistinct oblique band (♀); the hindwing with pupillated anal ocellus, the submarginal ocelli of the underside feebly shining through above.

*) We are not able to ascertain which species FABRICIUS had before him; it cannot be made out from the description.

At once recognized by a scent-brush which is more than 3 mm long and placed exactly in the centre of the cell. — In Japan and Corea, more in the plains; larva on bamboo (PRYER). The butterflies are extremely common. They are decided night-insects; in August they commence to swarm about 8 o'clock at night. The ♂♂ are posed on the branch of a bush in the middle of a clearing in the wood. If one is taken with the net, at once another comes to occupy the same place, so that I once might have caught dozens without changing my position.

L. hecate *Leech* (31b). Similar to *sicelis*, but darker and the markings heavier. The ocelli on the underside of the hindwing are much more distinct and sharper, being vestigial also on the upperside. The ♂ has no scent-brush in the cell. — In West China (at Wa-shan and Ta-t sien-lu), not rare, from 2000 feet upwards, in June and July.

L. manzorum *Pouj.* (31c). Upperside much more variegated than in the previous insects. Forewing with apical ocellus, discal stripe and 2 dark lines across the cell. Hindwing with a row of ocelli which are black distally, the 5. ocellus bearing a large white pupil. Underside yellowish grey, all the transverse lines thick, brown and straight, only the 1. and 5. ocelli large, all the others very small or replaced by dots. — Central and West China, in June and July.

L. gemina *Leech* (31c). Above uniformly dark earth-brown. Hindwing with a row of 4 large black ocelli thinly edged with yellow. Beneath only the 1. and 5. ocelli are developed, having a large pupil, the other ocelli being absent. It may be added that in contradistinction to *syrceis* the 1. and 2. oval rings are contiguous above or nearly so. The last figure of row 5 on Pl. 3t therefore represents the upperside of *syrceis* ♀, not of *gemina*, as erroneously stated. — In West China, on the Omei-shan, in July: apparently rare.

L. syrceis *Hew.* (31b, the fig. erroneously called *gemina*, and 31c). Above as in the preceding species, but both wings more rounded: on the hindwing above the 1. ring does not touch the 2., but is rather remote from it; beneath, besides the 1. and 5. ocelli, there are others developed, though they are small, and the disc is traversed by a straight dark line crossing the cell of both wings, being entirely absent from *gemina*. — Throughout China except the North, also in the plains, in June and July.

L. titania *Leech* (31c). Recalling *daridi*; forewing above with sharply defined paler distal margin, all the ocelli of the underside on both wings with comparatively very prominent pupils. — West China, in June and July.

L. ocellata *Pouj.* (= *simulans* *Leech*) (31c). Brown above; there is a curved row of dark nebulous patches, visible only when viewed at a certain angle, and extending from the costa below the cell: the ocelli of the underside of the hindwing appear above as slightly pale-edged dots. The light marginal area of the underside sharply contrasts with the dark basal area; there are no ocelli on the forewing beneath, but only a small white subapical band composed of 2 contiguous spots. — Exclusively Palaearctic like the preceding species; so far only met with in West China, where it appears to be a rarity; in June and July.

L. violaceopicta *Pouj.* (= *calisto* *Leech*) (31c). The ♂ is uniformly brown above, the ♀ bearing a row of white diffuse patches before the margin of the forewing and an abbreviated white band distally to the apex of the cell. Beneath the forewing has 3 ocelli, the hindwing 6, the last one of these having always 2 pupils. The basal area of the hindwing beneath is traversed by numerous irregular angulate and interrupted silvery lines. — In West China, in June and July.

L. sidonis *Hew.* (31d). Brown above, both sexes bearing 2 small white costal spots in the distal half of the forewing. Beneath there are abbreviated curved silvery white bars in the cell, beyond the cross-veins and near the apex, being especially distinct in the ♂. The basal half of the hindwing beneath traversed by irregular silver-lines which are interrupted several times. Distal edge of wings almost regularly undulate, the hindwing with a hardly vestigial tooth at the 3. radial vein. — Afghanistan, North and Central Kashmir, and elsewhere in the Himalaya. In the southern part of Kashmir, in Kulu, which is outside the Palaearctic Region, the species is represented by *L. vaivarta* *Doh.*, which is said to differ from *sidonis* in the structure of the ♂-genitalia.

L. siderea *Marsh.* Similar to *sidonis*, but smaller and above uniformly dark brown without markings: the ocelli of the hindwing beneath form an irregularly curved row. — A Sikkimese species of the Indo-Australian fauna; LEECH, however, records a specimen obtained by KRIECHEDORF in July at Mupin, for which reason we mention the species here.

L. nigrifascia *Leech* (31e) is at once recognized by the broad scent-stripe which in the ♂ extends from the apex of the cell to the middle of the hindmargin and is dilated at the veins. On the underside the discal stripe is bordered with white on the outer side, being excurved distally to the apex of the cell. From Chang-Yang. One of the largest Palaearctic species of *Lethe*. — At Pu-tsu-fong there occurs another,

fasciata. smaller. form, ab. **fasciata** (31d). In this the scent-stripe is narrower, being less widened at the veins, and the discal stripe of the forewing beneath is more sinuous, but less excurved at the apex of cell. — Perhaps both forms are only races of certain Indian species.

marginalis. **L. marginalis** Motsch. (= *maackii* Brem.) (31d). Dark brown above; the hindwing of the ♂ with 2—4 ocelli, of the ♀ with 4, at least 3 of these being pupilled with white. Beneath the forewing has 3 strongly developed ocelli, one placed behind the other: proximally to these there is a very slightly curved whitish discal stripe from the costa to the hindmargin. The 1. and 5. ocelli of the hindwing are very large, the others being essentially smaller. ♀ considerably larger than the ♂, with broader wings. — Widely distributed, from Japan inclusive of the Northern Island over Corea, the Yang-tse-kiang upwards to West China: in July, not rare.

helena. **L. helena** Leech. ♂ very similar to that sex of *marginalis*, but the forewing beneath, instead of 3 distinct ocelli, has 5 more diffuse ones. The ♀ bears above and below a slightly curved white band running from the middle of the costa towards the hind angle. — In July in West China.

proxima. **L. proxima** Leech (31e). Upperside dark brown, forewing with a large apical ocellus, hindwing with dark submarginal dots. On the hindwing, beneath, the first submarginal ocellus is replaced by an oblong ring containing 2 contiguous ocelli. — In West China, at altitudes of from 5000 to 7000 ft., in July and August.

trimacula. **L. trimacula** Leech (31e). Very similar to the preceding species, hardly distinguishable from it on the upperside; but beneath the oval of the 1. ocellus is less oblong, more representing one ocellus with 2 pupils; moreover, the lines crossing the disc of the hindwing beneath are differently arranged. — In July at Chang-Yang and I-chang in Central China.

labyrinthea. **L. labyrinthea** Leech (30e). This exclusively Palaearctic form is one of the largest and finest species of *Lethe* which are known. The ♀♀ especially are bright in colour. The ground-colour is earth-brown; before the dark margin there are rows of yellowish bone-colored patches in which are placed on the hindwing large, oval, black spots; patches of the same colour are situated in and beyond the cell, being almost white before the apex. On the underside the forewing is without ocelli in the ♂, while the ♀ has 2 or 3 small ones. The ♂ is duller above, the scent-stripe being the same in position and shape as in *nigrifascia*, but less prominent. — In Central and West China, in July.

callipteris. **L. callipteris** Bth. (31e). Above yellowish grey-brown; there are yellowish bone-coloured spots in and below the cell of the forewing as well as before the margin of both wings, bearing oval, black spots on the hindwing, the row being forked towards the costa of the forewing. The insect has the appearance of being a small form of *labyrinthea*, but the ♂ in without the dentate band-like scent-organ found in that species. — The insect was hitherto known only from Japan; the specimen from which our figure is taken and which belongs to the Tring Museum, however bears the locality "Kashmir". If that is not an error in labelling, I am inclined to regard *callipteris* and *labyrinthea*, in spite of the difference in the scent-organ, to be localized forms of one widely distributed species.

cyrene. **L. cyrene** Leech (30e). Reminds one of *sicelis* on the upperside; the hindwing has a row of 5 black oval spots edged with yellow. Beneath similar to the preceding species, but the discal lines straight and the forewing with a straight row of 5 small submarginal ocelli. — This species, which is closely allied to *spreis*, appears to be very local (LEECH); it was found at Chang-Yang in July.

5. Genus: **Zophoëssa** Doubl.

This genus is hardly separable from *Lethe*. As in that genus the antennae are delicate and scarcely incrassate at the apex; the palpi long, thin, laterally compressed; the eyes hairy. Tongue rather strong. The foreleg of the ♂ much reduced. The forewing triangular, the distal margin somewhat concave in contradistinction to most species of *Lethe*. The hindwing with strongly scalloped margin, often produced into a tooth at the 3. radial vein. Colouration above rather uniformly dark brown, the underside of the wings, however, with light stripes and bands, which have sometimes a silvery gloss.

The species of *Zophoëssa* are restricted to the mountain-system of the Himalayas. There occur 9 species in the Palaearctic fauna and also 9 in India, some of them being common to both Regions. The early stages are not known. The butterflies are local, but often plentiful where they occur. They fly after dusk, rather fast, taking to the wing in day-time only when disturbed or in dull weather. They are decided mountain-insects, which have a preference for settling on rocks or bare spots on the ground; they have not yet been met with at flowers. They appear in midsummer and have apparently one brood only.

Z. sura Doubl. This species is represented in several localities in Western China by the local race *moupinensis*, **moupinensis** Ponj. (32a), which is similar to *Z. dura* Marsh. Above deep dark brown, the hindwing bearing a long tooth or tail and in the paler marginal area dark dots. Underside marked with lighter brown, but

without distinctly white or pale yellow bands; *moupinensis* is distinguished from *dura* by the shorter tail and the darker colour of the wings. The largest Palearctic form; singly at Chang-Yang, Omei-shan (Museum Tring) and other places in West China.

Z. albolineata *Pouj.* (= *andersoni* *Pouj.*) (32a). This species, which is not rare almost at the whole course *albolineata*. of the Yang-tse, has been received from Capt. JANKOWSKI from I-chang. It is olive-brown above; about 5 mm from the margin there is an even band which hardly contrasts with the ground-colour and converges towards the anal angle with a second one which extends from the costa backwards. These bands are nothing but the creamy satiny bands of the underside shining through above: they are so characteristic that is sufficient to refer to the figure. The insect can only be confounded with *andersoni* *Atkins*, which only occurs however in South China (Yunnan) and Upper Birma, and is distinguished by the bands of the underside having a more vivid silvery gloss.

Z. argentata *Leech* (32a). Similar to the preceding, smaller, the bands on the underside of the *argentata*. hindwing vividly silvery, more strongly shining through above, the discal band of the hindwing only reaching to the median veins, the median nervure and its branches silvery white; ground-colour of upperside more reddish brown. — In June, July and August, in mountainous districts of West China, up to 7000 ft., not rare.

Z. luteofasciata *Pouj.* (32e). In colour of the upperside and size similar to the preceding insect; *luteofasciata*. but the bands of the underside yellowish with a slight sheen, never silvery. The forewing beneath bears a second shorter band proximally to the light cell-band, and the discal band of the hindwing beneath is replaced by a net-work of yellowish lines, which partly are situated along the median nervure and its branches. Abbé DAVID discovered this species at Mupin in West China, *POUJADE* described it and *OBERTHÜR* gave a figure of it; *LEECH* considers it local, as his collectors did not meet with it at Mupin. Not known to me in nature.

Z. jalaurlida *Nicé.* (32c). Similar to *argentata*, but the ground-colour olive-brown above and beneath. *jalaurlida*. On the underside the middle band is a regular band only from the costa to the median nervure, being continued by 3 dull white square spots. — Very plentiful at higher altitudes in the Himalaya, sometimes on the wing in large numbers after dusk or on rainy days; rarer and more local in the Palearctic fauna (West China). The butterfly has a predilection for resting on the branches of the bamboo-fences which in China take the place of walls as borders of the yards and fields, and also on rocks. The somewhat more interrupted silvery markings which *LEECH* considers to be characteristic for Palearctic specimens, are also met with in single specimens from Sikkim.

Z. gracilis *Oberth.* (32b). Similar to the preceding; the light cell-spot of the underside of the fore- *gracilis*. wing does not shine through above as in *jalaurlida*, and the discal band of the hindwing beneath is much broader and not silvery white, but yellowish-grey; the hindwing is regularly dentate, without the sharp tooth situated in the centre of the distal margin in *jalaurlida*. — The ♂♂ not rare in West China and Tibet, May to July, in mountain-districts, up to 9000 feet according to *LEECH*.

Z. helle *Leech* (32b). This species, the previous and the two following ones are above not distin- *helle*. guishable, resembling one another also beneath. In *helle* the white discal band of the forewing forms an even curve; there are as a rule 2 ocelli below the white apical spot and the small transverse band runs very obliquely across the cell; fringes chequered. — Widely distributed and common in West China, occurring as high as 9000 feet, from June to August.

Z. armandina *Oberth.* (32b). There are hardly ever ocelli below the white apical spot on the under- *armandina*. side of the forewing, or they are only feebly marked: the discal band is more straight, the white cell-spot is more transverse, i. e. is at right angles to the central line of the cell; the fringes of the forewing are not distinctly chequered. — In West China, not rare from May to August, at altitudes of from 4—8000 ft.

Z. procne *Leech* (32b). More variegated on both sides than the previous forms. The markings of *procne*. the underside shine through more strongly above; the discal band of the forewing beneath composed of white square spots is somewhat more irregularly curved; the distal band on the underside of the hindwing commences broad at the costa, being here whitish, and posteriorly becomes more and more broken up by being intermixed with greyish brown spots. — Common in West China, from May to August, flying at the same places as *helle*.

6. Genus: **Rhaphicera** *Btlr.*

Antennae moderately long, reaching to the middle of the forewing, gradually incrassate, with feeble club. Palpi strongly projecting, densely and regularly hairy like a brush. Eyes hairy. Thorax densely hairy. Abdomen thin. Hindwing with the margin feebly scalloped or even quite smooth, the centre not distinctly projecting; neuration not essentially different from that of *Lethe*.

Medium-sized Satyrids which are marked with yellow and black above and show affinities to the genus *Neope*, although they strongly resemble in outward appearance the Australian genus *Heteronympha*.

They fly fast with a tumbling flight on roads in the forest, and settle on moist places in the woods, returning to them after a very short time when disturbed. They also like to rest on damp rocks in the shade, and are on the wing on cloudy days as well as when the sun shines (ELWES).

dumicola. **R. dumicola** Oberth. (32e). Black-brown above, with numerous light yellow spots; beneath dull yellow, with numerous thin or thick black lines and before the margin a narrow orange band. — In West China, not plentiful.

moorei. **R. moorei** Bth. (= *satricus* Moore) (32c). The spots of the upperside darker yellow and sparser. Midway between *R. dumicola* and *satricus* as regards colour and pattern, but smaller than both. Hindwing beneath with a row of submarginal ocelli, which have very vivid pupils. — In the western Himalaya, Kashmir, in the autumn, not plentiful, but sometimes more abundant (DOHERTY).

satricus. **R. satricus** Doubl. (32c). Upperside bright deep orange. Underside similar in colour to upper, hindwing with a row of submarginal ocelli which have very vivid white pupils. — In China rather rare, larger and much more abundant in North India.

7. Genus: **Melanitis** F.

The species of *Melanitis* are large dark butterflies which have affinities to the forms of *Lethe* as well as to the genus *Neope*. The veins are all strong, being distinctly raised above the wing-membrane, but none are inflated at the base as in *Zophoessa*. The cell of the forewing is very broad, and the submedian vein, which is quite straight in *Lethe*, is somewhat curved, the wing therefore being very broad as compared with the delicate and weak body. The distal edge of both wings, from the apex of the forewing, which is often produced into a sharp point, to the small tail of the hindwing, which is always present, forms an almost straight line, the anal angle of the forewing as well as the apex of the hindwing being strongly produced. The ground-colour of the upperside is always uniformly dark brown in the Palearctic species, there only being occasionally an apical ocellus; some Indian species have a light band on the forewing. The underside is strongly liable to variation according to season and locality. — The larvae are spindle-shaped, with 2 rather long horns on the head, the body being covered with a fine velvety pile and ending posteriorly in two processes. They are green, with lighter and darker longitudinal lines, and feed on bamboo, sugar-cane and other Gramineae. The butterflies rest in day-time at the foot of trees or among leaves, also on the bare ground, and when flushed only fly a few yards, settling again with the wings always closed. At night, however, they swarm briskly about and suck at the sap of trees and at fallen off fruits of trees. They come to the baits, as well as to the bright light of lanterns. Their flight is unsteady, tumbling, but rather fast. They are not shy and therefore easy to catch. They belong to the most abundant butterflies where they occur, only being rare towards the borders of their area of distribution.

leda. **M. leda** L. (32e). Uniformly dark brown above, there being a black rounded spot with a white pupil before the apex of the forewing as well as above the anal angle of the hindwing. Under surface grey, densely and minutely striated; hindwing with several ocelli of various sizes, bearing white pupils and being often edged with yellow. Abundant during the rains of the summer. — **ismene** Cr. (32e) is the corresponding winter-form, flying during the dry season. Larger, the apical ocellus of the forewing with double pupil and usually surrounded by orange-red spots; the underside is simple, without the minute striolation of *leda*, bearing often dark patches and clouds; instead of ocelli there only are small rings or dots.

To give a general and concise description of this variable species is not possible. The form *ismene* especially is extraordinarily changeable. There are hardly two specimens alike among 68 which I caught in China in a few days and in a place of little extent. The underside may be grey, clay-colour, earth-brown, or — as in fig. 32e — brownish red, uniform in colour or dark-banded, without any trace of ocelli, with dots, black square spots or small rings. On the whole the colour of the under surface of the wings depends somewhat on the soil, on slopes with rocks of basalt a grey lead-colour being prevalent, on sand an ochreous shade, and on red ferriferous rocks the red-brown tint. But I have also found specimen strongly contrasting with the soil, for instance leaden-grey ones on reddish yellow sand, etc. The insects then appear to be copies of dry leaves, sometimes the veins of a leaf being distinctly imitated.

As in *Mycalis* we also here do not find an alternation of generations, but with the change of the season a certain form commences to fly and becomes more and more predominant. DE NICÉVILLE has bred the larvae from the batch of eggs laid by one ♀. These larvae did not grow at the same rate and the time of appearance of the butterflies also was different. The first specimens which emerged resembled the mother, the later individuals assuming the garb of the form which was on the wing during the meanwhile changed season. In India, where the larvae grow very fast, a brood going through all its stages of development in a few weeks, there are always several consecutive broods of the same form before it changes into the other variety. Whether the number of broods is reduced to two in the Palearctic Region, which would regularly alternate, I have not been able to ascertain.

M. leda is one of the most widely distributed butterflies; however, it all but reaches the Palaearctic Region. Though yet abundant in the Punjab, it is already rare in Southern Kashmir. In Japan *leda* only occurs in the extreme south, being here rare (PRYER); it is found singly in Corea and at the whole Yang-tse-kiang. — Larva grass-green with a yellow lateral stripe and thin longitudinal lines of light dots; the head with two somewhat thorny horns, pale green with 3 black spots on the face, or brown with 3 white spots. On Gramineae. Pupa obtuse, dorsally constricted, short, pale green, resembling in shape the pupa of *Euploea*.

M. aswa Moore. An Indian form; larger than the preceding, much more constant, seasonally as well as individually. It extends into the Palaearctic Region in Southern Kashmir and in West China: *tristis* Fldr. *tristis*. On upperside very dark and uniformly blackish brown, the ♀ bearing diffuse white-centred ocelli; beneath very finely striolated with fuscous on a brown ground, dark curved lines running from the costa to the abdominal margin. Among Palaearctic ♀♀ there occurs occasionally the form *suyudana* Moore, which is *suyudana*. more frequent in India; there is only one white pupil on the forewing above, and the underside has before the apex a large pale triangular spot which is bordered proximally by the oblique discal stripe. At once distinguished from *leda* by the shape of the wings. — In June and July, not abundant.

8. Genre: **Neorina** Westw.

Very large butterflies whose hindwing bears a distal marginal tooth; dark brown above, with a band of yellowish bone-colour; beneath with large ocelli on the hindwing. The forewing is not produced into a point below the apex, as in *Melanitis* ♀♀. It is characteristic for all species of *Neorina* that the ivory yellow band of the forewing does not terminate at the inner angle, but is continued on to the apex of the hindwing. 4 Indian and 1 Palaearctic species are known. The *Neorina* are forest-butterflies, which are concealed among leaves in day-time. When disturbed they fly rather fast a few yards with a flapping flight, but are easily caught when sitting on the ground. They occur singly. Nothing is known of their early stages.

N. patria Leech (32 d). Perhaps only a form of the Indian *N. hilda* Westw. Forewing with a broad *patria*. whitish yellow oblique band; the heavily black cross-vein almost in the middle of the band, the distal portion of the cell being entirely whitish yellow. Differs therein from the otherwise similar *hilda* from India, in which only the extreme upper corner of the cell is situated inside the light band. Near the apex of the forewing a small white dot. — At Omei-shan and Mupin in West China.

9. Genre: **Neope** Btlr.

Antenna of medium length, only a little incrassate at the apex; palpi rather long, erect; the forewing triangular, the distal margin being somewhat concave, especially in the ♂♂. The veins arranged as in *Lethe*, thick and distinct, often pale on a dark ground, but not really inflated. The abundantly variegated underside is characteristic for the genus, bearing various kinds of figures, dentate lines and spots, besides a submarginal row of ocelli present on both wings. The upperside is brown, being dotted in most species with numerous small white or yellow spots.

The *Neope* are large, of a stout and strong built. They are so closely allied to *Lethe* that it has recently been proposed to reunite them with that genus. Their area of distribution is restricted to the Himalaya and its eastern branches. They occur from Kashmir to Japan, but not in the plains. They fly at dusk, also in day-time when disturbed, resting motionless on walls and trunks of trees. The wings are always closed above the back at rest, the forewings lying in between the hindwings, the insect being well protected by its underside resembling boulders and mortar. They have two broods and appear usually in great abundance where they occur, being met with in large numbers in the gardens of the towns, where one can find them in the early morning low down on the walls. If once flushed, they always fly upwards, settling on trunks or rocks, often so high that they are beyond reach. They are the commonest butterflies in September, f. i. in the suburban gardens of Tokio. I caught 42 specimens within one hour on the Bluff near Yokohama. The sexes are equally abundant.

N. yama Moore. This common species of the Indian Himalayan countries is represented in the Palaearctic district of Eastern Asia by the form *serica* Leech (33a). Blackish brown above, with two small *serica*. white costal dots, and hardly visible black dots before the margin corresponding to the ocelli of the underside; beneath olivaceous grey-brown with pale reticulate markings and ocelli. In name-typical *yama* those submarginal dots are more distinct and the ground-colour of the underside is more reddish-brown, the wings too not being so pointed as in *serica*. In Central and West China, on the Yang-tse-kiang, common, in April and again in August and September, at altitudes of from 5—10 000 ft.

- muirheadii*. **N. muirheadii** *Fldr.* (33a). Large, dark velvety brown above; hindwing with some obsolete submarginal ocelli; all the fringes light. Beneath there is a pale discal stripe from the costa of the forewing to the anal angle of the hindwing, being proximally bordered with dark; distally to this stripe both wings have a row of submarginal ocelli; some irregular markings on the disc and near the base. Central and
segonax. West China. — As **segonax** *Heur.* a specimen has been figured in which the band-like marking of the
segonacia. underside is more reddish grey than yellowish grey. — **segonacia** *Oberth.* is smaller, and the discal band of the underside is distinct only in the costal half of the wings; the ocelli of the hindwing are very small,
felderi. almost punctiform. From Kiang-si. — In ab. **felderi** *Leech*, which flies together with the other forms on the Omei-shan, the upperside is paler, somewhat suffused with golden, the black dots being absent or indistinct; the white band of the underside is broader and somewhat shines through above.
- bremeri*. **N. bremeri** *Fldr.* (33b). Dark brown above, with black submarginal spots, to which a small yellowish bone-coloured spot is joined both on the proximal and on the distal side. Beneath greyish brown, suffused with lilac and variegated with yellowish; a submarginal row of white-pupilled ocelli which are bordered with yellow and on the hindwing moreover with fuscous. — Not rare and distributed over a wide area, from the provinces at the mouth of the Yang-tse to Tibet, in May and again from July to September.
- pulaha*. **N. pulaha** *Moore* (33b). Wings chocolate above, being chestnut-brown towards the base; the costal area traversed by ochreous transverse bands commencing at the costa, one being placed at the apex of the cell, the third before the apex, and the second midway between them, these bands being continued each by a row of yellow dots; the median and submedian nervures of the forewing, moreover, being yellow in the basal half. Hindwing clouded with dark beneath, on the disc a dark irregular band, which is variegated with white and has a white distal border. In the western Himalayan countries, as far as Kashmir, where
ramosa. **Young** found swarms of this butterfly flying around oak-trees. — Its eastern representative is **ramosa** *Leech* (33b, c), in which the spots of the upperside are dull white instead of ochre-yellow and reduced in size. In Central and West China, in April and again from June to August.
- goschkevitshii*. **N. goschkevitshii** *Mén.* (= *gaschkevitshii* *Fldr.*, *nipponica* *Bltr.*) (33c). Upperside of ♂ bright ochre-yellow, of the ♀ spotted and veined with yellowish bone-colour. One of the brightest species of *Neope*, the entire surface of the wings in the ♂ being suffused with a golden yellow sheen. — In Japan, extremely plentiful, in spring and again from the end of July, on trunks of trees, on poles, walls, etc.
- armandii*. **N. armandii** *Oberth.* (33d). The forewing more sparsely spotted with yellow, the hindwing on the contrary almost entirely yellow, except the costal margin, the costal portion of the distal margin and the basal area. In the very irregular markings of the underside of the hindwing a certain pattern is distinctly recognizable: a dull white band with a greasy gloss extends from the middle of the abdominal fold towards the apex, at the subcostal vein a second band emanates from it, running parallel with the submarginal row of ocelli and ending above the anal angle, being several times incurved. This band separates from the disc of the underside of the hindwing a dark cloudy spot which is reticulated with white. In West China, near Mupin and Ta-t sien-lu; hitherto only obtained in mid-summer, but being probably on the wing also in
fusca. April and May. — The form **fusca** *Leech* (33c, d), from Chang-Yang and Omei-shan, has the hindwing above brown, therein resembling *bremeri*, but is at once recognized by the characteristic pattern of the hindwing beneath. Here belongs perhaps as an accessory form the more brightly coloured *N. kashiana* *Moore* from North India.
- oberthueri*. **N. oberthueri** *Leech* (33d). Likewise very similar to *bremeri* on the upperside, but the forewing above has 3 distinct pale costal patches. The hindwing beneath is almost uniformly dark brown, being finely chased. — In West China, on the Omei-shan, at Mupin, Pu-tsu-fong, and Tchou-pin-sa, in June and July.
- christi*. **N. christi** *Oberth.* (33d). Above black-brown, rather abundantly spotted and marmorated with yellow, especially in the ♀. The underside of both wings with a very irregular pattern, bearing numerous bands, lines, clouds and rings. On the underside of the hindwing two light bands are more distinctly recognizable, these bands extend from the costa towards the anal angle, converging behind, meeting each other between the anal ocellus and the preceding one. — In West China widely distributed and not rare, in May and again from August.
- simulans*. **N. simulans** *Leech* (33e). One of the finest *Neope*; above deep chocolate-brown, with pearly white double row of spots and at the apex of the cell of the forewing a thin white curved bar. Hindwing beneath beautifully marked with violet. — In West China, in the summer. The specimens figured are from Ta-t sien-lu and Wa-su-kow.
- agrestis*. **N. agrestis** *Oberth.* (33e). Much smaller than all the previous species. Above brown, spotted with dark yellow. The underside of the hindwing dark brown, with 2 larger, angulate, white costal spots. —
albicans. In ab. **albicans** *Leech* (33e) the dark underside of the hindwing is dusted with grey and variegated with several white spots. In West China, where the two forms fly promiscuously in some places and are separate in other districts; hitherto found only in May and June, but there is probably a second brood from August.

10. Genus: **Ypthima** *Hbn.*

Body delicate and weak. Head small, eye naked and prominent. Antenna rather short, never reaching beyond the middle of the costal margin, hardly incrassate at the apex. Palpi projecting by more than the length of the head, pointed, rough with dense erect hairs as in a brush. Wings very broad in comparison with the slender body, blackish brown above, without markings or with ringed, ocelli, beneath grey with brown striolation and usually submarginal ocelli. The subcostal of the forewing is inflated at the base, the other veins being rather thin.

Ypthima contains small, rarely medium-sized, sombre coloured butterflies, which are found in grass and shrubs, flying low with a slow hopping flight, the wings being alternately opened and entirely closed. Nearly all the species are very common where they occur; they frequent meadows, hollow roads, embankments, and rocky inclines, being on the wing not only in fine weather, but also when the sky is dull, and even in rainy weather. They rest on grass-halms and low shrubs, the wings being held open in sun-shine. The ♀ fly less and must be flushed from the grass and undergrowth. The scaling is extremely delicate, and the wings of caught specimens are very easily torn. While on the wing they have nearly the same habits as our *Coenonympha*. They are distributed almost over the whole of the Old World, only being absent from Europe, North Asia, North Africa and a large portion of Australia. More than 70 species are known, of which the majority is found in India and tropical Africa. In the Palaearctic Region the genus occurs only in Syria, Kashmir and East Asia.

Y. huebneri Kirby (= *philomela* *Hbn.*, *howra* *Moore*, *apicalis* *Moore*, *catharina* *Bthr.*) (34a). One of *huebneri*. the smallest species, if not the very smallest. Above dark brown, with a larger ocellus on the forewing and two smaller ones on the hindwing. Forewing beneath with one ocellus, hindwing with 4, one being placed near the apex and 3 in the anal region. The forewing, moreover, bears above a distinct submarginal line. West Kashmir, throughout the summer, not rare. — The form **kasmira** *Moore* (= *kashmira* *Bingham*) *kasmira*. (34a), from East Kashmir, differs externally only in the absence of the dark submarginal line of the upper-side of the forewing and in the somewhat deeper brown ground-colour; ELWES and EDWARDS, however, separate it as a distinct species on account of the differences in the ♂-genitalia. From April to September. — Whether BINGHAM is right in treating the (Indian) *ceylanica*, which has the hindwing snow-white, as a race of *huebneri*, may here be left undecided.

Y. asterope Klug (= *mahratta* *Moore*, *alemola* *Swinh.*, *complexina* *Swinh.*) (34a). On upperside very *asterope*. similar to the preceding; easily recognized by the underside, on which the strigae are condensed to curved stripes, one of them often encircling the apical ocellus forming a kind of loop. Below the ocellus there is a space devoid of striae. The species extends from Syria over Arabia far into tropical Africa and over Kashmir to China and India, and varies very much according to locality as well to season. In ab. **norma** *norma*. *Westw.* even the apical ocellus of the upperside of the forewing is absent. Likewise, the submarginal ocelli of the hindwing beneath are often larger than in our figure or — in the dry-season form — may be reduced to dots. In the Palaearctic Region — i. e. in Syria, Kashmir, Central and West China — from April to October. In warm districts very plentiful throughout the year.

Y. baldus F. (34a, b). In this species, which is allied to the Indian *Y. philomela* *Joh.*, but should *baldus*. not be united with it according to ELWES and EDWARDS, the ocellus of the forewing above has two pupils, and the hindwing beneath bears a close-set row of 6 ocelli. — In ab. **argus** *Bthr.* (34b) the number of ocelli *argus*. is reduced to 5; in ab. **evanescens** *Bthr.* the ocelli, though all 6 are present, are reduced to minute rings *evanescens*. or pupilled dots. — The form **prattii** *Elw. & Edwards* resembles ab. *argus*, but has above a conspicuous, *prattii*. proximally sharply defined, marginal band.

Y. baldus is one of the commonest East-Asiatic butterflies. In Japan I have sometimes found 5 or more sitting on one single leaf. Our very extensive material, most specimens being caught by myself, exhibits an extraordinary variability, especially in the number and position of the ocelli of the hindwing. These may be reduced to one in single specimens (LEECH), and if one wished to give a separate name to every individual aberration, as has been done in the case of many European butterflies, whole pages might be filled with descriptions of "new" forms. The area of distribution comprises the whole of Japan, and the opposite portion of China as far as Se-chuen, as well as Corea and Amurland.

Y. zodia *Bthr.* (34a). Under this name apparently a number of different species are united. While *zodia*. in the form **albescens** *Pouj.* there is on the underside of the hindwing a row of distinct ocelli pupilled with *albescens*. pearl-grey, the ocelli are reduced to minute rings or dots in name-typical *zodia*, so that they are entirely concealed among the grey clouded strigae and therefore at first sight appear to be quite absent, as in our figure and that given by LEECH. It is, moreover, very remarkable that *zodia* has only been found in spring, while all the other *Ypthima* are on the wing throughout the summer. This renders it very probable,

as already suggested by LEECH, that *zodia* is not a distinct species but the spring-form of some other species.

motschulskyi.

Y. motschulskyi *Brem. & Grey* (34b). More intensely coloured and larger than the previous species. The hindwing beneath has always 3 ocelli, of which the first and second are very large, almost as large as the apical ocellus of the forewing, only the third one placed entirely into the anal angle being smaller. The underside is uniformly grey, being very evenly pencilled with brown, the upperside of the forewing showing in typical ♂♂ dark veil-like clouds. Japan and the opposite portion of China as well as Corea. —

amphitheia.

From Amurland the form **amphitheia** *Mén.* is known, in which there are no dark clouds in the disc of the forewing. — In Central and West China the species is represented by the form **perfecta** *Leech* (34b), in which the ocelli on both sides of the wings are placed in a pale cloud, which is especially distinct on the forewing. In consequence of the presence of this cloud the submarginal line of the forewing is much more prominent. On the middle Yang-tse-kiang there occur transitions from *motschulskyi* to *perfecta*, combining the colouration of the former with the ocelli of the latter: the figure of *Y. motschulskyi*-♀ on Pl. 34 represents such a specimen. Very dark specimens from Gensan (Corea) in which the apical ocellus of the forewing

obscura.

is hardly recognizable above have been separated as a distinct species, **Y. obscura**, by ELWES & EDWARDS

multistriata.

on account of the differences in the ♂-genitalia. — In the form **multistriata** *Btlr.* from the middle Yang-tse-kiang (and Formosa) the apical ocellus of the forewing has completely disappeared from the upperside, the hindwing of the ♂ on the contrary bearing also above an ocellus, which is often absent from typical ♂♂ of *motschulskyi*. — Not rare, but like *baldus* more local; on wooded hills, in the mountain-grooves of the Japanese, throughout the summer, up to an altitude of 10000 ft.

chinensis.

Y. chinensis *Leech* (34b). Larger than the previous species, the underside rather uniformly coloured and pencilled, the ocellus of the forewing more oval and somewhat oblique, the hindwing beneath with 3 ocelli, one before the apex, the other 2 hardly smaller and very close to each other in the anal area. — Central China, not rare.

nareda.

Y. nareda *Koll.* Much smaller, but the ocelli on both sides as in *chinensis*; the strigae of the underside very fine; the margin of both wings pale, while the submarginal area is darkened, especially on the forewing. — Kashmir, up to 8000 ft., plentiful. This as well as the preceding species have been regarded as local forms of *Y. newara* *Moore* from India, *newara* being taken as inhabiting the central system of the Himalayas and as being replaced in the West by *nareda* and in the East by *chinensis*. ELWES and EDWARDS, however, keep the 3 insects separate on account of differences in the genitalia.

praenubila.

Y. praenubila *Leech* (34c). One of the largest species; the apical ocellus on the underside of the forewing is elongate-oval, but not transverse or oblique in position. The distal margin as well as a shadow proximally to the distal third of the forewing conspicuously dark, the apical ocellus being placed in a pale band. There may be small accessory ocelli in addition to the large ones beneath as well as above. — In Central and West China, from May to August.

sordida.

Y. sordida *Elw. & Edw.*, from Kiu-kiang, is founded on a single ♂ in which the dark shadowy bands bordering the marginal area of the forewing beneath are wanting, while the underside of the forewing appears almost brown on account of the very dense strigae. — Found in June; the type is in the ELWES-collection.

megalomma.

Y. megalomma *Btlr.* (34c). The ocellus of the forewing very large, with double pupil, the anal ocellus of the hindwing being present only above. The hindwing beneath without distinct strigae, brown, with grey marginal area, which is angulate at the apex of the cell. — On the Yang-tse-kiang, from Se-chuen to Ningpo, in April and again in July.

beautei.

Y. beautei *Oberth.* (34c). Brown; almost the entire subapical area occupied by a gigantic, oval, oblique ocellus with 2 pupils; underside evenly brown, the hindwing bearing 3 irregular lines. — At Ta-tsien-lu in West China, in May and June.

insolita.

Y. insolita *Leech* (34d). Above entirely as in *Y. megalomma*; beneath also similar, but more yellowish grey and with small rings below the apical ocellus and on the hindwing. — At Wa-su-kow in West China, found at an altitude of 5000 ft.

avanta.

Y. avanta *Moore* (= *ordinata* *Btlr.*?). Somewhat larger than *baldus*. The strigae of the underside condensed to brown stripes which traverse the wings from the costa to the abdominal margin separating the wings into 3 almost equal areas, nearly as in *asterope*. The hindwing with 5 or 6 well developed ocelli. — In Kashmir, West and South China, as well as North India, not rare, from April to August. — The identity of this form with *ordinata* from Bengal is disputed.

iris.

Y. iris *Leech* (34d). At once recognized by the large oblique apical ocellus of the forewing and the 3 almost equal-sized large ocelli of the hindwing. In West China, not rare, from May to July. OBERTHÜR supposes the South Chinese *Y. dromon* to be a form of the present species. — A specimen in which the anal ocellus is absent from the upperside of the hindwing, is figured by OBERTHÜR as **dromonides** (34d, not *dromonides*, as on the plate); it came from Ta-tsien-lu.

dromonides.

Y. ciris *Leech* (= *clinia* *Oberth.*) (34 d). The ocellus of the forewing, as in the preceding species, *ciris*. large and oblique, but the hindwing beneath with more than 3 ocelli; the ocellus at the apex of the hindwing mostly with 2 pupils. — Widely distributed over West China, occurring up to 10000 feet, in July and August; *clinoides* *Oberth.* may be a southern (non-Palaeartic) form of this species.

Y. sakra *Moore* (34 e). Forewing beneath with the usual, nearly circular, double-pupilled apical ocellus. The hindwing bears on the underside 3 ocelli before the anal portion of the distal margin and an 8-shaped double ocellus before the apex. In Kashmir as well as several Indian Himalayan countries, up to 8000 ft., locally very plentiful, in April and May. — ab. **nikaea** *Moore* is a darker form, which also is usually smaller, the yellow edge of the 8-shaped spot before the apex of the hindwing being absent. This aberration is the commoner form in the western Himalayas, while in the eastern Himalayan districts the nymotypical *sakra* is prevalent.

Y. methorina *Oberth.* (34 e). The apical ocellus on the underside of the forewing very broadly edged with yellow; the hindwing beneath with 5 ocelli arranged in two groups, 2 ocelli being placed in the costal portion of the hindwing, while 3 are situated in the anal portion. The striation of the underside rather coarse. In most specimens a light band runs through the gap in the row of ocelli on the hindwing beneath, this band however is absent from *OBERTH.*'s figure, while *LEECH* regards it to be characteristic. — In ab. **medusa** *Leech* the yellow margin of the apical ocellus of the forewing is more restricted on both sides, and the striation of the underside is finer. Of wide distribution in West China, in some places represented only by the first form, in others by the second, while in certain localities, f. i. Wa-shan and Huang-mu-tsang, both forms fly together.

Y. conjuncta *Leech* (34 e). The largest *Ypthima*. Underside very similar to that of *methorina*, but the apical ocellus larger and still more broadly margined with yellow; the two ocelli situated before the apex of the hindwing united and 8-shaped, both being flattened; the 3 ocelli placed in the anal half touching each other with their yellow margins. The ♂ appears to have only one pupil in the apical ocellus of the forewing beneath, but there is above mostly also a second one placed excentrically in or at the yellow ring. — Central and West China, common.

Besides the 30 forms of *Ypthima* enumerated there are quite a number of others which very closely approach the Palaeartic Region, f. i. *Y. bolanica* from Beluchistan, *Y. indecora*, etc. We have, however, confined ourselves to those forms which are already known to occur on Palaeartic soil.

11. Genus: **Callerebia** *Bth.*

Butterflies of medium or large size, the upperside being of a uniform dark brown colour and bearing on the forewing a large double-pupilled ocellus. The body slender as compared with the very broad wings, the head especially being very small. The eyes are very prominent, the palpi long and porrect, and the antennae very delicate. The subcostal nervure of the forewing is inflated as far as about the middle of the cell, which is especially plainly visible on the underside. The genus differs from *Ypthima* by the often considerable size of the species; the underside of the hindwing moreover never has a complete row of ocelli, but is often clouded, not being so regularly striated as in *Ypthima*. The genus agrees so closely with *Erebia* that recent authors have given up separating them. The two genera are said to be distinguished from one another by the antennae of *Callerebia* being more slender and the anal angle of the hindwing of many species being produced into a kind of lobe, as well as by the wings having a greater width. Fresh live specimens have a magnificent deep blue sheen on the wings.

With a single exception all the species of *Callerebia* occur in the mountain ranges of the Himalayas, especially in the western and northern chains, so that the genus is essentially Palaeartic. Most species are inhabitants of Kashmir and the adjacent Himalayan valleys, occurring more in the hills than on the high mountains. They fly in day-time, but mostly in the deep shade of the woods, their flight being weak and jerky; and they settle on bushes or on the ground with the wings closed.

C. annada. The anal ocellus exactly the same above and below, having a double blue-white pupil and being broadly edged with orange. The hindwing beneath darker in the basal half and in the distal area, being centrally paler with whitish scaling. The species is well characterized by the very strongly rounded apex of the forewing and the strongly projecting anal lobe of the hindwing. Occurs in quite a number of races from Kashmir to the interior of China, the forms being in part geographically separated, and in part flying together. — In the name-typical **annada** *Moore* (35 a), from Kashmir, the disc of the forewing beneath is dusted with russet. — In **orixa** *Moore* (34 f), from the northern slopes of the Himalaya, the disc is more olivaceous brown; the hindwing beneath is darkened in the basal half by dense brown striation and, distally to the brown and severally dentate discal line, broadly powdered with white; in Chinese specimens of *orixa* the ground-colour has a reddish tint. — **polyphemus** *Oberth.* (34 f) is by far the largest form of the whole genus, being easily recognized by the size alone; the upperside of the fore-

hybrida. wing bears frequently accessory ocelli. — **hybrida** *Btlr.* (= *annada* *Marsh. & Nicér.* in tab.) (35a), which is only half the size, has an oval apical ocellus on the forewing and 2 ocelli in the anal area of the underside of the hindwing; comes nearest to the name-typical *annada*. — **ophthalmica** *Stgr.* is exactly like *orixa*, *carola*. except that the whole anal area of the hindwing is more strongly dusted with white. — **carola** *Oberth.* is probably also but a form of *annada*; still smaller than the latter, but of exactly the same shape, the anal lobe of the hindwing not being very strongly developed. The border of the ocellus of the forewing is continued towards the hindmargin of the wing as an orange-brown band, within which there are 2 ocelli; the hindwing, too, bears 2 submarginal small ocelli on the upperside. From Western Se-chuen.

scanda. **C. scanda** *Koll.* (35a) has exactly the shape and size of *annada*, especially of the form *orixa*, which it resembles very closely; but the underside is not yellowish brown, but dark. The wings above are paler in colour towards the distal margin; the hindwing has beneath some small white submarginal spots and sometimes 2 (often blind) subanal ocelli. The anal ocellus of the upperside of the hindwing shown in our figure may be absent. — South Kashmir, in July and August, as well as in the Himalayan countries eastwards as far as Mussuri.

phyllis. **C. phyllis** *Leech* (35b). The apical ocellus of the forewing is elongate-ovate and is almost placed obliquely. The hindwing beneath bears a rather evenly curved undulate discal line and distally to the same *ypthimoides*. 5 distinct white dots. In West China, found at a considerable altitude. — In **ypthimoides** *Oberth.* the ocellus of the forewing, though also oblique, is smaller and is placed on the underside in a reddish cloud; the hindwing beneath is paler on the whole and so strongly irrorated and dusted with white that the 5 white submarginal dots are quite obsolescent. From Tse-kou in West China.

sylvicola. **C. sylvicola** *Oberth.* (35a). The apical ocellus of the forewing has a dark border on the upperside and is somewhat irregular in shape beneath. On the upperside of the hindwing there are 5 dark white-centred ocelli, which shine through from beneath. The forewing whitish at the costal and distal margins on the *bocki*. underside. From Se-chuen, found in July. — In **bocki** *Oberth.*, likewise from Se-chuen, the forewing *megalops*. bears accessory ocelli, which stand in a row from the apical ocellus backwards. — In **megalops** *Alph.* the apical ocellus is more oblique and the small submarginal ocelli of the hindwing above are more broadly edged with brownish yellow: in Se-chuen, in June and August.

albipuncta. **C. albipuncta** *Leech* (35b). In this species, which is common in Central and West China, the somewhat oblique, oval, double-pupilled, apical ocellus of the forewing is irregular in shape, being sometimes pear-shaped. The hindwing beneath is rather evenly and finely striated and has a submarginal row of white dots, the one situated nearest the anal angle being the pupil of a small black ocellus.

pratorum. **C. pratorum** *Oberth.* (35a). Similar to the preceding, the apical ocellus less ovate. The apex of the forewing beneath light grey; the hindwing beneath the same, clouded with dark, with an undulate discal line which forms a very slightly curved arc. Strongly recalling *orixa* in the colouration of the entire underside. — Widely distributed in West China, common, from June to August, occurring up to 10000 ft. in the mountains.

nirmala. **C. nirmala** *Moore*. Uniformly dark above, resembling the form *hybrida*, but the apical ocellus smaller. On the underside the forewing is more uniformly dark and the apical ocellus is large and circular, being edged with a but feeble ring. The hindwing without the fine striation, but with a very regular row of white submarginal dots. The fringes chequered with light spots. Very common in the whole western portion of the Himalayas, but more on the Indian side. — While nymotypical *nirmala* bears small accessory ocelli, the form *intermedia* *Moore* (35b), from Southern Kashmir, always has but the one large round apical ocellus on the upperside of the forewing. Likewise abundant, from May to September. — The form *cashapa*. **cashapa** *Moore*, occurring still further south, has a row of ocelli on the underside of the hindwing.

daksha. **C. daksha** *Moore*. This is the smallest species of the whole genus and forms in aspect a transition to the *cyclopius*- and *rurigena*-groups of *Erebia*. It is characterized by the reddish yellow ring around the apical ocellus of the forewing above and the transverse striation on the underside of the hindwing being absent. The white submarginal dots on the hindwing beneath are always distinct, while the number of the ocelli is variable. — In Kashmir, at 8 to 9000 ft., in June, rare and local.

12. Genus: **Erebia** *Dalm.*

The *Erebias* are butterflies of generally medium size. The characteristic distinctions of the genus, besides the similarity in aspect, are chiefly found in the colour and pattern of the wing which is of the same kind in all the species of this genus. The ground-colour is a more or less dark brown, there being a continuous or interrupted submarginal band, which is seldom absent. In this submarginal band there are generally black ocelli, which are often centred with white and are absent but from few species. The head is large, being but little narrower than the thorax; the eyes naked and prominent; the palpi densely covered with fine hairs: antennae normal, usually black or brown above and whitish grey beneath, more

rarely ringed, the club elongate and somewhat flattened. Thorax and abdomen with a sparse silky pile. Neuration not constant and therefore of no value for characterizing the genus.

These butterflies have a well developed tongue and imbibe the honey of flowers, especially of Compositae, as well as the moisture on wet places on the ground; but the specimens thus engaged belong almost exclusively to the male sex; the females are sluggish, sitting mostly among the grass, waiting for their mate, and not before copulation has taken place and a portion of the eggs been deposited does the female fly about in search of food. The eggs are not laid or fastened on the stalks of the food-plant, but the female drops them on the ground among the grass. The snail-like larva, with globular head, tapers strongly backwards, ending in two small points, and bears usually paler and darker longitudinal stripes. The larva is known of but few species. Various kinds of grass serve as food-plants. These butterflies have only one brood.

The species of *Erebia* fly in mountainous and hilly districts, inhabiting especially the alpine regions of the Palaearctic countries of Europe and Asia, and of America, only a few forms descending into the plains. The area of distribution extends from the mountains of South Spain to the Pacific Ocean in East Asia. America will here not be taken into consideration.

The principal portion of the distribution-area, or the district of the whole area which is richest in species, are the Central Alps of Europe, which alone harbour 24 out of about 70 known species, the other members of the genus being distributed over the vast area and occurring in certain definite districts. 7 European species (*disa*, *medusa*, *aethiops*, *embla*, *tyndarus*, *euryalus*, *ligea*) have become distributed far into Eastern Asia, while not one of the Central Asiatic *Erebias* has penetrated into Europe; they appear to have remained stationary. Though the species of *Erebia* from Central Asia agree in aspect and colour on the whole with the European forms, some species are quite different in pattern from the European *Erebias*, deviating also in aspect. This is true especially of *mani* and its subforms, *parmenio*, *kalmuka*, *radians*, *maracandica*, *hades*, *tristis*, *saxicola*, etc. This group approaches more *Callerebia* and may be regarded to a certain extent as a connecting link between the genera *Erebia* and *Callerebia*, which are very closely related to one another.

As is well known, the *Erebias* vary very much in the distinctness of the markings, as well as in colour and size. This variability is often so great as to render it almost impossible to recognize to which species certain individuals belong. The figures of *Erebias* in the present work naturally illustrate this variability but incompletely. In the descriptions of the various species the deviations from the ordinary characters of the species have been referred to, as far as it appeared necessary.

The descriptions are given in the order adopted by STAUDINGER and REBEL in their Catalogue of 1901.

E. epiphron. Above dark brown, the distal margin brownish grey. Before the distal margin of the forewing a russet transverse band which is divided by the veins and bears 3—4 black ocelli, which are larger and usually white-centred in the ♀. Also on the hindwing the band is transected by the veins, being broken up into 3, rarely 4, ovate spots bearing black ocelli, which have now and again small white pupils. Underside similar to upper, but lighter; on the forewing the band is sharply defined distally, but gradually vanishes in the ground-colour basally. Antenna black-brown above, whitish grey beneath. — The form occurring in the Harz Mts., from which KNOCH described the species, must be regarded nymotypical **epiphron** Knoch (= *egea* Bkh.) (36a). In specimens from the Altvater in Silesia and from the Vosges *epiphron*. colour and pattern are less developed than in specimens from the Harz; they must be considered transitions towards the alpine form *cassiope*. — **cassiope** F. (= *melampus* Esp., *alcyone* Bkh., *aethiops* minor Vill., *cassiope*. *rhodia* Hbn.) (36a) is as a rule somewhat smaller than the first-described form; the russet band of the forewing is narrower, less sharply defined and usually separated into isolated spots. There are 3—4 black dots in the band, often hardly visible. The hindwing has some small brown spots before the outer margin bearing sometimes black dots. The ♀ is somewhat larger than the ♂, the wings being narrower and having a paler ground. In ab. **nelamus** Boisd. (= *cassiope* Meyer-Dür) (36a) the russet distal band is almost *nelamus*. entirely effaced by the extension of the ground-colour, being separated into small spots which bear hardly visible black dots; the hindwing is without markings. Occasionally there occur also uniformly black specimens without any markings. — A somewhat larger form with well-developed and continuous band bearing 4—5 larger ocelli in the same is **valesiana** Meyer-Dür, occurring in the Alps of Southern Wallis. — **mnemon** *valesiana*. Hew. has a paler ground and bears on the forewing 3—4 black dots which are bordered with russet-yellow. *mnemon*. The hindwing without markings. This form, as well as ab. **obsoleta** Tutt with the uniformly black-brown *obsoleta*. wings having no trace of markings, inhabits the mountains of Scotland. — **pyrenaica** H.-Schöff. (36a) is *pyrenaica*. somewhat larger than *cassiope*, the band being broader and the ocelli larger; from the western Pyrenees. — The eggs of *epiphron* are elliptic, ribbed, yellowish green, the larva appearing after 14 days. The adult larva is green with dark longitudinal lines and yellow lateral stripe; the anal processes brownish. They feed on grasses, especially *Aira praecox* and *caespitosa*. Pupa light grey. The butterflies are on the wing from May to August, occurring in grassy and somewhat moist localities, not being rare at their flight-places.

melampus. **E. melampus** *Fuessl.* (= *janthe* *Hbn.*, *aetherius* *Esp.*, *arete* *Bell.*) (36b). One of the commonest *Erebia*s of the Alps. Other districts where it occurs are the Pyrenees, the High Tatra and the western and southern Carpathian Mts. The ground-colour is black-brown, the margin reddish grey, the antenna blackish above, whitish grey beneath. The forewing has a russet macular band, interrupted by the veins, bearing in the same 2—3, more rarely 4 black ocelli. On the hindwing there are before the distal margin 3—4 ovate ferruginous spots which bear black dots. The underside is paler, more reddish grey, the band and spots being distinct. The wings of the ♀ are more elongate, the ground-colour and band being lighter than in the ♂. — On the Altvater in Silesia there occurs the form **sudetica** *Stgr.* (36b); it differs from the alpine form in the distal band of the forewing being broader and lighter and bearing regular 4, sometimes even 5 black dots, and in the ferruginous yellow spots of the hindwing being larger and being more prominent than in name-typical *melampus*. — Egg elliptic, longitudinally ribbed, sulphur-yellow, becoming reddish grey before emergence. Larva clay-colour before the last moult, then bright green, with dark dorsal line which is finely bordered with light colour, and with indistinct lighter subdorsal lines which are edged with dark; a lateral stripe light green, above the same the small orange stigmata. Reared on *Poa annua*. Pupa pale yellowish grey, with darker markings; free on the ground. The butterflies are on the wing in July and August, flying often in great abundance on the grassy alpine meadows and occurring up to 2600 m, their flight being low, slow and straight on.

kefersteini. **E. kefersteini** *Er.* (36b) is nearest to *melampus* and of the same size. The central area inclusive of the cell is brown-red, the base and the costal, distal and hindmargins being black-brown. In the ♂ the reddish yellow distal band, which is divided into 6 spots by the veins, contrasts in colour but slightly with the central area and proximally gradually disappears in the latter. There are small black pupils in spots 2, 3 and 4 counted from the costal side. The underside is lighter, more greyish brown, the markings being as above. Among the few specimens examined there is one which essentially differs in markings: The forewing is black-brown, being centrally but little dusted with brown; the black dots are completely absent from the band of both wings. In the ♀ the forewing is dark brown, the cell being more or less filled in with red-brown. There are 4—5 black ocelli in the spots of the transverse band, and the hindwing bears 4 red-brown ovate spots with black dots. — In the second half of July on the alpine meadows of the mountains of Central Siberia.

flavofasciata. **E. flavofasciata** *Heyne* (36b). This interesting *Erebia* has only lately been discovered. Lieutenant-Colonel von NOLTE obtained the first specimens in July 1893 in the Alps of Tessin in the Campolungo-Pass near Fusio. Later the species has also been found, in a but slightly different form, at Pontresina in the upper Engadine. In shape and size like *cassiope*, but nearer *melampus* in pattern. Ground-colour dark brown, as in most *Erebia*s, the ♀ being distinctly paler. The narrow russet-brown distal band of the forewing is separated by the veins into 5—6 rounded or ovate spots which bear small black dots; the spots in cellules 4 and 5 are generally somewhat elongate and bear a stronger black dot than the others. The hindwing above bears before the outer margin 4 russet-yellow rounded spots with black dots. In the ♀ these spots are larger and have stronger black dots. The underside of the forewing greyish brown, the more yellow-brown distal band not separated into spots as above but continuous, also somewhat broader. The black dots contrast sharply. The central area has a feebly red-brown tint which gradually fades away proximally. The hindwing beneath is brownish grey; there is, before the outer margin and parallel with the same, a rather large straw-yellow band, which extends from the costal margin to near the anal angle. In this band there is a row of 5—6 black dots of almost even size, being shifted a little distad. The ♀ beneath is lighter and brighter in colour than the ♂. — The form **thiemei** *Bartel* (36c) from the Engadine is darker than specimens from Tessin. The distal band of the forewing is separated into isolated spots of different sizes. The number of these small spots, which have but feeble black dots, varies, the spots being sometimes obsolescent. Otherwise but little different from the name-typical form. — The butterflies occur on steep grassy and rocky slopes.

eriphyle. **E. eriphyle** *Frr.* (36c). This *Erebia* which is very close to *melampus* was formerly considered to be only a variety of the latter, but is constantly different. The distal band of the forewing is more or less reddish brown, sometimes brown-yellow, being separated by the veins into several elongate, distally rounded spots. The number of these spots is variable, there being usually 5, sometimes only 3—4. The 2 spots placed close to the outer margin bear small black dots. On the hindwing there are 3—4 red-brown or brownish spots of which the one near the median vein in cellule 4 is placed a little more basad, being always larger and more elongate, while in *melampus* it is never larger than the other spots of the hindwing. The shape and position of this spot and the absence of black centres are the main characters of *eriphyle*, which moreover is distinctly larger than *melampus*. Beneath the band of the forewing is lighter than above, being ochre-yellow in many specimens; the spots of the hindwing are of the same colour, being much more prominent than above. In the ♀ the ground-colour paler, the underside yellowish brown, band and spots less distinct than in ♂. The distal margin of the ♂ somewhat paler than the ground, brownish grey in the ♀. Antenna black-brown above, white-grey beneath. — An inhabitant of the Alps, prefers limestone, and occurs

in July and August at altitudes of from 900 to 2200 m. — ab. **impunctata** *Höfn.* differs in the spots of *impunctata*, both wings being larger and in the band of the forewing bearing no black dots. — In ab. **tristis** *H.-Schäff.*, *tristis*, from Graubünden and the Alps of Schwyz, the marginal band of the forewing is brighter in colour and the disc of the hindwing beneath has a reddish flush. — ab. **intermedia** *Frey*, from Carinthia, has more distinct *intermedia*, reddish yellow spots, also on the hindwing.

E. christi *Rätzer* (36c). This species comes nearest to *cassiope*, being however at least one-third *christi* larger. The forewing more elongate than in *cassiope*, apex and distal margin rounded, also in the hindwing, the apex of the latter being obtusely pointed in *cassiope*. The brown transverse band of the forewing is of even width and runs parallel with the distal margin, being sharply defined proximally and distally and separated by the veins into spots, usually 6. The 2. and 3. of these spots counted from the costal side are not prolonged both ways as is *cassiope*, but are of the same size as the others. In the upper spots there is a straight row of 3 or 4 black dots, of which the 2 middle ones are always larger than the others. The hindwing bears 4, more rarely 3, oval russet-yellow spots with ovate black dots, which in the ♀ are sometimes prolonged to streaks. The underside of the forewing is russet-brown, being darker basally, the lighter band contrasting distinctly with the central area. Costal and distal margins brown-grey. Only the 2 central black dots are as large as above, while the others are either completely absent or are represented but by small black specks. The hindwing beneath violet-grey, with a darker dentate band, which is obsolete in the ♂, but distinct in the ♀. — The only locality so far known is the Laquin Valley at the southern Simplon-road below the village of Simplon. The flight-place is very limited, having only an extent of 5–600 m, consisting of grassy and flowery slopes covered with rocks and boulders. The butterfly is not abundant.

E. mnestra *Hbn.* (36c, d). Shape as in *melampus*, but larger. The band on the forewing of the ♂ *mnestra* is reddish or brownish yellow and distally sharply defined, proximally more or less shading off into the black-brown ground-colour. In this band there are sometimes 2 small black pupils near the apex, which are mostly absent. The hindwing has sometimes a brown band separated by the veins into 3–4 spots, which may be absent. The forewing beneath is russet-brown, the costal and distal margins being dark brown like the hindwing. The ♀ is somewhat lighter in colour, the band of the forewing is russet-yellow and on both sides sharply limited, bearing 2 usually white-centred ocelli, which are visible also on the underside. Specimens in which the band is especially prominent bear in the same 2–3 small black ocelli with white centres. The band, however, is mostly absent, being represented only by some diffuse brown spots. Underside of the forewing as in the ♂, but the band lighter, and the wing russet-brown from the band to the base. The hindwing beneath light brown, dusted all over with yellowish grey atoms, the wing being centrally crossed by a but slightly lighter band, which is somewhat dentate on both sides. Antenna black above, white beneath. In the Swiss and Tyrolean Alps, but local. — **gorgophone** *Bell.*, from South *gorgophone*. France, is smaller and has a broader band.

E. arete *F.* (nec *Bell.* = *claudina* *Blk.*) (36d). Forewing deep dark brown; the band red-brown, *arete*, slightly interrupted by the veins, sharply defined proximally and distally, and extending to the hindmargin. There are two small white-centred ocelli in the band, which in the ♂ are usually visible only on the underside. The brown band is either entirely absent from the hindwing or it is only represented by small brown spots. There are 4–5 white dots before the distal margin, which are hardly visible in the ♂, being sometimes absent, while they are always present and quite distinct in the ♀. The forewing beneath is dull red-brown in the ♂, the costal and distal margins being black-brown like the hindwing; in the ♀ the costal margin and apex of forewing as well as the hindwing greenish grey. Fringes but slightly lighter than the wing in the ♂, yellowish grey in the ♀. Antenna black above, whitish beneath. In the Alps of Carinthia and Salzburg, in the Weissbriach valley, in July and August, said to occur only in the years with uneven numbers. — ♀♀ with bone-yellow band and pure white fringes have been distinguished as ab. **albofasciata** *Höfn.* — The egg is described as being round and white. The larvae appeared after 11 days; *albofasciata*, they were light green with 6 dark longitudinal lines; they were fed on *Aira caespitosa*.

E. pharte *Hbn.* (36d). Shape and size as in *melampus*, the forewing however narrower, being more *pharte* elongate, the apex not so much rounded. The yellowish brown distal band of the forewing is interrupted by the veins, extending usually close to the hindmargin, sometimes only to the centre of the wing. The hindwing has mostly 3–4 yellowish brown spots of different sizes, which are sometimes completely absent or are represented only by some small brown dots. On the underside the band of the forewing is continuous and somewhat lighter yellow-brown than above, the disc being diffuse red-brown. The hindwing beneath dark brown in the ♂, the yellow-brown spots being the same as above, only being more prominent. In the lighter coloured ♀ the underside is dusted with greyish yellow, especially at the costal and distal margins of the wings. In the higher Vosges and the Central Alps, especially in swampy meadows, rarely going above the tree-limit. — In ab. **phartina** *Stgr.* (36d) the brown-yellow macular band of the forewing is *phartina*, represented by only 2–3 spots of different sizes; the hindwing has only some small obsolescent spots,

which may even be absent. Occurs singly among the name-typical form, especially at higher altitudes. —

fasciata. The form *fasciata* *Spul.*, from Carinthia, has a specially dark ground-colour; the band reddish orange in the ♂, yellowish orange in the ♀, broader, on the hindwing more extended, with lighter spots as remnants of the ocelli.

kindermannii.

E. kindermannii *Stgr.* (36 e). Somewhat smaller than *maurisius*, but closely allied to the same. The brown macular band rather broad, the cell distally brown: in the ♀ the whole central area as far as the band with a brown tint. The hindwing has 5—6 russet-brown spots, which are ovate in the ♂ and a little smaller and rounded in the ♀. On the underside the central area of the forewing is brown, the macular band being somewhat broader than above but less prominent. The two marginal spots in cellules 4 and 5 of the forewing and the three in cellules 2—4 of the hindwing have in the centre a very small black dot only in the ♀. — From the Altai.

pawłowskyi.

E. pawłowskyi *Mén.* (= *herzi* *Christ.*). Shape and size as in *pharte*, to which it bears a close resemblance. The distal band of the forewing consists of a series of separated russet-brown spots, usually 5—7, the two uppermost being somewhat broader than the posterior ones, which moreover are more rounded. On the hindwing, parallel to the distal margin, there is a row of 5 ferruginous brown spots, which are not rounded as in *pharte*, but elongate. The brown transverse band of the upperside is very variable, being sometimes of greater and sometimes of lesser width, or being even so much reduced as to be represented but by some brown dots. The underside is bright brown (of the same tint as in *manto* *Esp.*), the forewing having centrally a russet-yellow tint. The spots are lighter, being more brownish yellow and more prominent than above. The hindwing is beneath but little darker and bears 5—7 russet-yellow ovate spots. The ♀ is lighter above, being more greyish brown, the spots are larger and of a brownish yellow colour. Underside greyish brown, the spots of the forewing brownish yellow, those of the hindwing ochre-yellow. At the apex of the cell there is an obsolescent yellow patch, which also appears occasionally in the ♂. North-East Siberia, in June and July, locally abundant. — *sajana* *Stgr.* (36 e) is somewhat larger than the first described form, differing otherwise but little. The brown spots vary in number and colour, which however is also the case in the name-typical form of *pawłowskyi*. Occurs in the mountains of Eastern Mongolia.

haberhaueri.

E. haberhaueri *Stgr.* (36 e). The black-brown wings have before the distal margin a russet-brown band which is separated by the veins into a number of spots, usually 6. The cell of the forewing shaded with brown. The spots of the hindwing rounded, those of the forewing somewhat elongate. On the underside the forewing is centrally russet-brown, the fore and distal margins being dark brown. The macular band is distinct in the ♂, while it is but feebly marked in the ♀, partly disappearing in the ferruginous brown central area. The hindwing beneath is dark, with 5—6 small yellowish dots before the distal margin, the dots sometimes being each bordered proximally by a very small narrow ferruginous brown dash. The yellowish dots are smaller in the ♀ than in the ♂. Tarbagatai. — In *elwesi* *Stgr.* (= *maurisius* *Stgr.*) (36 e), from the Altai, the macular band is much wider on both wings and brighter brown, the cell of the forewing is brown, and there is an obsolescent russet-brown patch below the subcostal vein. The forewing beneath ferruginous brown, fore and distal margins dark brown, the brownish yellow distal band distinctly contrasting with the ground-colour. The spots of the hindwing somewhat smaller and lighter than above.

maurisius.

E. maurisius *Esp.* (36 e). The reddish brown band of the forewing is separated by the veins into a number of elongate spots — usually 6; the cell is more or less filled in with ferruginous brown, and behind the cross-vein there are 2 somewhat diffuse narrow streaks, which extend towards the distal band, in which they disappear. The hindwing has 6 round russet-yellow spots. On the underside the band of the forewing is lighter, and the space between the band and the darkened base is russet-brown; inner and distal margins blackish brown. The hindwing dark brown in the ♂, with very small, point-like, russet-yellow spots. In the ♀ the hindwing is grey-brown beneath, being finely dusted with greyish yellow, the ochre-yellow dots at the distal margin are prolonged to small stripes. In the cell there is a whitish yellow diffuse spot on the upperside. The fringes grey-brown in the ♂, whitish grey in the ♀. Antenna finely ringed, the club white on the inside, black-brown on the outside. Middle of July, on the Altai, from 2000 to 2700 m, on grassy slopes. — The form *theano* *Tausch.* (= *stubbendorffii* *Mén.*) (36 f) is much brighter in pattern than *maurisius*; the spots of the distal band are larger and not russet-brown but yellow. The two upper and the two lower spots are of the same width, while the other two are especially long, extending towards the cell. The forewing has a yellow discal spot on both surfaces more or less filling up the cell, below the same a small yellowish spot, which is often only indicated by yellowish dusting. The band of the hindwing consists of 6 rounded or quadrangular yellow spots, there being an additional, smaller, spot in the cell. The underside somewhat lighter, the spots forming the bands arranged as above, but those on the hindwing large and bright bone-yellow; there are also a number of elongate spots, which vary in size and shape, near the base of the hindwing. Fringes chequered with dark brown and grey.

turanica.

E. turanica *Ersch.* (36 f). Very variable in size and pattern. The upperside of the wings deep dark brown. There is a row of 5 ochre-yellow spots at the distal margin of the forewing, varying in size,

namely: a small one at the costal margin, followed by a large one which is somewhat more proximal and is composed of 2, and below this two somewhat smaller spots which are more rounded than the others. The spot placed at the hindmargin is either very small or entirely absent. It happens also that all the spots are so enlarged and united as to form a broad, irregular, yellow band. On the hindwing, parallel to the distal margin, there is a row of 5—6 yellow spots which are of nearly the same size and of which the two situated at the inner margin are usually united. The forewing is somewhat lighter beneath, the markings being the same as above. On the underside of the hindwing the yellow spots are somewhat smaller than above, there being small black dots in some of them. Proximally to the spots there is a white band which is somewhat dentate distally, being now and again separated into white spots. The cell bears sometimes a small white spot. In the *Ala-tau*. — **laeta** *Stgr.* (36 f), which occurs in the northern Tian-shan, has only *laeta*. 4 spots on the forewing above, the upper two being united and somewhat more proximal, while the other two are nearer the distal margin and parallel with the same. The spots of the hindwing as in *turanica*. Beneath both wings are finely dusted with grey-yellow. The white spot in the cell of the hindwing is mostly absent in the ♂, being nearly always present in the ♀. — In the form **tristis** *Gr.-Grsh.* the spots of *tristis*. the upperside are darker, more brown, the white band on the underside of the hindwing absent. From the higher altitudes of the Tian-shan. — **jucunda** *Püng.* (36 f, g) is the largest and most conspicuous of the *jucunda*. *turanica*-forms. The brownish yellow spots are bright and light, those on the forewing being large and often confluent, the last one sometimes absent, sometimes well developed, the spots of the hindwing proportionately small. Hindwing beneath with a continuous white band. In the Tian-shan district, north of Korla.

E. manto *Esp.* (= *erina* *F.*, *pyrrha* *F.*, *oeme* var. *Esp.*) (36 g). The russet band of the forewing *manto*. consists mostly only of oval spots, in which there are 2—3 black dots. The hindwing has often, but not always, some russet-red small obsolescent spots. The underside is brown in the ♂, the band of the forewing being more prominent and better defined than above, and is often continuous. The band of the hindwing consists of some russet-red spots, which bear occasionally some black dots. The ♀ is visibly lighter beneath, the central area of the forewing being brownish, the fore and distal margins as well as the hindwing densely dusted with yellowish grey. At the base of the hindwing there are a number of ochreous spots, moreover some yellow spots extend from the costal margin to below the apex of the cell, sometimes merged together to a broader abbreviated band, there being often some smaller additional spots near them forming a row which is parallel with the distal margin. Fringes in the ♂ somewhat lighter than the ground-colour, in the ♀ grey. The species distributed over the whole chain of the Alps, being plentiful in many places; it occurs on grassy slopes of the alpine and subalpine districts; also on the mountains of the Auvergne and in the Pyrenees, as well as on the mountains of Hungary. — In ab. **bubastis** *Meissn.* (= *pyrrha* *macca-* *bubastis*. *baeus* *Frr.*) from the northern Central Alps the hindwing beneath bears a white band; the fringes are dark-chequered. — ab. **caecilia** *Hbn.* (36 g), which is above uniformly black-brown without spots, occurs in *caecilia*. Switzerland and the Tyrol among the name-typical form, but is rare. — A similar form with the ground-colour more greyish brown but also without markings, flies in the Pyrenees; this is **constans** *Elwes* (= *caecilia* *constans*. *Dup.*) (36 g). — In the Swiss and Tyrolean Alps, high above the tree-line, there flies a very small form, **pyrrhula** *Frey* (36 h), which is scarcely as large as *pharte*. The forewing has some small streak-like russet- *pyrrhula*. brown spots, in which there are but rarely small black dots. The hindwing is without markings as a rule, only occasionally showing small brown wedge-shaped spots. The underside as in *manto*, but the markings reduced. — **trajanus** *Hornm.* differs from the first described form chiefly on the underside. The forewing *trajanus*. of this form is light reddish brown, being dusted with yellowish grey towards the apex and costa; the light reddish yellow band is dentate between the veins both distally and proximally or there are feeble teeth only on the proximal side, the band bearing always two distinct ocelli in cellules 4 and 5. The hindwing greenish grey beneath, the spots of the distal band of different sizes, not being reddish yellow as in the nymotypical form, but whitish yellow, the basal spots are completely absent. Distribution-area: Bukovina. — The form from the Vosges has been described as **vogesiaca** *Christ.*, the ♀♀ being without light basal spots *vogesiaca*. on the hindwing beneath. — Larva greenish yellow, with the head and legs honey-colour; on the back 2 rows of black comma-spots. Pupa yellow, with black markings. The butterfly emerges in 3 weeks from the pupa, which lies free on the ground. The species is plentiful and is on the wing from June to August.

E. ceto *Hbn.* (36 h). Ground-colour dark black-brown. The distal band, which consist of a number *ceto*. of narrow, oval, isolated spots, is russet in the ♂, reddish yellow in the ♀. There are small black dots in the spots, the dots being somewhat larger in the ♀. The hindwing bears 4—5 small roundish brown spots with white-centred black ocelli. The lighter underside is marked like the upper. The ♀ above visibly lighter, the russet-yellow spots and the ocelli placed in the same larger than in the ♂. The underside is brownish grey, the spots ochreous. The ♀♀ are exceedingly variable in pattern; the russet-yellow band of the forewing is not rarely so much reduced as to even disappear, and the hindwing is often devoid of every trace of the macular band. — Especially in the Southern Alps, where it is abundant; rarer and but local in the Central and Northern Limestone Alps. Also on the higher mountains of South Hungary and the Apennines. — **phorcys** *Frr.* (36 h) is the form from the Balcan; here the spots on the underside of the *phorcys*.

obscura. hindwing are white or bordered with white. — In ab. **obscura** Rätzer (36h) the brown-red spots of both wings are strongly reduced; otherwise like the name-typical form; in the Simplon district and the Carinthian Alps. — In the Alps of Graubünden there occurs a small form, **caradjae** *Caflisch*, with small dull red-brown spots, which are occasionally but very faintly indicated. — Egg oval, pale yellow, dirty red before emergence. The larva, which appears in 12 days, is yellowish grey before the last moult, and green when adult, with a white-edged dark dorsal line and dark-bordered light subdorsal line. On the 4. segment there commences above the leg a thin black-brown line which is widened to a dot at each joint between the rings. Head yellowish grey, with red mouth. Reared on *Poa annua* (LIEBMAN). Pupa yellow, with brown back and black eyes; free on the ground. The butterflies from the middle of June into August; the ♀♀ have a low straight flight, flapping the wings very regularly. The ♀♀ are at first so awkward that they can sometimes be taken up with the fingers from the grass.

medusa. **E. medusa** F. (= *ligea* Esp., *themistocles de Loche*, *medea* Bkh.) (35f). In the reddish yellow macular distal band there are two larger white-centred black ocelli near the apex placed close together, being sometimes united. The ocelli which are situated in the other spots — usually 3 — are smaller, being often reprinted by blind black dots. The hindwing has 3—4 reddish yellow separated spots bearing white-centred black ocelli. The somewhat lighter underside has the same pattern as the upper. Modifications as regards the number of the ocelli and reddish yellow spots occur frequently. Central Europe, from Northern Germany and Belgium southward to South France, Central Italy and the Balcan, eastwards to the Amur, flying also in the plains. — In the form **psodea** Hbn. (= *eumenis* Err.) (35f) the macular band is somewhat lighter and broader; the ocelli, especially in the band of the hindwing, are larger and bear a more conspicuous white pupil. In South Hungary, the Balcan, Caucasus, and Western Siberia: is said to occur occasionally in Central Europe as aberration. — **procopiani** *Hormuz.*, with blind ocelli, is a smaller form from the Bukowina. — **hippomedusa** O. (35g) is still smaller; occurs in the alpine regions, the macular band being reduced and the ocelli smaller. — **polaris** Stgr. (35g) is but little larger than the preceding form, the macular band being obsolescent on the hindwing beneath. Lapland, Finmark, Norway. — **uralensis** Stgr. (= *medusa* Er.) (35g), with less ocelli, otherwise but little different from *polaris*, forming a transition towards the latter, the underside of the hindwing being different. In the Southern Ural, the Kirghizsteppe and the adjacent districts of Siberia. — **subalpina** Gump. Beneath like *medusa*, but deep black above, the forewing bearing ferruginous red black-dotted spots; in the Bavarian Alps, up to 3000 ft. — **transiens**. **transiens** Rühl-Heyne (= *medusa* var. Stgr.) comes nearer *psodea*; the ocelli are larger and more numerous than in *medusa*; the hindwing beneath more or less dusted with grey in the ♀; East Siberia. — Larva light green, with light-edged dark dorsal line, a light line above the stigmata, a white line above the legs, and 2 black ocelli on the head. It feeds on various grasses, as *Panicum sanguinale*, *Millium effusum*, etc., hibernates and changes the end of April into a light grey pupa, which lies on the ground in a loose web, the butterfly appearing in 4 weeks. The species is on the wing from the end of May to early July, occurring in the woods in meadows and on grassy roads, in road-ditches, etc., the flight being slow but irregular and probing. The ♂♂ are very abundant, while the ♀♀ remain at rest, appearing but towards the end of the period of flight.

oeme. **E. oeme** Hbn. (35g). Variable in size, usually somewhat smaller than *medusa*, the wings more elongate. On the forewing there is near the apex a russet-yellow, sometimes divided spot which bears two white-centred black ocelli. The hindwing has distally 2—4 white-centred ocelli which are edged with russet-yellow. Underside grey-brown, markings as above. The ♀, which is usually somewhat larger, is lighter, the ocelli being larger and more prominent than in the ♂; the hindwing beneath yellowish grey. Widely distributed over the Alps, but sporadic, occurring especially on limestone, being usually not rare on the flight-places. — ab. **lugens** Stgr. is a smaller form in which the forewing is uniformly black-brown above; on the underside the ocelli below the costa are always separated. In the Gaden valley in Western Switzerland. — **spodia** Stgr. (35g) is mostly somewhat larger than *oeme*, the fore- and hindwings have a complete distal band, the ocelli are larger and conspicuously centred with white. Transitions towards name-typical *oeme* are not rare. This is the form of the Eastern Alps and the Balcan. — Egg (of the form *spodia*) round, glabrous, glossy white. Larva similar to the larva of *medusa* in shape and markings, not being green however, but pale clayish, with brownish longitudinal lines; each ring is crossed by a transverse line composed of 4 black united spots; above the legs a chocolate-brown side-stripe. On *Luzula*-species. Pupa pale yellow, the sheaths of the eyes, tongue and wings edged with brown (ROGENUOFER). The butterfly in June and July.

stygne. **E. stygne** O. (= *pirene* Hbn.) (35g). Upperside of both wings dark black-brown. The forewing has before the distal margin a russet-brown band which is broad anteriorly, strongly tapering behind, and bears in its upper portion 2 white-centred black ocelli; towards the hindmargin an additional, somewhat smaller ocellus is visible. The hindwing has 3—4 white-centred ocelli which are edged with brown. The underside of the forewing is in ♂ and ♀ but little lighter than the upper, the distal band being broader,

lighter brown and continuous. The hindwing beneath dark brown in the ♂, brown grey in the ♀. The ocelli as on the upperside, but smaller, being narrowly edged with brown. Specimens from the Black Forest are much brighter coloured, the broad russet yellow band of the forewing commences near the costal margin of the forewing and extends to the hindmargin, remaining of nearly even width. In the band there are always 3–5 large black white-centred ocelli, and, especially often in the ♀, there is above the first ocellus, towards the apex, an additional smaller ocellus with white pupil, this ocellus not being visible beneath. On the hindwing the brown band is as wide as on the forewing, the ocelli, 3–4 in number, are likewise large and have conspicuous white pupils. — The form **pyrenaica** *Rühl.*, which is *pyrenaica* found in the Western Pyrenees in June, differs from the first-described form only in the reduction of the red colour. — In ab. **valesiaca** *Ehr.*, which occurs in Wallis as well on the Simplon, and even in the Pyrenees, *valesiaca*. the russet-red is effaced in the ♀ except for faint traces, being altogether absent from the ♂. — *stygne* occurs in the Black Forest and the Thuringian Forest, the Jura, Alps, Vosges, the Pyrenees, and Apennines and extends eastwards to Armenia; in June and July; the butterfly begins to appear already below 3000 ft. and goes rarely above the tree-line.

E. evias *God.* (= *bonellii* *Hbn.*) (35 g). Always somewhat larger than the preceding: the upperside *evias*. of the wings dark black-brown, the forewing with a russet-red or reddish yellow transverse band bearing 5 white-centred black ocelli of different sizes, 3 of them standing near the costa and being united, while the 2 others stand further back and are somewhat smaller. The band of the hindwing consists of 4–5 oval brown spots, each bearing a white-centred black ocellus. The forewing beneath is similarly marked as above, the hindwing of the ♂ being black, thinly dusted with grey, and bearing a more or less dark median band which is somewhat excurved between the veins. In the lighter discal margin there are 3–5 white-pupilled black ocelli. The ♀ is brownish grey beneath, costal and distal margins of the forewing marmorated with grey and brown like the hindwing, the median band of the latter being more prominent than in the ♂. — The smaller form from the Pyrenees, **pyrenaica** *Stgr.*, has the underside more strongly *pyrenaica*. marked, the russet-red band is narrower and the ocelli are absent or strongly reduced. — The form **hispanica** *Zap.* (37 a) is somewhat smaller, the transverse band being lighter in both sexes, the ocelli smaller, and the upper 3 ocelli in the band of the forewing moreover are not united as in nymotypical *evias*, but stand separated one below the other. — The species appears already the middle of May in warmer localities, flying from June to August at higher altitudes, and occurs on grassy slopes; plentiful in most flight-places. The insect is found in the Pyrenees, the lower Alps of Southern France, in Wallis and the Southern Tyrol.

E. hewitsoni *Led.* The broad russet-red band of the forewing gradually narrows towards the hind- *hewitsoni*. margin and ends close to the latter. It bears anteriorly 3 large white-centred ocelli, which are usually confluent, being rarely separated, and are followed towards the hindmargin by 2–3 small ocelli feebly dotted with white. The russet-red band is continued on to the hindwing, bearing 4–5 white-centred ocelli of equal size. The markings on the forewing beneath are as above. The hindwing beneath is dark brown from the base to the middle, being feebly dusted with grey, the outer margin being lighter and bearing 5–6 white-centred black ocelli which are narrowly edged with brown. — In June and July in Armenia and Northern Persia.

E. nerine *Frr.* (= *goante* *H.-Schöff.*) (37 a, b). The upperside dark black-brown with slight gloss. *nerine*. The red-brown transverse band of the forewing is posteriorly interrupted by the veins, forming 3–4 basally somewhat pointed spots; sometimes the band is continuous, which is nearly always the case in the ♂. There are 2 white-centred black ocelli anteriorly in the band. The band is interrupted by the veins on the hindwing and bears 3 smaller ocelli. The forewing beneath bright russet-red, darker towards the base, the costal and distal margins being black-brown: the ocelli as above. The hindwing beneath dark brown as far as the centre, this area being bordered by a whitish grey narrow band which is somewhat sinuate near its centre; the ocelli in the lighter distal area are mostly indicated by small black-bordered white dots, which are sometimes absent. The ground-colour of the ♀ is lighter, the band of the forewing broader and russet-yellow, the 2 eyes at the apex larger and usually confluent, there being often two additional smaller ocelli towards the hindmargin. The ocelli placed in the band of the hindwing are also larger and have conspicuous white pupils. The forewing beneath is light russet-yellow, darkened towards the base, the costal and distal margins grey-brown, the apex dusted with white-grey. The hindwing beneath white-grey, irrorated with brown atoms; the white-grey band, which limits the dark basal area, contrasts distinctly. The fringes chequered in the ♀, the distal margin of the hindwing slightly dentate. In the Central and Southern Alps, northward to the Fern Pass and Scharnitz Valley. — **reichlini** *H.-Schöff.* (= *styx* *Frr.*), *reichlini*. from the Bavarian Alps, Reichenhall and the Glockner district, is usually somewhat larger than the first described form. The band of the forewing is strongly reduced. The hindwing with 3 small ocelli in russet-red spots. — **italica** *Frey*, from the Alps of Wallis and North Italy, is a transition from *nerine* towards *italica*. *reichlini*. — In **stelviana** *Curo*, from Bormio, the red band of the forewing is continuous, the underside *stelviana*. devoid of ocelli, being paler and basally but indistinctly dusted with white. — **morula** *Esp.*, from the *morula*. southern slopes of the Eastern Alps, is smaller and darker, the ocelli are but faintly ringed with reddish

yellow. Hindwing beneath with the basal half dark brown, the distal area being lighter and bearing 3 white pupils. In South Tyrol, Seiser Alp. — *nerine* flies in various dispersed localities, from the end of June to August in shady places of the forest region up to more than 5000 ft.

- melas*. **E. melas** *Hbst.* (= *maurus* *Esp.*) (37 a). In shape and size like *stygne*, bearing a close resemblance to the alpine form of the same; the ground-colour however is much darker, being nearly black. On the forewing there are towards the apex two white-centred black ocelli, which contrast with the ground-colour and are sometimes confluent; a third smaller ocellus is situated towards the hindmargin. The hindwing has distally 3—4 white-centred ocelli, which are sometimes as large as those on the forewing. The russet band is indicated by a pale sheen only in the ♀. The underside of the ♂ agrees fairly well with the upper, the hindwing being somewhat darker than the forewing and bearing sometimes traces of a distally slightly dentate middle band. In the ♀ the underside is variable, the brown band of the forewing is sometimes distinctly developed or is indicated by a lighter tint, being sometimes altogether absent. The hindwing is brown-grey with blackish atoms; there being before the distal margin a lighter band which is exteriorly undulate and bears 3—4 small white-centred ocelli. In Carinthia, Istria, the Balcan countries, South Russia and Greece. — In the form **astur** *Oberth.* (37 a) the upperside is quite black, sometimes without ocelli, but mostly with 2 small, white, usually deep black-bordered ocelli. The ♀ silvery grey beneath, with darker forewing. Before the distal margin there is a band which is dark red-brown on the forewing and pale grey on the hindwing, thus contrasting with the ground. From the higher parts of the Pyrenees. —
- lefebvrei*. **lefebvrei** *Dub.* (37 a) has the forewing more elongate than the name-typical *melas*; the ocelli of both wings are larger and more brightly white-centred, the two on the forewing being mostly united. On the underside the forewing is but little paler than above, the russet-red band being distinct. The hindwing is uniformly black-brown without band, the submarginal ocelli being very small or quite absent. Antenna black above and beneath, being white beneath in *melas*. Pyrenees. —
- pyrenaica*. **pyrenaica** *Oberth.* has in the ♂ often a red-brown band on the forewing beneath; the ♀ has the forewing dark red-brown, the underside with bright red distal band, the hindwing beneath being brown-red with pale yellowish distal band. On the rocky slopes of the Canigou, from 2400 m to the summit. — An intermediate form, **intermedia**, was described by OBERTHÜR from the mountains of Cambrès d'Ase, south of the Mt. Louis (Pyrenees). — Egg light ochreous, with 30—32 longitudinal ribs and irregular impressions. Larva yellow or reddish grey, with yellow sides, dotted with brown on the back, there being a broad dark dorsal line. Pupa first green, the abdomen marked with red, later the wing-cases milky white. The butterflies are on the wing in July, hurrying in a fast flight over the precipices and the boulders, flying at but a little distance above the ground (OBERTHÜR), plentiful.
- scipio*. **E. scipio** *Bsd.* (37 b). Rather large, the wings narrow and elongate, the distal margin but little curved. The russet-red band of the forewing is interrupted by the veins, being costally rather broad and narrowing posteriorly. There are anteriorly 2 equal-sized white-centred ocelli standing close together and being followed by 2 additional small black ocelli which have likewise white pupils. On the underside these last two are frequently absent or are represented by simple black dots. The band of the hindwing consists of 3—4 elongate russet-red spots, which have but rarely small ocelli. On the underside the forewing is russet-red in the ♂, and russet-yellow in the ♀, the costal and distal margins being grey-brown in the ♂ and white-grey in the ♀. The ocelli as above. The hindwing beneath is dark brown in the ♂, sometimes somewhat paler towards the outer margin, being uniformly white-grey without any markings in the ♀. In the Basses Alpes, for instance at Digne in South France.
- glacialis*. **E. glacialis** *Esp.* (= *alecto* *Frr.*) (37 b). Upperside of both wings sombre black-brown, with an obsolescent red-brown band on the forewing which often hardly contrasts with the ground-colour. The hindwing is either simply blackish brown, or there is a faint red-brown tint in the place of the distal band. The forewing is beneath dark russet in the centre, being a little lighter in the ♀; the hindwing uniformly dark black-brown in the ♂, and blackish grey in the ♀, a little lighter distally. — Distributed over the whole Alps, but occurring above the tree line, in July and August, on localities covered with boulders. —
- alecto*. In **alecto** *Hbm.* (= *persephone* *Esp.*, *nicholli* *Oberth.*) (37 b) both sexes have before the apex of the forewing two white-centred ocelli, which are also visible beneath. On the hindwing, too, there are 2—4 white-centred ocelli, which are generally but partly present beneath or may be entirely absent. Otherwise like the form *glacialis*. More an insect of the northern and eastern Limestone Alps, occurring but sporadically and mostly in small numbers of individuals. —
- pluto*. **pluto** *Esp.* (= *tisiphone* *Esp.*, *duponcheli* *Oberth.*) (37 c) has the upper- and underside uniformly black, only in the ♀ there being occasionally a faint reddish brown tint on the upperside of the forewing. From the Abruzzi and the highest Alps.
- erinna*. **E. erinna** *Stgr.* (= *erynnis* *Stgr.*). Essentially larger than *glacialis*, to which it comes nearest. ♂ above deep brown-black, with some obsolescent brown longitudinal patches in the outer part of the forewing. On the underside there is in this species a large brown spot which occupies also the apex of the cell. Hindwing on both sides quite dark black-brown, with glossy deep black veins. In the somewhat

duller coloured ♀ the entire disc of the forewing above is dark chestnut, beneath light red-brown, only the margins of the wing remaining dark; all the veins are black in this brown disc. On the hindwing, which is black-brown above and somewhat lighter beneath, there appears in a certain light a but faintly visible band. — From East Sajan, according to STAUDINGER's surmise from the alpine region.

E. fasciata *Bthr.* Size and shape as in *glacialis*, ground-colour sombre black-brown, with a russet-*fasciata*. brown incomplete distal band which is traversed by the veins and has no ocelli. On the hindwing there is a grey-brownish submarginal band extending from the costal to the hindmargin and being of nearly even width. The russet-brown band is lighter and more prominent on the underside of the forewing, the costal margin and part of the outer margin being thinly dusted with grey. The hindwing beneath more or less dusted with grey at the base, the externally somewhat dentate central area being dark brown, the submarginal band pale ashy grey and the distal area of the same colour as the central area. The ♀ is lighter throughout, the forewing having a brownish tint and a somewhat longer and broader submarginal band, on the hindwing the basal area and the submarginal band whitish grey, the central area and distal margin grey-brown. — From East Siberia: at Pokroffka and the mouth of the Jenisei, in June.

E. pronœ *Esp.* (= *arachne* *Hbn.*) (37 c). Dark black-brown, with a red-brown band which is *pronœ*. anteriorly broader and posteriorly narrower and bears costally 2 white-centred ocelli and towards the hindmargin an additional smaller one. The band of the hindwing consists of 3 rounded russet-brown spots with black eye-dots, which have occasionally white pupils. Underside of the forewing sombre red-brown, the band lighter and distinctly contrasting; the distal margin and apex dusted with bluish grey. The hindwing beneath bluish- or ashy-grey with black-brown dusting; the centre traversed by a curved, posteriorly broadly dentate, almost uniformly brown band which sharply borders the distal area. In the latter there are one or two black blind ocelli. The ♀ is much lighter above and beneath, with the markings more prominent than in the ♂, the ocelli being larger and the base and submarginal band of the hindwing beneath light white-grey, the brown middle band contrasting sharply. Distributed over the whole Alps, occurring also in the Apennines, Pyrenees, Carpathian Mts., South and South-West Russia and the southern slopes of the Caucasus. — In *pitho* *Hbn.* (37 c), which represents the species in the Swiss Alps and the *pitho*. southern Jura, the markings of the upperside are either entirely absent or there is only a reddish tint as a faint remnant of the same, the 2 ocelli near the apex are small and have minute white pupils. Some species have no ocelli, being simply dark black-brown with some violet sheen. Underside as in the first described form. — In the form *almangoviae* *Stgr.* the subcostal ocelli, though present in the brown band, *almangoviae* are without distinct white pupils, those on the hindwing too having no white pupils or only traces of such. In the Allgäu. — Egg barrel-shaped, ribbed, white. Larva dirty reddish yellow, with a dark dorsal line, the lateral markings consisting of streaks and the spiracles being black. From October to July on *Poa*. Pupa anteriorly bone-yellow marked with dark, abdomen cinnamon with dark incisions; so covered among the roots of grass that only the head is visible (GROSS-STEYER). The butterfly appears in August and September, fluttering with a jerky flight in meadows and on grassy slopes of the mountain and alpine regions. In some years not rare, occurring up to 6000 ft. in the high ranges.

E. epistygne *Hbn.* (= *stygne* *Hbn.*) (37 c). Above coffee-brown, costal margin dusted with grey; *epistygne*. the forewing has usually a diffuse yellow spot in the cell and a broad, posteriorly narrowing, light ochreous, submarginal band which is distinctly divided by the veins. There are 5–6 white-centred black ocelli in the band, 3 near the apex being larger and united and 3 placed further back smaller and having minute white pupils. The submarginal band of the hindwing consists of 4–5 oval russet-red spots, each bearing a small white-centred ocellus. The forewing beneath russet-red, the distal band somewhat lighter and traversed by the brown veins; costal and distal margins and the apex grey with brownish atoms. The hindwing grey-brown beneath, dusted with grey and dark brown, the middle band is darker than the basal and distal areas and distally crenate, the ocelli being represented in the latter by black dots. The ♀ is not essentially different from the ♂ on the upperside, the ground-colour is somewhat lighter, the spots of the distal band of the hindwing are not russet-red, but more reddish yellow, the ocelli situated in the same having larger and brighter pupils. The underside of the hindwing white-grey, dusted with brown, the middle band strongly prominent, being distally edged with white, the veins traversing the same white-grey. Specimens from South Spain are essentially brighter in markings, the submarginal band of the forewing is broader and extends with almost even width to the hindmargin, not being ochreous but light whitish yellow; otherwise the markings are not different. — The butterfly occurs from the beginning of March to the end of April in South France, the Basses Alpes, and in Central and South Spain.

E. goante *Esp.* (= *scaea* *Hbn.*) (37 c). Upperside marked as in *nerine*, but the ocelli as a rule *goante*. somewhat smaller and the hindwing of the ♀ more distinctly dentate. The band of the forewing narrows posteriorly, being bright russet in the ♂ and light russet-yellow in the ♀. There are 2 united, white-centred, black ocelli near the apex of the forewing, and above them there is sometimes a black ocelliform dot, which has but rarely a pupil. Towards the hindmargin there is a further small ocellus, which has

occasionally a white centre. In the somewhat narrower distal band of the hindwing there are 3, rarely 4, white-centred black ocelli. The underside of the forewing russet-brown, lighter in the ♀, with black-brown margin, the apex being dusted with white-grey. Underside of the hindwing black-brown, marmorated with white-grey; the strongly dentate central band is externally bordered by a band-like line which consists of an accumulation of white scales and is here and there interrupted; towards the distal margin there are 3—4 white-centred black eye-dots. The ♀ is throughout lighter in colour, the ocelli being larger. The underside of the hindwing is white-grey, thinly dusted with brown atoms, the veins being sparsely scaled white. The distal margin of the ♂ somewhat lighter than the ground-colour, being chequered brown and white in the ♀. — In the Alps, in the mountain-and subalpine region, in the High Tatra and the Carpathian Mts.; in the West Pyrenees as a small form which has been figured by HERRICH-SCHÄFFER as *gorgone*. The butterfly flies in July and August in dry and stony localities, and likes to settle with the wings half open on rocks.

gorgone. **E. gorgone** Bsd. (37 d). Formerly considered to be a variety of *gorge*, it has recently been proved a distinct species by the examination of the genitalia. The ground-colour is a reddish brown with strong sheen. The sombre russet-band of the forewing contrasts but feebly with the ground-colour, posteriorly gradually disappearing in the same. In the band there are 3 white-centred black ocelli, of which the 2 subapical ones are somewhat larger and mostly touch one another. The distal band of the hindwing consists of 3 wedge-shaped russet spots, which are occasionally united to form a band; they have 3 small white-centred ocelli, which are often hardly visible. The forewing is russet-brown beneath, being a little darkened basally, with the fore and distal margins dark brown and the ocelli as above. The underside of the hindwing dark brown, thinly dusted with grey, the outer area somewhat lighter, with 3 black or black-brown dots in place of the ocelli. The ♀ is lighter, being more vividly marked than the ♂, the band of the forewing contrasting distinctly and sharply with the ground-colour. In the light grey distal band of the hindwing there are 3 small white-centred ocelli. In the Eastern Pyrenees, at the end of July. — In *rhodopensis*. **rhodopensis** Stgr. (37 d) the wings are more elongate than in *gorgone*. The band of the forewing, sharply limited proximally by the ground-colour, bears anteriorly 2 white-centred ocelli one close below the other, there being towards the hindmargin an additional, small, minutely white-centred ocellus. The band of the hindwing is continuous and includes 3 small ocelli, which likewise have minute white pupils. In the mountains of Bulgaria (Rhodope Mts.).

gorge. **E. gorge** Esp. (= *aethiops minor* Esp.) (37 d). The wings are somewhat narrower and less rounded than in *gorgone*, the hindwing being distinctly angulate and in the ♀ feebly dentate. The russet submarginal band of the forewing is rather broad and extends usually to the hindmargin. In the band there are costally 2 pupillated ocelli placed somewhat obliquely towards each other, and in the ♀ united. In this sex, more rarely in the ♂, there is sometimes a small third ocellus towards the hindmargin or a black dot instead. The band of the hindwing is narrower and bears 3—4 white-centred ocelli. The forewing beneath is russet-brown, the fore and distal margins being black-brown, sometimes thinly dusted with whitish grey. The hindwing beneath black-brown, being marmorated with white-grey; the distal band is of a more or less light colour, bearing sometimes 3 black eye-dots, which have rarely white centres. The ♀ is hardly different, being only lighter in colour, the underside of the hindwing grey, dusted with brown, with a dark middle band which is dentate on its distal side. Widely distributed in the higher Alps, but *erynis*, occurring only from the tree-line upwards. — ab. **erynis** Esp. (37 d) is a rarely occurring aberration in which the ocelli are either absent or are but vestigial. In the southern Central and Eastern Alps and in the *triopes*. Abruzzi.*) — ab. **triopes** Spr. is found among the nymotypical form as single specimens, being more frequent in the Eastern Alps and dominating at the road of the Stilsfer Joch, where name-typical *gorge* occurs but rarely. In the distal band of the forewing there are regularly 3 large white-centred ocelli, which are usually merged together. Towards the hindmargin — but not always — there are, shifted towards the distal margin, 2 more somewhat smaller ocelli, which are also visible on the underside. The *gigantea*. hindwing has usually 4 brightly white-centred ocelli, which are somewhat smaller beneath. — **gigantea** Oberth. is a very large form, being otherwise hardly different from the first-described form. From the high mountains of Spain. — *gorge* is a lively butterfly which flies about rather fast in the sunshine notwithstanding the cold air of the immense altitude of its flight-places, and likes to settle with the wings half open on the boulders warmed by the sun. The insect is somewhat more shy than most Erebias, but does not easily fly off. The specimen chased by the collector, however, is often blown away by the strong breeze on the mountain, being carried downwards and then slowly returning on the lee-side towards the summit of the mountain. Sometimes it is blown on the snow, where it often remains lying a long while. Plentiful in its flight-places, nothing, however, being known of its early stages.

neoridas. **E. neoridas** Bsd. (37 d, e). Smaller than *aethiops*, to which it comes nearest. The distal band of the forewing light russet, being yellowish red in the ♀, broad at the costa, posteriorly narrower, and

*) On the plate the figure bears the corrected name *erinnys*.

proximally sharply limited and exteriorly feebly incurved in the middle. The band bears anteriorly 2 white-centred contiguous ocelli, followed near the hindmargin by a somewhat smaller one which is but occasionally centred with white. The band of the hindwing consists of 4 rounded or angular spots, of which 3 or 4 bear ocelli with minute white pupils. The band of the forewing is beneath more irregular and somewhat darker russet than above, the apex of the wing being dusted with bluish grey. The hindwing beneath grey-brown from the base to the middle, then there follows a proximally somewhat dentate ashy grey band, the distal area being of the same colour as the base; the ocelli are completely absent. The ♀ is lighter throughout, the ocelli moreover are as a rule somewhat larger than in the ♂. The fringes brownish grey in the ♂, white-grey in the ♀. — **OBERTHÜR** figures as **margarita** a small specimen from the Eastern *margarita*. Pyrenees, the upperside vividly recalling that of *zapateri*, while the underside is as in *neoridas*. — The nymotypical form flies in the Basses Alpes, for instance in the neighbourhood of Digne. — Egg light grey, with dark ribs. Larva greenish yellow, with dark dorsal stripe, whitish side-stripe and dark-bordered white spiracles. Head with 2 dark spots, brown, as are also the legs. On *Poa annua* and *Panicum sanguinale*. The butterfly from June to September.

E. zapateri *Oberth.* (37 e). The upperside dark black-brown, near the distal margin there is an *zapateri*. anteriorly broad, posteriorly tapering ochre-yellow band, which bears costally one behind the other 2 ocelli with white pupils. The hindwing is usually without markings, there appearing sometimes in place of the band 3 russet-red or reddish yellow small round spots with black dots. The underside of the forewing is russet, the yellow band posteriorly abbreviated, the 2 ocelli larger than above, the apex of the wing dusted with grey. The hindwing beneath with brown basal area and lighter distal band, without ocelli or dots. In the ♀ the distal band is ashy grey, being dusted with minute brown atoms. — In the mountainous districts of Aragonia and Catalonia.

E. sedakovii *Er.* (= *stygne* *Fisch.-Wald.*) (37 e). Dark black-brown above; the dentition of the *sedakovii*. wings hardly indicated in the ♂, but distinct in the ♀, in the latter sex the margin chequered grey and brown. The ochre-yellow distal band is proximally straight, distally somewhat sinuate, bearing 3 white-centred ocelli of equal size, the upper 2 being united. Below them there is sometimes, a little shifted distad, a small black eye-spot, which is not visible beneath. The hindwing with a narrow reddish yellow band, which includes 3 white-centred black ocelli. The underside cinnamon-colour in the ♂, the band of the forewing as above, the somewhat grey-scaled distal band of the hindwing but slightly prominent and bearing 3 narrowly black-edged white dots. The ♀ is yellowish brown beneath, the band of the forewing being lighter than above and the costal margin grey-yellow. The distal band of the hindwing is light white-grey and the 3 white spots situated in the same are bordered with brown. From the Altai and the mountains of Amurland. — **niphonica** *Jans.* is the Japanese form, from the heights of the Asama-Yama *niphonica*. (7000 ft.). The ♂ beneath evenly brown, while the underside of the ♀ is strongly fasciated with white. — In **scoparia** *Blhr.* the upperside is as in *niphonica*, but the underside is more variegated, the forewing being *scoparia*. basally densely dusted with white and deep chocolate at the outer margin; the underside of the hindwing vividly recalling that of *aethiops*, but the pupils come through from the upperside as distinct white dots. In Hokkaido (Yezzo), in August. — **alcmena** *Gr.-Grsh.* (37 e), from the Dshakar Mts. (? and Amdo), differs *alcmena*. from *sedakovii* in the russet band of the forewing above being incurved and duller yellow: the ocelli of the same moreover have no pupils or only very indistinct ones. The specimens from West China are distinguished from Tibetan examples by the paler colour of the band of the forewing and a more uniform grey colour of the underside of the hindwing. — The butterfly is not rare in Siberia and on the north island of Japan, being very local on the main island of Japan, and very plentiful in Western China at an elevation of 10000 ft. in July and August.

E. aethiops *Esp.* (= *blandina* *F.*, *media* *W. V.*, *medusa* *Blhr.*, *alcyone* *Steir.*) (37 e). The wings are *aethiops*. dentate, the distal margin being grey-brown in the ♂, and chequered white-grey and brown in the ♀. The distal band of the forewing, which is russet-brown in the ♂ and reddish yellow in the ♀, is somewhat constricted in the middle, narrowing behind in both sexes. The band has usually 3 white-centred black ocelli, of which the upper two are united, the third standing towards the hindmargin and being a little smaller. In between these ocelli there is sometimes a black eye-spot, which has but rarely a pupil, appearing mostly as a simple black dot. The band of the hindwing is narrower and has 3, more rarely 4, white-centred ocelli. The forewing beneath grey-brown, the distal margin a little lighter, the band and ocelli as above. Underside of the hindwing reddish brown, somewhat paler at the base, with a grey-scaled discal band bearing 3—4 white dots which are thinly edged with black. In the ♀ the underside of the hindwing is much lighter, the basal area being white-grey, more or less dusted with grey, the median band brown or grey-brown, somewhat excurved, the distal band light ashy grey with 3 or 4 very minute white-centred black dots, the distal margin of the same colour as the median band. From Scotland and Livonia to Italy and South-East Siberia, also in the plains. — **leucotaenia** *Styr.* (= *neoridas* *Frr.*) (37 e) is a *leucotaenia*. sporadically occurring form which is more plentiful in the South, the distal band on the underside of the

melusina. forewing being strongly scaled white. — In *melusina* H.-Schöff. (37 f) the russet band of both wings is broader, that of the hindwing being continuous; otherwise not different from the first described form. In *aethiopella*. Armenia, Kurdistan and Northern Asia Minor. — *aethiopella* has been described by STAUDINGER from a single specimen from Kentei. The forewing has but faint vestiges of the brown transverse band, while the band is entirely absent from the hindwing, this wing bearing above 3, beneath 4 large white submarginal dots. The band-like marking on the hindwing beneath, which is always present in *aethiops*, is entirely wanting. The author, however, leaves it undecided whether we have here to do with a constant variety or an accidental aberration of *aethiops* or some other species. — Egg pale yellowish red, ribbed longitudinally and finely transversely. Larva yellowish grey, lighter at the sides, with light-bordered dark dorsal line, each ring bearing laterally a dark longitudinal stripe; spiracles black; till June on *Poa annua*, *Agrostis canina*, *Dactylis glomerata*, etc.; in day-time well concealed. Pupa brownish yellow, the wing-cases bone-colour and the head darker. The butterfly appears at the end of July and flies in a slow, probing flight over the grassy ground of open woods. They suck at flowers, especially Compositae, and have a predilection for the perspiration of man, on hot days fluttering around people and settling on the hand to imbibe the moisture. Very plentiful where they occur, and not restricted to definite flight-places.

melancholica. **E. melancholica** H.-Schöff. But little smaller than *aethiops*, the pattern similar as in that species; the ocelli in the russet band of the fore- and hindwing are conspicuously centred with white. The forewing beneath grey-brown, the band not defined proximally, gradually disappearing in the ground-colour. The underside of the hindwing with a rather broad russet-yellow band, without ocelli or dots; the base and distal area yellowish grey, the median band grey-brown, somewhat sinuate distally. — Area of distribution: Caucasus, Southern Armenia, Altai Mts.

debanensis. **E. debanensis** Ersch. (37 f). Upperside dark black-brown, on the forewing a straight submarginal row of 4 round small black spots bearing black dots; before the margin of the hindwing there are as a rule 3, but rarely 4, such red-brown spots, which are only very minutely or not at all dotted with black. The underside of the forewing grey-brown, with an obsolescent russet-brown distal band, the ocelli of which have a somewhat lighter border. The apex and distal margin thinly dusted with white-grey. The underside of the hindwing is somewhat more densely scaled white-grey and has a but little darker dentate median band which is sharply defined in- and outwardly and bordered by a narrow whitish dentate line here and there on both sides. The ocelli which are situated in the somewhat lighter distal area are smaller than above, being sometimes altogether absent or replaced by small, hardly visible, black dots. Before the outer margin there is a submarginal band composed of small obsolescent brown spots. The ♀ is lighter, more grey-brown, the ocelli of the hindwing are distinctly larger and on the underside of the hindwing of the *tundra*. same size as above. From East Siberia. — *tundra* Stgr. is smaller, the distal band of the upperside somewhat obsolescent, beneath broader and proximally and distally sharply defined. The underside of the hindwing scaled white-grey, with dark brown, distally dentate, median band and before the distal margin a slightly dentate dark transverse line. Likewise from East Siberia. — *fletcheri* Elw., of which we know only the figure of the single sure ♀ captured by FLETCHER at 7500 ft. in the Altai Mts., is we think nothing but a specimen of *debanensis* in which the reddish yellow borders of the ocelli of the forewing are merged together on both sides to form a broad russet band. On the hindwing the small ocelli are widely separated from one another. The median band on the underside of the hindwing is dark and somewhat prominent in *debanensis*, while in *fletcheri* it is of the same dark brown colour as the rest of the wing, so that only the edges of this band are visible as two finely dentate black curved lines. Found in July between Kurai and Bashkaus.

meta. **E. meta**. A species which is very variable in size and pattern. The nymotypical *meta* Stgr. is of about the same size as *ceto*. The ground-colour is dark black-brown, before the distal margin there are 4—5 separated, rounded, russet-brown spots bearing black dots. The upper 2 spots, which are a little shifted basad, mostly touch each other, being sometimes confluent. The hindwing has 5, more rarely 6, small roundish brown spots with black dots. On the underside of the forewing the brown borders of the black dots are somewhat widened and the distal area bearing these spots is somewhat washed with brown. On the underside of the hindwing there is between the ocelli and the cell a row of white transverse bars which stand on the veins. These markings are very variable, the white transverse bars being quite obsolete in many specimens, while in other individuals, especially in ♀♀, the white scaling is widened and forms a narrow irregular white transverse band. Antenna finely ringed above, whitish beneath, the club black-brown with reddish yellow tip. In July on the alpine meadows in the mountains of Osh in East Turkestan, and in the Altai. — The form *mopsos* Stgr., from Namangan in Turkestan, has the dull red spots bearing the black eye-spots longer and broader than nymotypical *meta*, the spots being sometimes confluent, forming an irregular russet-red distal band. On the underside, however, the black dots have but narrow brown borders; the dots on the hindwing beneath are smaller than above and sometimes situated in narrow brown rings, but are mostly without these rings. The black dots are very prominent in the distal area, which is

somewhat variegated with grey. Before the darker median area there is an obsolescent white-grey transverse band. The ♀ is reddish brown on the forewing, the margins being narrowly dark brown and the veins black-brown. The forewing beneath is dull red-brown, the fore and distal margins being somewhat darker, with thin grey scaling. The underside of the hindwing grey-brown, the black dots situated in the distal area are but small and have thin brown borders. The white-grey, somewhat dentate *gertha*. median band is rather broad. — In ab. **gertha** *Stgr.* (37 f) the red-brown spots before the margin are completely merged together and form a continuous irregular band which bears the black eye-dots. Also on the hindwing the brown spots appear as a band which is slightly interrupted at the veins. The distal area of the forewing beneath, which bears the black dots, is proximally dark brown. The ocelli of the hindwing beneath are narrowly edged with russet-yellow; the whitish transverse band as in *mopsos*. Occurs in the same district as the latter. — The form **issyka** *Stgr.* (37 f), which is on an average somewhat *issyka*. larger, has only a somewhat darker ground-colour. The russet-brown distal spots are still broader than in *gertha* and form nearly always a continuous band, in which the black dots are very prominent. The brown spots are also broader on the hindwing, but rarely contiguous. On the underside of the forewing the brown distal spots are narrower than above, being sometimes altogether wanting, and the black dots have but narrow russet-yellow borders. The white band-like marking of the ♂ is sometimes strongly, sometimes faintly developed, being in the ♀ on the contrary mostly rather broad. The ♀ is lighter above than the ♂, and the cell of the forewing has mostly some red-brown colour, which is sometimes extended all over the wing to the distal margin. The red-brown borders of the ocelli of the hindwing are broad, being often merged together to a band. In the Issykkul district. — In **alexandra** *Stgr.* (37 f) the black-brown ground- *alexandra*. colour has a reddish brown sheen, which is especially strong on the forewing. The russet-brown spots of both wings are broad and form a continuous band which bears the rather large black dots. In the ♀ the cell of the forewing is sometimes washed with russet-brown. The underside is greyish brown, the black eye-dots of the forewing are rather broadly bordered with russet-brown, while those of the hindwing are encircled by narrow brown rings. The whitish transverse band in the centre of the wing is sometimes more sometimes less developed. From the Alexander Mts. — **melanops** *Christ.* (37 g), from the mountains *melanops*. of the farther environs of Samarkand, has a sombre black-brown upperside, the black eye-dots of both wings have hardly visible dull brown rings; sometimes even these brown rings are wanting, in which case the eye-dots are scarcely recognizable. The underside is somewhat paler black-brown, the apex and part of the distal margin being thinly dusted with white in some specimens, the brown borders of the black ocelli a little lighter than above. The dark middle area of the hindwing is distally bordered by an irregular white-grey transverse band. The distal area is minutely dusted with grey and the black dots situated therein are without brown borders. The ♀ is somewhat lighter, the cell and sometimes also the central area being obsolescent brown. The ocelli somewhat larger and but faintly bordered with brown.

E. euryale *Esp.* (= *philomela Esp.*) (37 g). The distal band of the forewing varies from dull russet- *euryale*. brown to bright red-yellow in the name-typical form, becoming narrower behind and nearly always reaching to the hindmargin, being occasionally separated into isolated spots. In this band there are 3—4 black ocelli of which the small white pupils are usually developed only on the underside, the 2 anterior eye-spots being placed close together, while the third is smaller and is somewhat shifted distad. The band of the hindwing is narrower, being separated by the veins into 5 russet-red spots which bear black dots, with the exception of the costal spot, the dots being sometimes larger sometimes smaller or even quite absent. There occur also specimens in which the band is not divided into spots but is continuous. On the underside of the forewing the brown band fades away proximally, the fore and distal margins are dark brown, the ocelli as above. The hindwing beneath dark red-brown, with a lighter, more or less grey-scaled distal band, bearing 3—4 ocelli bordered with russet-yellow and having mostly minute white pupils. The distal band is sometimes hardly visible. The ground-colour of the ♀ is lighter, the band of the forewing beneath is light russet-yellow, the eye-spots situated in the same have minute white pupils, the costal margin is sometimes more and sometimes less dusted with whitish or yellowish grey above the band. The hindwing beneath is mostly, but not always, shaded with whitish or yellowish scales at the base for some distance, the grey or yellowish grey distal band contrasting sharply with the ground-colour. The ocelli situated in the band are often hardly visible, being sometimes altogether absent. The margin is distinctly dentate, the fringes being chequered brown and white. — In the form **isarica** *Lühl*, from the mountains of Bavaria, *isarica*. the distal band is yellowish brown instead of reddish yellow above and beneath; the ocelli are small and without pupils, and the fringes not distinctly chequered. — **ocellaris** *Stgr.* (37 g), which occurs from the *ocellaris*. middle of July till the end of August on grassy pastures of the Alps of Styria, Carinthia and the Tyrol, is much darker in ground-colour, being rich black-brown. The band of both wings is separated into small roundish sombre red-brown spots which bear black dots. These spots are often altogether absent from the hindwing. — Specimens without any markings above also occur, but are rare; this is ab. **extrema** *Schaur.* *extrema*. The forewing has only beneath a diffuse vestige of the distal band, without eye-dots; the hindwing is without markings also beneath. Near Toblach, Seis, at the Karersee. — In **euryaloides** *Tengstr.* there are *euryaloides*.

on the forewing above but 2 small oval brown spots as remnants of the distal band, without eye-dots. *jeniseiensis*. The hindwing usually without markings or bearing but faint traces of russet-brown spots. — *jeniseiensis* *Trybom* (= *velox* *Herz*), distributed in Central and North-East Siberia, is a form in which the black dots are thinly edged with russet-yellow. The hindwing above is mostly without markings, bearing beneath a narrow white band. — Larva light yellow-brown, with light brown head, white-edged dark dorsal line and yellow subdorsal ones, and a yellow side-stripe; the spiracles black. Till June on grasses. Pupa yellowish, with dark dots and streaks: free on the ground. The butterfly in July and August on clearings in the woods of the mountain- and especially the subalpine region. The nymotypical form occurs in the high mountains of Europe: the Pyrenees, Alps, Apennines, Carpathians and Balcan; the varietal forms distributed northward to Finland and eastwards to East Siberia.

ligea. **E. ligea** *L.* (= *alexis* *Esp.*) (37 g). Similar to *euryale*, but essentially larger. The upperside dark blackish brown, the hindwing being visibly dentate, and the fringes chequered brown and white. The russet or bright russet-yellow distal band is either of equal width throughout or constricted in the centre and narrowed posteriorly. The band contains usually 4, rarely 5, black ocelli, of which the first 2 are close together and nearly always have white pupils. Sometimes — especially often in the ♂, more rarely in the ♀ — all the ocelli have small white pupils. In the somewhat narrower band of the hindwing there are 3–4 white-centred ocelli. Both sexes vary very much in the aspect of the bands and the number of ocelli. The forewing beneath black-brown in the ♂, with the distal margin somewhat lighter, grey-brown in the ♀, with the costal margin dusted with white-grey above the band. On the underside of the hindwing there are in the but little lighter distal band 3–4 small white-centred ocelli with russet-yellow rings. At the middle of the costal margin there is a milky white spot, which is often prolonged band-like as far as the centre of the wing, becoming gradually narrower. The basal area is dusted with grey, being externally here and there limited by some whitish grey spots; the distal band likewise whitish grey, being more or less dusted with brown; the ocelli situated in the band either small, minutely white-centred and very faintly bordered with russet-yellow, or as large as above and placed in broad russet-yellow rings. — *adyte*. **adyte** *Hbn.* (37 g) is a smaller form which deviates towards *euryale*; the distal band of the forewing being narrower, sometimes interrupted and the 2 contiguous eyes in the costal part of the band always white-centred. The band of the hindwing is likewise narrower and often separated into spots. In Switzerland, *livonica*. Silesia, Carinthia and Scandinavia. — In *livonica* *Teich*, from Livonia and Finland, the hindwing beneath *ajanensis*. is uniformly brown, without white scaling or whitish grey markings. — **ajanensis** *Mén.* (= *eumonia* *Mén.*) (37 g), from the Amur and Ussuri, differs but little from the nymotypical form. The white band on the hindwing beneath is broader and more continuous, there being some obsolescent white spots near the base, which are occasionally also found in the nymotypical *ligea*. In the Bukovina there occur specimens which have the upperside of nymotypical *ligea* and the underside of *ajanensis*. — Larva similar to that of *euryale*, greyish yellow, with the head but little darker and bearing 2 whitish streaks; the dark dorsal line bordered with light: the side-line light; the spiracles black; till May on grasses. Pupa light brown, with dark markings, free on the ground. The butterfly flies in July and August in open woods of deciduous trees and are fond of sucking at the flowers of black berries. In many districts the butterfly appears but every other year, but is then plentiful. It occurs nearly throughout the mountainous regions of Germany: the Harz, Black Forest, Vosges, the mountains of Silesia as well as the hill-districts of North Germany; further in Italy in the Abruzzi and Apennines, in France in the Basses Alps etc., also in the Carpathians, the Balcan, and the whole of Scandinavia. In Russia and Scandinavia it is also found in the plains; in Asia in the Caucasus, North Siberia, and Mongolia.

embla. **E. embla** *Thunb.* (= *dioxippe* *Hbn.*) (37 h). Dark grey-brown above, the hindwing being feebly dentate and the fringes chequered brown and grey. The forewing bears 3 black eye-spots in brown-yellow rings, the anterior one being largest and having mostly 2 white pupils, while the 2 posterior ones are shifted distad and are small, black, and without pupils. There are on the hindwing mostly 3–4 black ocelli which are bordered with brown-yellow, have no pupils and are sometimes absent. The forewing beneath somewhat darker than above, the apex and part of the distal margin being dusted with ashy grey. The ocelli are not brown-yellow, but light with ochre-yellow ring, these more prominent than above. The hindwing beneath densely dusted with white-grey, bearing a more or less prominent, brown, distally somewhat dentate, median band, at the outside of which there is sometimes a larger, somewhat diffuse, grey costal spot and usually a small white central one. Before the distal margin there are some black dots, which are here and there narrowly edged with yellow. In Scandinavia, North Russia and Siberia. — *succulenta*. **succulenta** *Alph.* is lighter above than the nymotypical *embla*, with more numerous and larger black eye-spots, which moreover are broadly ringed with brown-yellow. In Kamtchatka and Mongolia; in Europe *unicolor*. occasional specimen among the nymotypical form of *embla*. — **unicolor** *Spuler* is the form occurring in Lapponia; it is uniformly black-brown, the ocelli of the forewing being absent except the upper 2, which are faintly edged with red or not at all. — Nothing is known of the larva. The form *embla* flies on the northern moors; *succulenta* according to ELWES in the woods, apparently nowhere in abundance.

E. disa *Thunb.* (= *embla* *Boisd.*, *gefiou* *Quens.*, *stheno* *Hbn.*, *mancinus* *Dbl.*) (37b). Ground-colour *disa*. as in *embla*, to which it bears a great resemblance. The black eye-spots before the distal margin of the forewing are smaller and have but rarely white pupils. The reddish yellow rings in which the ocelli are situated are united, being sometimes merged together to form a distinct band. In the ♀ the costal margin, apex and part of the distal margin are dusted with whitish grey. The hindwing is uniformly grey-brown and without markings in both sexes. The yellow rings are separated on the underside of the forewing and the black ocelli situated in them are often minutely centred with white, though not always. The whitish grey scaling at the apex and distal margin is denser than above. The hindwing beneath is more or less white-grey, bearing a broad median band which is dentate on the in- and outside. Between this band and the distal margin there is an arched brown line interrupted at the veins. The fringes chequered brown and grey. — In Scandinavia, Lapponia, Finland, North Russia and Siberia, in July.

E. rossii *Curt.* Shape and size as in *disa*. Ground-colour dark black-brown, the fringes but little *rossii*. lighter, while they are chequered brown and grey in *disa*. On the forewing there is towards the apex an oval russet-brown spot with 2 black ocelli, there being further back sometimes 2 further brown rounded spots with black dots. These spots occur mostly in the ♀, but rarely in the ♂. The hindwing of the ♂ is either without markings, or there are 3, obsolescent, brown-edged, submarginal dots, which are larger in the ♀ and ringed with lighter brown. The forewing beneath sombre red-brown, the fore and distal margins being dark brown, the ocelli sometimes centred with white. The underside of the hindwing dark brown, thinly dusted with white-grey, bearing an obsolescent dark median band. In front of the cross-vein there is usually a roundish white spot, which may also be absent, and behind it in the distal area there are 2—3 smaller spots of the same colour. Antenna black-brown with narrow club. In East Siberia, in the Altai and Dauria, in the alpine region, end of June and July. — In *ero* *Brem.* the underside of the hind- *ero*. wing is more densely dusted with whitish grey, the brown dentate band and the dark distal area therefore being more prominent than in the form *rossii*. — The butterfly occurs on stony and rocky slopes; in the Altai it is in many places with *Argynnis freija* the most abundant butterfly, but not easy to obtain in good condition, though it is easy to catch (ELWES).

E. edda *Mén.* (= *intermedia* *Trybom*) (35c). Wings above coffee-brown, darker towards the base, *edda*. distally with a russet-brown sheen. There is before the apex a large rounded reddish yellow spot bearing a black ocellus composed of two and having two small white pupils. The hindwing is without markings. On the forewing beneath the yellow spot is larger and lighter than above, being more ochre-yellow, the double ocellus having bright white pupils. The hindwing beneath dark brown, thinly dusted with whitish, especially towards the costa. At the apex of the cell a rounded white spot, and before the distal margin 3—4 white dots. Antenna black-brown above, finely ringed with white and brown beneath, except the russet-brown club. The sexes are the same in markings and size, but the yellow spot of the forewing is paler in the ♀ than in the ♂. ELWES found some specimens with accessory ocelli below the large subapical ocellus. — This species is the first of that group of *Erebia*s which come nearest to the preceding genus (*Callerebia*). It resembles *Callerebia* also in that it is not a really alpine insect, but occurs more in the hills. In East Siberia, in the Amur-district according to GRAESER in June and July in swampy woods, but rare. Very local in the Altai, but abundant in some places, occurring already as low down as 4000 ft. It flutters with a weak flight among the grass, always settling on stones in dry brooks.

E. cyclopius *Er.* (35c). Upperside grey-brown. The forewing has on both surfaces a subapical, *cyclopius*. nearly circular, black ocellus with 2 white pupils and ochre-yellow border. The underside of the forewing is somewhat lighter than above and the yellow border of the eye-spot is much wider, the apex of the wing being feebly dusted with bluish grey. The hindwing beneath at the base likewise dusted with bluish grey for a considerable distance; a submarginal band bluish ashy grey, in some places interrupted by the ground-colour. The ocelli of the ♀ are larger and more broadly ringed with yellow than in the ♂, the apex of the wing being more densely dusted with grey-blue. Antenna ringed black and white, the club russet-yellow. — In the Ural, Altai, and Kentei Mts., on the Amur and its tributaries, and on Askold; in May, June and July in damp pine-woods, locally abundant. The largest specimens occur on Askold, having an especially large subapical ocellus.

E. tristis *Brem.* (= *wanga* *Brem.*) (35c). Very similar to the preceding, with which it agrees in *tristis*. size, shape and ground-colour. The yellow border of the double ocellus is narrower and somewhat dull in the ♂, and broader and light yellow in the ♀. The border of the ocellus is yellow on the underside of both sexes, being broader than above. The hindwing beneath is thinly dusted with whitish in the ♂ and bears a small white spot at the apex of the cell. In the ♀ the underside of the hindwing is more densely dusted with whitish, the dark dentate median band therefore being more prominent than in the ♂, in which sex it contrasts but little with the ground. Before the distal margin there is an arched, narrow, dark dentate line, proximally to which there is a small white dot each in cellules 2 and 4. The antenna thinly

ringed black and white, club above black, the tip and underside russet-yellow. — Amurland. The specimens from Blagovestshensk larger than those from Raddefka.

puricula. **E. puricula** *Leech*. This species bears above a gigantic, almost circular, apical ocellus which is double the size of that of *tristis*, being bordered with yellow and having two pupils. The upperside is otherwise uniformly russet-brown with a dark submarginal line. The forewing beneath as above, but the ground-colour somewhat lighter: the hindwing beneath grey-brown, clouded, and in several places dusted with whitish, without ocelli. *delarayi* *Oberth.* is nothing but a larger form of *puricula*, being put into *Callerebia* by the author, where the species is perhaps better placed on account of the distinctly produced anal lobe of the hindwing. — In West China, in July, rare. The southern form *delarayi* outside the Palaearctic Region in Yunnan.

rurigena. **E. rurigena** *Leech* (35b). Similar to the preceding, larger, the forewing more pointed (especially in the ♂), the border of the apical ocellus much brighter yellow, the anal part of the hindwing not so much produced. The apical ocellus variable in size. — In West China, local, in July.

saxicola. **E. saxicola** *Oberth.* (35e). Forewing broad, with the distal margin excurved, the apex rounded, and the costal margin arched. Ground-colour dark black-brown: forewing with a deep black, oval, ocellus which is slightly edged with brown and bears two white pupils. On the hindwing a larger ocellus at the apex and sometimes another smaller one below the same, both black, white-centred and bordered with dull brown. Above the larger ocellus there are 3—4 white dots. Underside grey-brown with the same markings as above: the double ocellus of the forewing with a narrow russet-brown border in the ♂ and a broader russet-yellow one in the ♀, the disc having a dull brown sheen. On the hindwing beneath the white dots are more prominent than above, being in the ♀ partly narrowly edged with yellow. Antenna dark above and beneath, the club being elongate. — Distribution: Northern Kashmir and Mongolia, occurring up to 6000 ft. Settles often on rocks.

shallada. **E. shallada** *Lang* (35b). Larger than the previous. Above dark brown, a large russet-brown patch in the distal portion of both wings. The apical ocellus large and circular, bearing as a rule but one pupil. The hindwing beneath has a submarginal row of white dots. — In Kashmir, local, but in some places abundant, flying on grassy and rocky slopes, in May and June.

hyagriva. **E. hyagriva** *Moore*. This Kashmirian butterfly is now placed with *Erebica* by BINGHAM, whereas former authors put it into *Ypthima*. It has indeed the aspect of an *Ypthima*: above dark brown, with a large, oval, yellow-bordered apical ocellus in the forewing bearing 2 pupils, and with a similar but somewhat smaller ocellus in the anal area of the hindwing. This wing is beneath as in *Ypthima* grey-brown, being finely striated with brown: a double ocellus in the apex of the hindwing and two contiguous ocelli at the anal angle. — From Kashmir to Sikkim: plentiful in the latter country, but rather rare in the Palaearctic districts, in August and September.

hades. **E. hades** *Stgr.* (35e). Above similar to *shallada*, almost black, forewing with 1—2 small white apical spots. The underside grey-black, the forewing with a large black ocellus which bears 2 white pupils and is bordered with dull yellow. The hindwing beneath is thinly dusted with grey, there being a curved row of 6—7 white dots before the distal margin. The ♀ is somewhat lighter above, the underside of the hindwing being densely dusted with white and the ocellus of the forewing sharply bordered with light yellow. The fringes are chequered black and white, these spots being hardly visible in the ♂, while they are distinct in the ♀. — In the Altai and the mountains of the Transalai.

nero. **E. nero** *Stgr.* (35d). Upperside as in *hades* with a white-centred black ocellus before the apex of the forewing, the ocellus being larger and more brightly centred-white on the somewhat lighter underside, with the border dirty brown. The wings are otherwise without markings above and beneath. The antenna ringed black and white, with a dark club. — In Southern Fergana.

mani. **E. mani** *Nicér*. Above black-brown: fringes chequered dark brown and grey. Forewing with a broad, oval, yellow, posteriorly slightly brownish distal band which bears a large black white-centred ocellus. In the ♀ the distal band is more elongate, extending to near the hindmargin, while it reaches in the ♂ usually but to cellule 2. The hindwing uniformly black-brown, without markings. The forewing beneath red-brown, with the hind and distal margins darker: the distal band reddish brown, the ocellus broadly bordered with yellow. In the ♀ the band more yellow shaded with brown. The hindwing beneath grey-brown, thinly dusted with grey in the ♂, more densely in the ♀: before the distal margin and parallel with the same there are 6 or 7 white dots. In the Pamir and Kashmir (Ladak), at a considerable elevation,

icelos, in July. — GRUM-GRSHMAILLO describes as *icelos* a form which is similar to *jordana* and was found in the Pamirs at a height of 11000 ft. The reddish yellow band of the forewing is shorter and the upperside as a whole darker, the red scaling being absent from the disc of the upperside. — The form from the Tian-shan and Kho-kand has been described as *jordana* *Stgr.* Here the broad yellow distal band extends to the hindmargin, being more or less shaded with brown. The hindwing bears sometimes vestiges of a brown

distal band. — **fasciata** *Stew.* (= *roxane* *Gr.-Grsh.*) (35e) differs in the distal band of the forewing being *fasciata*, broader and lighter, in the hindwing bearing a broad chestnut-brown band, which is either absent from *jordana* or but vestigial. On the underside the band of the forewing is almost pure yellow, only the posterior portion being sparsely irrorated with brown. The white dots situated before the distal margin of the hindwing beneath are sometimes absent. From the Transalai Mts. — In ab. **subocellata** *Stgr.*, also *subocellata*, from the Pamir, the hindwing beneath is darker and bears a yellow-bordered ocellus before the apex in both sexes. — The yellowish red band is best developed in *ida* *Gr.-Grsh.*, extending across both wings, *ida*, being broad and contrasting distinctly with the ground-colour; the fringes are pure white, being interrupted only on the forewing by minute, hardly visible grey dots situated at the tips of the veins. — On the Kodja-Djailau (in the Pamir), at 11000 ft. *)

E. maracandica *Ersch.* (35e). The fore- and hindwing above are dark black-brown and bear *maracandica*, distally large red-brown spots. At the apex of the forewing there is a black ocellus with a bright white pupil. The forewing beneath red-brown, all three margins being dark brown, the ocellus as above, but with a yellow border. The hindwing beneath brownish grey, with 6—8 white dots before the distal margin. The ♀ above essentially lighter in colour, more brown-grey, the brown spots are larger, especially on the forewing. The cell is mostly filled up with red-brown. The hindwing beneath more densely dusted with grey. Antenna ringed black and white, the club being white beneath. — Widely distributed in Turkestan; in the Altai Mts., in the farther environs of Samarkand, in the Pamir and Eastern Bochara; already in the hills, in May and June, locally very abundant.

E. herse *Gr.-Grsh.* (37h). Above dark black-brown, with a broad red-brown band on the forewing *herse*, in which there is a large black apical ocellus with a bright white centre. The cell is sometimes shaded with russet-brown in the ♂, being nearly always filled up with russet-brown in the ♀. In cellules 2 and 3 there are sometimes small dots without pupils. The hindwing uniformly black-brown. The forewing beneath red-brown, broadly margined with dark, the band but little lighter than above, the apex of the wing being finely marmorated with grey and brown. The ocellus narrowly bordered with russet-yellow, bearing sometimes 2 white pupils. The hindwing beneath marmorated with grey-brown and black. The ♀ lighter on both sides, the ocellus larger. — Occurs in mountainous districts of Tibet and West China, for instance near Ilav-Kow and Ta-t sien-lu, in smaller specimens in the Sinin Mts.

E. discoidalis *Krb.* (= *lena* *Christ.*) (37h). The forewing narrow, with the apex rounded, the costal *discoidalis*, margin being brownish grey and striated with whitish grey and brown. The dull brown disc broadly bordered with dark chocolate anteriorly and posteriorly, this border being narrow on the distal side, the dark apex of the wing feebly dusted with grey. The forewing beneath is marked as above, the border of the brown central area is somewhat broader, the apex and distal margin densely dusted with bluish grey. The hindwing beneath dark brown from the base to the middle and thinly dusted with whitish grey, the outer half being blue-grey with small dark brown striae. At the apex of the cell there is an oval whitish grey spot and at the costal margin 2—3 somewhat smaller ones. — Central and Eastern Siberia (Amurland); besides in Arctic America. GRAESER found the species to be very rare at Podrofka in June; from the worn condition of the specimens obtained he concludes that the insect is possibly more plentiful earlier in the year.

E. kalmuka *Alphér.* (= *calmucca* *Rühl.*) (35c). Upperside uniformly grey-brown with a silky gloss, *kalmuka*, without band and ocelli. The costal and distal margins and apex of the forewing white; the hindwing margined with bluish white, the border being distinctly broader at the costal margin and apex. Between the distal margin of the forewing and the upper portion of the cross-vein there is sometimes a narrow hook-shaped spot. The forewing is russet-brown beneath, the costal margin being sparsely white-grey, the apex and distal margin densely silvery grey. The hindwing beneath uniformly silvery grey, without markings. Antenna ringed black and white, the apex yellow-brown. The ♀ is on an average smaller than the ♂, the forewing being narrower and the ground-colour somewhat lighter. — In the Tian-shan, near Kuldja, at an altitude of 9000 ft.

E. radians *Stgr.* (35c, d). Forewing broad, with the distal margin rounded. Both wings dark black- *radians*, brown above. 4—5 broad red-brown longitudinal streaks extend from the dark distal margin to the centre of the wing. The hindwing remains broadly dark, and the first brown marginal streak commences nearly always above the 1. subcostal vein. Often the whole anterior portion of the forewing as far as the cell and the latter also are red-brown, only the veins being more or less dark. The brown streaks of the hindwing are proximally pointed, while they are broad and rounded distally; they commence at the distal margin but do not reach the cell. The underside of the forewing russet-brown, with a broad dark hindmargin; the costal margin, apex, and part of the distal margin dusted with white-grey. The hindwing beneath densely dusted with white-grey from the base to the distal margin, there being but rarely vestiges of the brown spots of the upperside. The wings are crossed by a narrow brown median band, which is bordered on the distal side by a number of white-grey spots. The ♀ is smaller than the ♂, the forewing above being mostly

*) Here would follow *E. kalinda* *Moore* from southernmost (Indian) Kashmir (Kulu), the record of which from the "Pamir" is probably erroneous.

entirely red-brown with only the distal and hind margins and the base remaining dark. The brown colour is also on the hindwing more extended than in the ♂, but does not reach to the cell. The short antenna *usgentensis*, grey-white with the club black. — The form *usgentensis* Stgr., so named because it occurs at Usgent in Turkestan, the hindwing is so thinly dusted with white that the dark brown ground-colour comes through. — *magna*. Especially large specimens of this Turkestanian form are sold as ab. *magna* Stgr. — On the other hand *progne*, small specimens which are hardly half the size of nymotypical *radians*, are named *progne* by GRUM-GRSHIMAILO. The upperside is uniformly russet-brown apart from the dark margins, the hindwing beneath being grey-black. From the north-side of the Transalai. — *radians* occurs at a considerable height in the Pamir and the mountains of Turkestan; the butterfly settles frequently and has a sluggish and low flight. In June and July, locally very abundant.

sibo. **E. sibo** Alphér. (37i). The wings above dark black-brown, sometimes with narrow brown longitudinal streaks, which are pointed distally and are quite obsolescent, being occasionally altogether absent in the ♂, while they are nearly always more or less distinct in the somewhat lighter ♀. Underside of the forewing of the ♂ dull russet-brown, the costal margin, apex and veins being dusted with grey. The hindwing beneath grey-brown, mixed with white-grey, all the veins being scaled white. The dark brown transverse band is distally strongly sinuous and here limited by a number of grey-white spots. Along the distal margin there is a band consisting of brown tooth-like spots. In the ♀ the underside of both wings much lighter than in the ♂ in consequence of the strong increase of the white-grey scaling; the brown longitudinal streaks of the upperside are but feebly indicated on the forewing beneath or there are only small vestiges of them. The hindwing beneath still more densely dusted with white, sometimes the whole wing being shaded with white-grey, only the brown median band and the dentate band at the distal margin remaining visible and contrasting sharply with the white-grey colour. The antenna black-brown above, white-grey beneath, the tip of the club being red-yellow. The ♀ always smaller than the ♂; the latter varies in size from 43 to 65 mm; while the ♀ mostly measures only 42–44 mm. — In the Kuldja district, Tian-shan, up to 10000 ft.

ocnus. **E. ocnus** Er. Similar to *lappona* Esp. Forewing sombre black-brown with dark costal and distal margins. The brown-red central area sometimes divided by the dark veins into brown longitudinal streaks or even entirely darkened apart from slight vestiges at the distal margin. The black submarginal eye-dots have the same position as in *lappona*, but are mostly smaller than in that species or are even absent. The dots are not visible beneath. The forewing beneath with the central area russet-brown and sometimes the costal and distal margins sparsely dusted with white, which scaling, however, may be absent. The underside of the hindwing more or less dusted with grey, the median area often bordered by two thin dark *mongolica*. dentate lines. In the Alatau. — In *mongolica* Ersch. the ground-colour of the hindwing beneath is more densely dusted over with white, the dark median band therefore being more prominent. From the Tian-
thianchanica. shan. — In ab. *thianchanica* Alphér. the underside of the hindwing has a greenish tint and the markings traversed by whitish veins. Likewise from the Tian-shan.

lappona. **E. lappona** Esp. (= *manto* Fr., *zilia* Bkh.) (37i). Upperside of both wings black-brown, somewhat glossy, the ground-colour of the ♀ lighter, more grey-brown. The forewing with a rather broad russet-brown band which does not reach the hindmargin and bears 4 black ocelli without pupils, the 2 upper ones standing close together and being somewhat shifted proximad. The band is not always equally distinct, varying in several directions. The hindwing has 3–4 black ocelli in russet-brown rings or is entirely unicolorous without markings. The forewing beneath with the central area russet-brown, the costal and distal margins being dusted with white-grey or bluish white, and the hindmargin black-brown. The ocelli as above, but mostly placed in russet-yellow rings. The hindwing beneath whitish or bluish grey with a median band which is bordered both proximally and distally by a thin brown dentate line. In the ♀ this median band is more or less dusted with brown, the dentate lines being darker and broader and the band therefore more prominent than in the ♂. Before the distal margin there are 2 or 3 black dots which are sometimes absent. Head, thorax and abdomen black, the last ashy grey beneath. Antenna brown above, grey beneath, with yellow club. In the Pyrenees, Apennines, Alps and Carpathians, mostly only at con-
pollux. siderable altitudes. — In ab. *pollux* Esp. (= *dubius* Fuessl., *aglauros* Hbst., *baucis* Schk.) the underside is dusted with white-grey, without markings; singly among the nymotypical form, in Graubünden and in
castor. Finmark. — ab. *castor* Esp. (= *pandrose* Bkh.) has the upperside duller in colour, bearing 2 subapical dots; the very evenly leaden-grey underside of the hindwing is traversed by 2 sharply marked black-brown dentate line. An insignificant aberration, which perhaps flies everywhere in the Alps among nymotypical
sthenny. specimens. — In the form *sthenny* Grasl., which occurs in the Central Pyrenees, the distal band of the forewing is not russet-brown but yellowish red, being proximally but indistinctly or not at all defined. The
stelviana. ocelli bordered with yellow rings above and beneath. — In ab. *stelviana* Gump. the forewing has no ocelli above. From the Tirolese Alps, but occurs as aberration almost everywhere among nymotypical specimens. —
mantoides. In the northern form *mantoides* Btlr. the ocelli of the forewing beneath are contiguous, forming a chain. — The Central-European mountain-form as well as the arctic form, however, vary so much individually that nearly all the aberrational forms occur in both districts. — Larva adult grass-green; head, a dorsal line,

lateral macular lines and the spiracles black. Feeds on grass, and contracts like a slug when being touched. In May it changes into an obtuse pupa, which lies free on the ground and has the anterior part of the body green and the abdomen brownish. The butterfly appears according to altitude either in June or August. In the Alps one usually meets with it only from the tree-line up to the snow. It flies especially on stony slopes with a sparse covering of grass and settles by preference on the ground, visiting flowers but rarely. It is very shy and therefore not easy to catch.

E. tyndarus *Esp.* (= *herse* *Bkh.*, *dromus* *F.*, *tyndarellus* *Hbst.*) (37 i). A widely distributed species *tyndarus*, which is geographically very variable in size, colour and markings. The wings above in the ♂ with a stronger, in the ♀ with a duller bluish green gloss. The russet-brown band of the forewing is broad costally, being narrower behind, and reaches only to the middle of the wing. Towards the apex of the wing there are two small white-centred ocelli or two black dots instead. The hindwing either entirely black-brown, or there are in the marginal area 3 minute black dots situated in small round red-brown spots. The forewing red-brown, in the ♀ red-yellow, with the costal and distal margins darker and the latter dusted with ashy grey. The hindwing beneath light ash-grey, dusted with brown, with a somewhat darker dentate transverse band. In the lighter marginal band there are sometimes some black dots, which however are mostly absent. In the ♀ the brown dusting on the underside of the forewing is denser, the transverse band being more sharply defined and more prominent. In the high mountains of South and Central Europe: the Alps, Apennines and Carpathians. — The name **cassioides** *Esp.* (= *cleo* *Hbn.*, *neleus* *Frr.*) is applied to a form *cassioides*, which occurs especially on the higher mountains of Hungary and Dahnatia and has the hindwing lighter and the forewing more yellowish brown, there occurring however all transitions towards the main form. — ab. **coecodromus** *Gn.* is an aberration which occurs among the nymotypical form especially in the Ortler *coecodromus* district; the wings are without ocelli and the band of the forewing is indistinct or diffuse or even entirely absent. — In **dromus** *H.-Schäff.* (37 i) the band of the forewing is broader and lighter, being more reddish *dromus*, yellow, the 2 subapical ocelli are larger, being mostly confluent and bearing bright white pupils. The band of the hindwing is always present and has 3 smaller ocelli which have nearly always white pupils. The hindwing beneath ashy grey or yellowish grey, but little dusted with brown, the band being obsolete. In the Western Pyrenees. — The form from the Eastern Pyrenees, hardly different, is named **pyrenaica** by *pyrenaica*. RÜHL-HEYNE. The russet-yellow band of the forewing extends only to the 2. median vein; the 2 subapical ocelli are merged together to form one which has 2 pupils. The band of the hindwing is diffuse, bearing at its distal edge small white-centred ocelli. — **hispania** *Bldr.* (= *nevadensis* *Stgr.*) (37 h), from the Sierra *hispania*, Nevada, is somewhat larger than the nymotypical *tyndarus*; the band of the forewing is reddish yellow in the ♂ and ochre-yellow in the ♀, sometimes extends to the hind margin, but only in the ♀, becoming mostly obsolete shortly before reaching it. The 2 subapical ocelli confluent, bearing 2 white pupils. On the hindwing there are sometimes vestiges of a distal band bearing obsolete black dots. The underside of the hindwing ashy grey in the ♂ and densely dusted with brown, being light grey in the ♀ with hardly visible traces of a transverse band. — **altajana** *Stgr.*, from the Armenian and Siberian high mountains, has the *altajana*, russet-red band of the forewing very broad, the band reaching proximally to the cell and extending to the hindmargin, becoming but little narrower behind. — From this form another, **sibirica** *Stgr.* (37 i), has been *sibirica*, separated, occurring in the Altai and Mongolia; it is somewhat larger, the hindwing being mostly without ocelli and without distinct band and being irrorated beneath with brown and grey. — **dromulus** *Stgr.* (37 i) *dromulus*, is similar to the name-typical form; the band of the forewing broader, the underside of the hindwing being but sparsely or not at all dusted with grey. From the eastern shores of the Black Sea. — **ottomana** *ottomana*, *H.-Schäff.* (37 i) is the largest of all *tyndarus*-forms. Besides the 2 subapical ocelli the band of the forewing has further back 2 additional small ocelli which are either feebly centred with white or are quite blind. Hindwing beneath uniformly grey. From the Balcan Peninsula, Greece and Armenia, being lately often sold as *baleonica*. — **iranica** *Gr.-Grsh.* (37 i) is often smaller than the nymotypical form, the band of the *iranica*, fore- and hindwing being rather bright russet-red. The subapical ocelli of the forewing are large and bear bright white pupils. From North Persia.

Whereas many of the forms here enumerated are connected by transitions, some others are still supposed to be separate species, a question which can perhaps only be solved with certainty when the early stages become known. These however are known only of the name-typical form (from the Alps). The larva of *tyndarus* is brown-grey with 5 dark longitudinal lines on the back; above the black spiracles there is likewise a longitudinal line formed of dark spots and beneath it another, darker and continuous side-stripe. Head dark brown with a light line on the face, the mouth being black (GRIEBEL). Till July on grasses. The butterflies occur in July and August on alpine meadows and sunny slopes; they have a hopping flight and like to settle with closed hindwings on boulders or the bare ground, as does *lappona*. The insect is locally extremely plentiful.

E. afer *Esp.* (= *afra* *Bsd.*, *phegea* *Bkh.*) (37 h). Hindwing above dark black-brown. The apex and *afer*, usually also the upper part of the distal margin dusted with grey. The forewing with 6—7 white-centred black ocelli in reddish yellow rings; a small one is situated near the apex of the wing, then follow 2 large

ones which are more proximal, being contiguous and sometimes even merged together, and the remaining 3—4 stand before the distal margin and are but little smaller. Underside of the forewing sombre brown, the cell red-brown, the apex of the wing being more or less dusted with grey. The ocelli as above, but the two standing near the hindmargin are nearly always absent. The hindwing beneath black-brown with whitish grey veins and an obsolete band of the same colour. The ocelli — usually 7 — smaller than above and not bordered with reddish yellow but white-grey. The abdomen black above and grey beneath. From

dalmata. South Russia and Anterior Asia to East Siberia. — The form **dalmata** *God.* (37h), is somewhat larger, the apex and distal margin are somewhat more thinly dusted with white-grey, on the hindwing beneath the veins are dark, not being shaded with white-grey as in *afer*. From Dalmatia and Western Kurdistan. —

hyrcana. **hyrcana** *Stgr.* (= *afra* *Christ.*) (37h) has the apex and distal margin densely dusted with white-grey for a considerable width, all the ocelli being visibly larger on both surfaces and bordered with light yellow rings. In Persia. — The butterflies are on the wing in spring, often already in April. They occur on rocky precipices and on slopes covered with boulders, and settle on stones. They do not appear to be plentiful in many of their flight-places.

E. parmenio. This species — one of the largest of the genus — has been separated from the other Erebias as a distinct genus *Erebomorphus* *Elw.* Besides important differences in the structure of the genitalia

parmenio. the main reason for this separation were the extremely short antennae and also the highly remarkable flight of this butterfly. The nymotypical **parmenio** *Boeb.* (35d) occurs in the mountains of Siberia, especially in the Altai and Amurland, as well as in Mongolia and Manchuria. The ground-colour of the hindwing above is somewhat lighter than in *afer*, the costal margin and sometimes the apex being dusted with grey. The band of the forewing consists of 4 rounded russet-yellow spots with black white-centred spots. The 2 upper ones are confluent, forming a large black spot which bears 2 white dots. The hindwing has 3—4, more rarely 5, russet-yellow spots with black white-centred ocelli. The forewing red-brown beneath, the costal margin, apex, and a portion of the distal margin dusted with silvery grey, the double ocellus narrowly ringed with yellow. The other ocelli are very small, being often partly or all absent. The underside of the hindwing grey-brown, finely dusted with white-grey, especially towards the base. All the veins are shaded with grey and contrast strongly with the ground-colour. The distally dentate median band is bordered by a band-like silver-grey arched line. The distal margin is edged with a grey line, and proximally to this there is a narrow dentate brown band which is divided by the veins. The submarginal ocelli encircled with pale yellow. The ♀ differs above but little from the ♂; the grey dusting at the apex of the forewing extends in many specimens to near the cell, especially on the underside, where the veins are also silvery

inocellata. grey. — In ab. **inocellata** *Graes.* (35d), which occurs singly among name-typical specimens, the ocelli are

alpina. either totally absent from both surfaces or there are feeble vestiges of the same on the hindwing. — **alpina** *Elw.* is a small and darker form from the higher mountains of the Altai; the forewing above with less brown and smaller ocelli; the underside, however, is not different from that of the name-typical form. — The butterflies flutter on dry and stony places slowly and low above the boulders, the forewing being moved in a different plane as the hindwing; *ELWES*, who saw all forms of *parmenio* alive, did not find this kind of flight in any other butterfly. On the wing in July, settling on grass. The species occurs in large numbers in its flight-places, whole swarms rising from before the feet of the observer.

13. Genus: **Melanargia** *Meig.*

This genus is composed of nearly 50 very similar forms. They are butterflies of medium size, the pattern being black and white, the forewing obtusely triangular and the distal margin of the hindwing slightly undulate or somewhat dentate. The forewing has an apical ocellus, which is sometimes concealed in the black markings; the underside has before the margin mostly a black lunate line and on the hindwing some submarginal ocelli. Nearly all the species occur with the ground-colour snowy white or slightly yellowish, both these forms flying at the same time and place without the occurrence of transitions. — The larvae are yellowish or brownish or light green; they feed on grass, being concealed in day-time, and hibernate either when half-grown or shortly before pupation. The pupa lies free on the ground without cocoon. — As far as is known, the species of *Melanargia* have but one brood. They are almost without exception common in their flight-places, and are easily caught on account of their rather slow flight. The genus is almost exclusively Palaearctic; apart from one form, which in the extreme South-East of the Region extends across the boundary into the Indian area, all forms are restricted to the Palaearctic Region. The various forms which hitherto have been distinguished from one another come so very close to each other that they represent with certainty but hardly 8—12 distinct species.

M. galathea. In the otherwise black cell of both wing an oval white spot which is not divided by a transverse bar. On the hindwing above the ocelli are quite invisible or shine through very faintly from the underside. Everywhere plentiful, from Livonia to North Africa, and from Spain to the Caucasus. —

galathea. The first-described form, **galathea** *L.* (38a), especially in North and Central Europe. — In the form **procida**

procida. *Hbst.* (= *galacra* *Esp.*) (38a) the upperside is much deeper black and the white marginal spots are

strongly reduced above on both wings. In South Europe, extending northward into the Southern Alps. — ab. **vispardi** *Jullien*, which I know only from a plain figure, appears to be a slight transitional form with *vispardi*. the discocellular spot very heavy and the ground-colour somewhat dull. — In **turcica** *Boisd.* (38a, b) the *turcica*. white is strongly reduced also on the disc, the black colour therefore being by far predominant on the upperside. — ab. **galene** *O.* has beneath only dots instead of a row of ocelli, and ab. **leucomelas** *Esp. galene. leucomelas.* (38a) has the hindwing beneath entirely white or creamy, the markings shining through very faintly from the upperside. Such specimens with uniformly white underside to the hindwing occur among the name-typical form as well as among *proclida* and *turcica*, but are not plentiful and are without exception ♀♀. — On the southern side of the Mediterranean Sea there flies a large form of *galathea*, **lucasi** *Rbr.* (= *mauritanica* *Oberth.*) (38b). More sharply marked than the name-typical form, but otherwise not different in markings and colour, except perhaps that on the underside of the hindwing the bar which connects the costal and distal portions of the grey median band is less thin. — A melanotic variety which is uniformly dark brown on both surfaces and in which the 5 small ocelli are marked as light rings only on the under- *lugens. melania. syriaca.* side of the hindwing, has been figured by OBERTHÜR as ab. **lugens**, and ab. **melania** *Oberth.* is the name given to a specimen from the Lozère in which the underside of the hindwing is densely dusted with grey. — In **syriaca** *Oberth.* the whole upperside is black, except a white discal band crossing both wings. Thus we have a pattern as in *taurica* *Röb.* (39a, = *syriaca* *Stgr.*, named «syriaca» on the plate) which however belongs to the *larissa*-group. The thin dark marginal line is sometimes missing, such specimens being named by METZGER ab. **amarginata**; this aberration can appear among the various forms. — It happens also that *amarginata*. the last (anal) ocellus of the hindwing, instead of only having two pupils, is separated into 2 ocelli, the submarginal row therefore consisting of 6 instead of 5 ocelli, which occurs especially often in *proclida*: this is ab. **electra** *Meig.* — Larva light greenish yellow, a dorsal and a lateral line brown; in May full-grown *electra*. on various grasses. The butterfly is on the wing in June and July, in Africa already from the end of May. The ♂♂ flutter slowly as if searching on grassy clearings in the woods and in meadows; the ♀♀, which appear somewhat later, are mostly found with the wings closed settled on thistles and scabious.

M. lachesis *Hbn.* (= *nemausica* *Esp.*) (38b). Lighter than *galathea*, even than the lightest form of *lachesis*. the same. The black discocellular anguliform spot of the forewing constricted where it is bent. Hindwing entirely white, apart from the interrupted submarginal band; the base very sparingly dusted, the markings of the underside however shine through in the ♂. In Spain, Portugal and South France. — The specimens with creamy yellow ground-colour, which are somewhat rarer than the chalky white ones, are **canigulensis** *canigulensis. Oberth.*; from the Pyrenees. — ab. **cataleuca** *Stgr.* (38b) is the name for ♀♀ in which the hindwing beneath *cataleuca.* is so shaded with white that the markings are hardly visible; everywhere among the name-typical form, but singly. — The species flies in May and June on slopes and fallow-fields, being plentiful where it occurs.

M. titea. Forewing as in *lachesis*, the base being sometimes strongly dusted, sometimes not at all. The hindwing above is always quite white on the disc (or creamy); the main distinction lies in the underside of the hindwing, on which the edges of the median band are marked by 2 sharp irregular undulate lines, the space between them however being the same tint as the ground-colour. — The true **titea** *Klug titea.* (= *darcei* *Dup.*) (38c) has a broad and deep black border to both wings, the discocellular oblique halfband being of even width and the bases of the wings except in the cell of the forewing strongly dusted with black. Syria, from Beyrut to Antiochia. — In **teneates** *Mén.* (38c) has the margin of both wings also deep *teneates*. black, but the bases are white and the discocellular band is narrowed posteriorly. In Armenia and the Taurus. — In **palaestinensis** *Stgr.* (38c, d) the margin of the wings bears a row of rather large white spots, *palaesti-nensis.* of which there are only vestiges visible in the preceding forms of this group; on the underside the central portion of the proximal discal undulate line is usually obsolete. Palestine. — A truly gigantic form, of which the ♀ has an expanse of over 6 cm, is **wiskotti** *Röb.* from Persia; the white subapical band of the *wiskotti*. forewing commences broad at the costa, and the ocelli on the hindwing beneath are much larger than in all the other *titea*-forms. The specimens which Mr. RÖBER has kindly sent me for comparison are from Dorak, not far from the mouth of the Shatt-el-arab. — In **titania** *Call.* (38d), from the Syrian desert *titania.* (Aleppo, Aintab), the black margin of both wings is strongly reduced, accompanying the very large white submarginal spots but as a macular band composed of triangular shadows. — *titea* is very local, being absent from large districts of its native country. The species likes pastures surrounded with oaks and flies in May, not being rare in its flight-places.

M. japygia. This species never has a broad black margin to the wings, but only a marginal line and before it a lunate one. The forewing is crossed about its middle by a transverse line dentate like a saw. Beyond the cell there runs across both wings a band which is always distinct on the upperside, being irregularly composed of spots and streaks. The species with its local forms is distributed over an enormous area, which extends from Portugal to the Pamir and Altai. — The blackest of all is the small form ab. **atropos** *Hbn.*, which occurs in South Italy amongst the nymotypical form. The latter, **japygia** *Cyrtilli* (38d), *atropos.* has especially in the anal area of the hindwing still prominent black dusting bearing the ocelli, which appear *japygia.* as large pupillated rings on the underside. South Italy and Sicily. — **cleante** *Boisd.* (38d, e) is the *cleante*.

western representative of the species, occurring in South France, the Riviera and Spain. Here the hindwing bears only a slight greyish shadow around the ocelli. The forewing, however, has a thick black *suwarovius*. band at the apex of the cell. — In *suwarovius* *Hbst.* (= *clotho* *Hbn.*, *rusciae* *Esp.*) (38e), which represents the species in the North and extends from Hungary across South Russia and Siberia to the Altai, the discocellular band of the forewing becomes lighter in consequence of the appearance of a white central spot *caucasica*. in the same, this white spot with its black border forming a kind of median ocellus. — In *caucasica* *Nordm.* (= *xenia* *Frr.*) (38e) also the median band of the hindwing is rendered light by the appearance of white spots, the black markings therefore being all separated into stripes, lunules, and arcuate lines. In the Eastern *transcaspica*. Caucasus (Daghestan) and Armenia. — *transcaspica* *Stgr.* (38e) has a little more black than this white form, the submarginal macular lines being thickened and proximally shaded with grey sealing, which extends on the veins as dark projections to the margin, the median band of the hindwing above also being filled in with dark sealing. Persia, Turkestan. — The forms of *japygia* occur especially on rocky slopes where tufts of grass grow here and there among the rocks and boulders, the ♂♂ inspecting these tufts in their flight. They ascend in the mountains to a considerable altitude.

M. parce. This insect is so close to the preceding that it might be united with it. The pattern *parce*. agrees entirely with that of *cleante* and *suwarovius*; the nymotypical *parce* *Stgr.* (36f), from the Pamir, has however the median band lighter in colour and on the other hand the margin of the hindwing (within *lucida*. the lunate line) broadly dusted with black. — The form *lucida* *Stgr.* (38f), from Koksú and Fergana, on the contrary has the disc of both wings pure white and without markings, also the external third of the forewing being white and the apical ocellus therefore appearing as a heavy dot.

M. larissa. Also the forms allied to *larissa* can be separated from the *japygia*-forms only with difficulty and some arbitrariness. The transverse cell-bar of the forewing is not so close to the centre of the cell, being apparently a little shifted towards the apex of the same, and the median band of the hindwing has a somewhat different position, but also varies rather considerably in the specimens of one variety. The countries inhabited by the forms of *larissa* are more or less grouped around the Black Sea, while the distribution area of the *japygia*-forms encircles that of *larissa* in a wide arch. — The nymotypical form *larissa*. *larissa* *Hbn.* (38f) is easily recognized by the strongly sooty blackening of the bases of the wings, only the cell having some light places left. Balcan Peninsula, especially its eastern portion, the coasts of the *astanda*. Black Sea and portions of Armenia. — As *astanda* *Stgr.* (38f) very different specimens are sold, which all have the median band of the hindwing strongly darkened, while the forewing is either heavily dusted with blackish or is very light (as in the figure 38i). As also the figure accompanying the original description (Rom. Mém. Lép. I, Pl. 1, fig. 5, 6) does not show any characters that hold good, it might be advisable to drop this name altogether, if one does not wish to keep it for those specimens which unite characters of *taurica*. *japygia* with such of *larissa*. — *taurica* *Rüb.* (= *syriaca* *Stgr.*) is a magnificent form which occurs especially on the southern slopes of the Taurus Mts. (near Adana), and in which, besides the margin, also the whole proximal half of both wings is black, there remaining only a white discal band. On plate 39 in row a this form is figured as "*syriaca*". — Specimens in which moreover the costal portion of this discal band is *gnophos*. shaded with black-brown on the forewing are distinguished by OBERTHÜR as ab. *gnophos*, being however considered by him as a form of *galathea*. From Akbès in Syria. — In contradistinction to these exceptionally *grumi*. dark forms there are a number of light ones: in *grumi* *Std/ss.* (39b) the cells and even the median band *occaecata*. of the hindwing are filled in with light colour; in ab. *occaecata* *Stgr.* the ocelli of the hindwing beneath *massageta*. are absent; *massageta* *Stgr.* is above as dark as the nymotypical *larissa*, while the markings beneath are obsolescent: these forms, which probably occur partly together, are found in Kurdistan, as well as in *herta*. Mesopotamia, which lies south of it. — *herta* *Hbn.* (39a), though still with the base of the hindwing blackish, has the disc already extended pure white. In the South and West of the Balcan Peninsula. — *hertina*. *hertina* *Stgr.* is the name for specimens from Achalzich in Armenia which, though otherwise similar to the preceding, have sharper black markings and are essentially smaller than *herta*. — A very white form from *adriatica*. Dalmatia may here be introduced as *adriatica* *form. nov.* (39a), in which the apical ocellus and the ocelli of the hindwing appear as black dots on a completely white ground and in which the subapical oblique shadow of the forewing has entirely disappeared. Like *astanda* also this form connects the *larissa*- with the *japygia*-type.

hylata. *M. hylata* *Mén.* (39b). This form from Armenia is at once recognized by the white underside, which bears on the hindwing but very diffuse, hardly indicated markings. On the forewing only the oblique band at the apex of the cell and an irregular submarginal band, which widens from the centre of the distal margin to the inner angle, are black. — Specimens from Shiraz are distinguished by the larger size and very extended white fringes, into which reach the strongly enlarged white marginal spots, there being no sharp line of separation. We name this form in contradistinction to the smaller Armenian one *iranica*. *iranica* *form. nov.* (39b).

M. halimede. This form, like all the East-Asiatic *Melanargia*, bears a broad black streak along the inner margin of the hindwing above, whereby a confusion with any form from Europe or Anterior Asia

is rendered impossible. In the nymotypical **halimede** *Mén.* (39b, c) this innermarginal stripe is rather broad, *halimede*, and the ocelli of the hindwing beneath are of medium size, being placed in a dark halfband, which is proximally quite straight. In North China, Mongolia and South Siberia. — As **ganymedes** *Rühl-Heyne* (39c) *ganymedes*, specimens have been forwarded to me in which the black is somewhat reduced on both sides; but the differences mentioned in the original description do not hold good, for which reason this but little diverging form has been sunk again in *STAUDINGER-REBEL's* Catalogue of Palaearctic Lepidoptera as not being worth a name. — **meridionalis** *Fldr.* (= *epimede* *Stgr.*) (39c) is a large form which is broadly black above and *meridionalis*, appears to occur chiefly at Ning-po and Kiu-kiang. The ocelli of the underside especially are enormously developed. — An aberration which is melanotic on both surfaces, bearing only reduced whitish smears between the veins on the otherwise quite dark wings, is ab. **lugens** *Hönr.* (39d); it is known from Central *lugens*, China. — The largest form of the present species, and indeed of the entire genus, is **montana** *Leech* (39c), *montana*, which occurs chiefly on the Yang-tse-kiang (I-chang, Chang-Yang) and is there no rarity. It is almost entirely white above, only the veins, the innermarginal stripe and an oblique macular band on the forewing being black-brown.

As **M. meda** *Gr.-Grsh.* several forms have been sent to me in which the dark innermarginal stripe *meda*, of *halimede* is replaced by a stripe on the submedian vein, this stripe extending however only to the middle, where it vanishes in the white discal area. Apart from this shadow the wings are either pure white except the black distal margin, or the forewing has at the apex of the cell a shadowy spot, which is sometimes continued obliquely to the hind angle of the wing. *STAUDINGER & REBEL* place this species between *japygia* and *lucasi*, but *STANDFUSS* was perhaps more correct in treating it as a variety of *titea*, if the form described by him but not named, in *Roman. Mém. Lép.* 6, p. 661, really was *meda*.

M. leda *Leech* (= *yunnana* *Oberth.*) (39d). This insect, though resembling *halimede* above, has an *leda*, entirely different pattern of markings on the underside of the hindwing, some grey spots and stripes being united to a kind of median band recalling occidental forms. The broad deep black hindmarginal stripe the upperside of the forewing leaves no doubt that *leda* belongs to the series of East-Asiatic forms. It is plentiful in Eastern Tibet (How-kow) in July and August, occurring up to 10000 feet (*LEECH*). It is noteworthy that this species is recorded from the Chinese province of Yunnan, this being so far the only *Melanargia* which has been observed outside the Palaearctic territories, namely in South China.

M. syllius *Hbst.* (= *occitanica* *Esp.*) (39d, e). At once recognized by the veins and transverse *syllius*, lines forming a network of brown markings on the hindwing beneath, the large ocelli with their heavy whitish violet centres standing in between the stripes. The cell of the forewing above bears a black transverse line not far from its apex. Distributed from Spain across the French and Italian Riviera to North Italy and Piedmont. In April and May on rocky slopes covered with boulders, the ♂♂ flying briskly about and are rather fast. They always select a rock or boulder to settle on, or the bare ground, but never plants like the other species. The species is very plentiful at its flight-places. — ab. **ixora** *Bdr.* (= *psyche* *ixora*, *Hbn.*) is the form without ocelli, which occurs among the nymotypical form, but not commonly. — In ab. **antixora** *Oberth.*, from Hyères in South France, on the other hand the shadowy and zigzag markings around *antixora*, the ocelli have disappeared, the ocelli being well developed and standing free on the wing. — In **pherusa** *pherusa*, *Bdr.* (39e) the short transverse band in the cell of the forewing is shifted towards the centre of the cell and is somewhat different in shape, the reticulate markings and the ocelli of the hindwing beneath being paler. Sicily, in May and June. — **plesaura** *Bell.* (39f) has the hindwing entirely white; of the stripes *plesaura*, only the submarginal lunate band remains, and the ocelli are absent, also from the underside.

M. ines *Hoffgg.* (= *thetis* *Hbn.*) (39e). Above similar to *syllius*, but the short transverse band of *ines*, the forewing heavily black, placed exactly in the centre of the cell and not united with the black discocellular spot. On the hindwing beneath the ocelli are magnificently coloured, the sky-blue centre being successively encircled by russet-red, yellow and black rings, the costal ocelli of the upperside being always centred with blue. — In the spring in Andalusia, Morocco, and Algeria on stony heights which are almost bare of vegetation; abundant.

M. arge *Sulz.* (= *amphitrite* *Hbn.*) (39f). Above white, only the submarginal lunate line, the two *arge*, short bands in the centre and at the apex of the cell, and the beautifully blue-centred ocelli being dark: beneath the markings of the forewing are similarly reduced. In South and Central Italy, but very local, in June. — ab. **caeca** *Stgr.* is without ocelli; rare among the preceding. *caeca*.

14. Genus: **Oeneis** *Hbn.*

Antenna very short, gradually incrassate towards the tip, the club being very diversely developed. Head small, concealed in the long hairs. Eye naked. Palpus densely and strongly hairy, projecting for about the length of the head. Forewing more elongate than in most species of *Erebia* and *Melanargia*, the

cell therefore longer; the costal margin very straight, likewise the hindmargin of the forewing. The hindwing rounded, sometimes with undulate or feebly dentate edge, with almost straight costal margin. The thinly scaled wings are pale yellow or sooty brown, bearing an often indistinct distal band with dot-like ocelli. The hindwing beneath often minutely striated, traversed by light veins and usually crossed by a dark median band. — The eggs, as far as known, are elongate, light in colour, with longitudinal ribs which stand close together. The larvae are remarkably like those of saw-flies; they have a large globular head, and are rather stout, strongly tapering behind and bearing 2 short anal processes. The colour is a dull green-brown or yellowish green, with longitudinal markings. They feed on grasses, grow very slowly, and sometimes hibernate twice before turning into the chrysalis. The latter free on the ground, rounded off in all directions, the wing-cases being often dark. The butterflies are on the wing in sunshine at the edge of woods and on rocky slopes, occurring in the South of their area only at considerable altitudes, in the North in the plains. The very heavy-bodied ♀ fly but rarely. The butterflies settle on the stems of trees and on rocks, with the wings closed above the back, being very difficult to perceive on account of the underside resembling stones or the bark of pines. There is no doubt that most of the 50 odd different forms known are but races of a small number of species, but how they belong together cannot be ascertained with certainty before the early stages are better known. The genus is circumpolar, being restricted to the North of the Palaearctic and Nearctic Regions. A few South American alpine butterflies which have hitherto been placed in *Oeneis*, are, we think, better removed from it. The greatest number of species occur in the Altai, Scandinavia and Canada. The most imposing forms are *chryxus* and especially *gigas*, a variety of *nevadensis* from the Pacific coast of North America; the smallest form is *sculda* from South Siberia, many specimens not being larger than *Coenonympha tiphon*.

- jutta*. **O. jutta** Hbn. (= balder H.-Sch.) (40a). One of the largest and most densely scaled species. ♂ with a black scent-streak interrupted by the veins and placed below the cell of the forewing, entering the lower angle of the same. Upperside sooty brown; before the margin a row of ochre-yellow spots, which, in the ♀, approach each other so as to nearly touch (being united to a band in American specimens). In these spots there are ocelli, which are nearly always without pupils: one in the apex and another above the hind angle of the forewing, and a third before the anal angle of the hindwing. Between the 2 ocelli of the forewing there appears usually a small accessory dot, placed before the centre of the distal margin, and on the hindwing 1 or 2 additional ocelli may also occur before the distal margin. The underside of the forewing similar to the upper, but the ochreous spots more washed out; the hindwing beneath so densely pencilled with dark transversely that the dark sinuous median band hardly contrasts with the ground. Scandinavia, North Russia, and Siberia; in Europe southward to Königsberg, in Asia as far south as the upper Jenissei and Amurland; also in North America. — The Livonian ab. **balderi** Hbn. (= balder Bdr.), which flies not infrequently among nymotypical specimens, has fewer and less prominent ocelli, and is considerably smaller than the ordinary North-European form, all transitions occurring. — **magna** Graes. is the large Asiatic race, whose ♂♂ have no scent-stripe below the cell. — Egg elongate, with longitudinal ribs. The larva leather-brown, with dark longitudinal lines and brown head. Pupa dull ivory yellow, the wing-cases being but slightly darker. The butterflies occur in June and July at the edge of woods and prefer to settle on the branches of willows and on flowers; they are rare at the southern boundary, for instance in North-East Germany, being considerably more abundant in the high North. The flight is rather fast; the resting butterfly is not shy and is easy to catch.
- mulla*. **O. mulla** Stgr. But little smaller than the large race of *jutta*. Both wings rather dark brown, with a broad ochreous distal band, which bears no spots on the hindwing, but has 2–3 eye-dots on the forewing: a large one near the apex and 1–2 usually smaller ones further down; cell of forewing above light in ♂. Hindwing below usually without distinctly white veins, with a dark median band which is diffuse at its proximal edge on account of the dense pencilling and is constricted below the cell; from Tarbagatai. — *elwesi*. The form **elwesi** Stgr. (= mulla Elw.) (40a) flies in the Altai; it is smaller and darker, the ♀ being almost coffee-brown. The median band of the underside of the hindwing bears small teeth on the distal side and the distal area is dusted with whitish along the band. At a considerably altitude, flying at rocks, local, the ♀♀ not abundant, end of June and July. The butterflies closely resemble on the wing *Satyrus hippolyte*, of which a small local form occurs in the same locality.
- tarpeja*. **O. tarpeja** Pull. (= celimene Cr., vacuna Gr.-Grsh.) (40a, b). Rather constant, above honey-yellow, the distal edge of the wings brown-grey, before the same a row of 4–5 heavy black dots on each wing. Beneath the forewing as above, but there is a grey cloud in the cell of the ♂, such scaling being present also around the cell in the ♀. Hindwing beneath with white veins, the base bearing dark clouds, which often are united with the dark median band. The latter mostly bordered broadly with white anteriorly and posteriorly. Very widely distributed, from South Russia across the Kirghiz steppe and the Kuku-nor district to Dauria; not rare, in June. — ab. **lederi** Alph. (40b) has the ground dull milky white or creamy; from Mongolia. — The larva of *alberta* from Canada, which many Lepidopterists consider to be the American form of *tarpeja*, is dark olive-green, with heavy brown straight longitudinal lines. The pupa has the

anterior part deep dark brown, the abdomen being ivory yellow (EDWARDS); the early stages of the European form are not known to me.

O. aëlo *Hbn.* (= *norna* *Hbn.*, *glacialis* *Schrk.*) (40 b, c). The largest *Oeneis* after (the American) *aëlo. gigas* and *chryxus*. Above sooty brown; in the obsolescent, sometimes only vestigial, pale ochre-yellow distal band there are some eye-dots, sometimes only apical or anal ocelli, sometimes complete rows of occasionally pupilled spots. Beneath the hindwing and the apex of the forewing are densely pencilled with dark transversely, being traversed by heavy white veins. — Only in the Alps, from 2000 to 7000 feet, chiefly in rocky localities. In many places of Switzerland and the Tyrol the species flies but every second year, here in the years of even number, there in the years of uneven number. In other districts it appears each year, but more abundantly only every second year; in July and August. Larva yellowish brown or olive-brown, with thin dark longitudinal lines on the back and a brown lateral stripe; on grasses.

N. norna. In this species the light leather-yellow distal area of the wings contrasts sharply with the smoky brown basal area; the fringes are conspicuously chequered. The forewing always bears eye-dots, which are sometimes pupilled: 1 before the apex, 1 above the hind angle, these two being sometimes the only ones, while they are sometimes connected by a row of small accessory dots. The median band on the underside of the hindwing bears usually two teeth externally in its upper half, its distal edge contrasting with the light distal area, while the band is almost the same in colour as the basal area. The nymotypical *norna* *Thunb.* *norna.* (= *celaeno* *Hbn.*) (40 c) has an imposing row of ocelli on the forewing and at least one eye-dot on the hindwing, placed above the anal angle. In ab. *hilda* *Quens.* (40 c) only the apical ocellus is distinct on the forewing. *hilda.* In ab. *ochracea* *Auriv.* the forewing is almost entirely yellowish brown. ab. *lampana* *Auriv.* has the distal band washed with russet-red distally. *ochracea.* *lampana.* All these forms occur in North Europe and the western districts of North Asia. — In the Altai the species is represented by the large *altaica* *Elw.* (40 c, d); as *altaica.* large as *aëlo*, darker than European specimens, the underside being much more brightly coloured; in the ♂ moreover the scent-stripe, which is sometimes strongly reduced or even absent in nymotypical ♂♂, is always present below the cell, being full and dark. — In *fulla* *Er.* (40 d), from Tarbagatai, the apex of the forewing bears but one ocellus, which is reduced to a minute dot in many ♀♀. *fulla.* In *elsa* *Aust.* (40 d) every trace of an apical ocellus has vanished from the forewing above also in the ♂, and the underside bears a minute ring which is hardly perceptible with the naked eye, the entire upper surface being uniformly dark dust-grey almost without any yellow tint. *elsa.* *vanda.* *vanda* *Aust.* (40 d) is likewise an unimportant aberration; very close to *fulla*, beneath exactly like the latter, but more grey, entirely without ocelli; above thinly covered with dust-grey scaling, the hindwing strongly transparent, the forewing with 2 quite obsolescent eye-dots before the apex and above the hind angle. The upperside of both wings paler, the median band of the hindwing beneath darker than the basal area. Scent-stripe of ♂ below the cell of forewing very feebly developed. The nymotypes of *elsa* and *vanda*, which we figure here, are in the Tring Museum. — The butterflies occur singly in June at the edge of pinewoods and settle with preference on the stems of larches. Fresh specimens have alive an agreeable scent, which is said to resemble the scent of roses. The butterflies are rather shy and therefore difficult to catch. ELWES never saw more than 1 or 2 specimens in the Altai during an excursion.

O. dubia *Elw.* (40 d, e). As large as *altaica*. Forewing dark sooty brown, so dark as in *jutta*; the distal band very regular, bright ochre-yellow, contrasting with the ground. The median band of the underside of the hindwing is more regular, not being distally produced into teeth as in the forms of *norna*. As ELWES, moreover, found the genitalia to be different from those of *norna*, we keep the insect separate. — *dubia* flies in July (4 weeks later than *norna*) in swampy larch-woods in the Altai, where it was obtained north of the Kurai-Pass and at Ongodai.

O. hora *Gr.-Grsh.* (40 e). Our figure is taken from the type, a much worn specimen in the Tring Museum. The forewing seems to have been rather uniformly dull ochre-yellow on the upperside; before the apex and above the hind angle obsolescent dots. On the hindwing the markings of the underside, the median band as well as the finer pencilling and spots, strongly shine through on the upperside. The median band of the hindwing beneath does not reach the costal margin, being elbowed and below the elbow strongly constricted. The veins hardly lighter than the ground, but slightly contrasting. Ferghana, in August. — *verdanda* *Stgr.* (40 e) is very similar; the ♂ is very dull in colour, but the ♀ has a beautiful yellow marginal band, and the genitalia are the same as in *hora*, being different from those of *bore* (ELWES). The band of the wings said by STAUDINGER to be characteristic for *verdanda* is inconstant. In the Tian-shan. *verdanda.*

O. bore *Hbn.* (40 e) is very close to the preceding, but the wings above are still paler, being almost dust-grey: the forewing has before the distal margin a hardly yellowish lighter area, which is present in all ♀♀ and in most ♂♂, while on the hindwing the median band of the underside feebly shines through above. Beneath the forewing is pale yellow, and the median band of the hindwing has a white border composed of a number of smear-like spots. From Norway and North Russia. STAUDINGER could not specifically separate from *bore* the American form *laygete* *Hbn.*, which we do not include among the Palaearctics. — The

egg is longitudinally ribbed. Larva brown-yellow, with striped greenish head, and dark longitudinal lines: on grass. Pupa with brown-yellow abdomen and light green anterior portion: at the sides of the head two black arcuate spots, along the back a dark-edged green line; it lies on the ground between the roots of grass without a cover of silk-threads (SANDBERG). The butterflies are on the wing in July in swampy meadows and are not rare.

ammon. **O. ammon** *Elw.* (40 f) was described as a form of *lore*. Upperside dust-grey, without eye-dots, the basal area somewhat darker. The hindwing is beneath very pale, being so little pencilled that the median band appears heavy and dark on the background. In the high Altai, 7000–9000 feet, the ♂♂ very common; in July. Here belongs also the form **alda** *Aust.* (40 e), which exactly agrees with *ammon* above, differing from the same only in the median band of the hindwing beneath being broad at the costal margin and disappearing behind in the dark basal area instead of narrowing towards the anal margin; even with a lens I cannot find a trace of eye-spots in the type-specimen (Tring Museum), which has kindly been lent me. — **pansa** *Christ.* (40 f) is without ocelli like the preceding, but on the whole a little more brightly coloured; larger, strongly glossy brown, the distal margin of the hindwing with a strong yellowish red tint. Polar regions of Europe and Asia, also in the Altai; the last two forms especially must be considered representatives in the Old World of the American *taigete*.

crambis. **O. crambis** *Frr.* (= subhyalina *Elw.*, *oeno* *Scudd.*) (40 f). A chiefly Nearctic insect. Wings more hairy than scaled, above uniformly dust-grey, with the fringes conspicuously chequered, as is also the costal margin of both wings beneath. The hindwing beneath much more densely pencilled than in the other *Oeneis*; the median band has exactly the same colour as the basal area of the hindwing beneath, only *oeno.* being separated from it by band-like white scaling. — In *oeno* *Bdr.*, from Lapland and Siberia, this white *also.* scaling is more prominent, smear-like. — In *also* *Bdr.*, likewise from Siberia, the white scaling has so entirely disappeared that the hindwing beneath, from the base to the external edge of the median band, is dark brown, being coarsely and evenly pencilled with black, contrasting slightly with the but little paler distal third of the underside of the hindwing. — The butterfly is not rare in North America, although local like all *Oeneis*. The Old World forms are but little known, and were formerly united with the closely allied *semidea* *Say*, which, however, appears to be purely American.

tunga. **O. tunga** *Stgr.* (= also *Herz.*) (40 g). This large species is almost without markings above, the uniformly dark earth-brown colour assuming a lighter yellowish tint before the distal margin; the underside of the hindwing is very uniformly scaled dark, but the median band nevertheless is not difficult to perceive, although its colour does not contrast with that of the ground. — From the Sajan district.

buddha. **O. buddha** *Gr.-Grsh.* (40 g). Above light sand-yellow; forewing with 1–3 eye-dots in a lighter band, the discocellular and the median nervure, sometimes also the subcostal, conspicuously black. On the hindwing the markings of the underside distinctly shine through. The underside bright in markings; the forewing show a black-brown border to the distal band, the discocellular and the distal edge being dark; the hindwing have heavy white veins, which traverse like rays the dark-edged, almost even, median band. The type before me (from the Tring Museum) has on both sides of the forewing 3 eye-dots, on the hindwing above only one subanal ocellus. — Tibet.

mongolica. **O. mongolica** *Oberth.* (40 g). However closely this species resembles certain specimens of *tarpeja*, the shape of the wings, the ground-colour and the eye-dots accidentally agreeing, there is hardly any resemblance in the underside of the two insects: there is in *mongolica* no trace of the median band, which in *tarpeja* is so dark and strongly prominent and moreover bordered with white and traversed by white veins. According to OBERTHÜR's figure, which we copy, the hindwing beneath is sand-colour, sparsely irrorated with grey, bearing a dark sinuous median band. — In eastern Mongolia, already at an altitude of about 550 m (OBERTHÜR).

urda. **O. urda** *Er.* (40 g). Very variable, above yellowish brown, greyish brown or uniformly dust-grey, with at least 2 usually pupilled ocelli on the forewing and often an entire row on the hindwing. In spite of all variability the species is easily recognized by the median band of the hindwing beneath bearing at the elbow a pointed tooth which projects distad beyond the apex of the cell. On the Amur and in Transbaikalia, in May and June, not rare in rocky places. While many *Oeneis* almost exclusively settle on the bare ground or on stones, *urda* visits flowers with preference according to GRAESER. — Large dark brown specimens are named ab. **umbra** by STAUDINGER.

nanna. **O. nanna** *Mén.* (= *hulda* *Stgr.*) (40 g). One of the largest and finest *Oeneis* of the Old World. Above leather-yellow, with the basal area dark on both wings; the ochreous distal area traversed by dark veins and bearing a chain of ocelli which are partly pupilled, at least 2 standing on the forewing, there being between them usually some additional smaller ones, 5–7 on the hindwing. The hindwing beneath is yellowish, similar to the upperside, the cell being proximally pencilled with grey; on the hindwing the row of ocelli is prominent also beneath, while the basal area is often quite dark and frequently marmorated. At Podrofka on the upper Amur, not rare; in the Altai, in larch-woods in rocky situations, in July. — As ab.

coriacea *ab. nor.* (40 g) I designate a light ochre-yellow form from the Apple Mts. (east of Lake Baikal), *coriacea*, which does not rarely occur among ordinary specimens. The wings are almost uniformly ochreous all over the upperside, with a darker contrasting basal area; the forewing has only 2 ocelli, the eye-spots of the hindwing being reduced in size and sometimes also in number. On the underside the hindwing, though still bearing a distinct median band, shows already an inclination of acquiring a finely and regularly pencilled clear ground. — Finally, the form **walkyria** *Firs.* has only one eye-spot left on the forewing, placed between the median branches, not at the apex; on the hindwing beneath the only slightly darker basal area contrasts but little with the uniformly coloured distal area; Corea, in May and June.

O. sculda *Ev.* (49 g). Has almost the facies of a small *nanna*, but the wings above are more uniform in colour, the basal area being less strongly darkened. The median band of the underside of the hindwing contrasts much more sharply and is better defined, being sometimes edged with white on both sides. Forewing usually with 2 eye-dots, hindwing sometimes with a complete row of such dots. At Kiachta, in the Altai and on the upper Amur. The smaller and paler *ab. pumila* *Stgr.* (= *sculda* *Gracs.*) (40 f) flies among the nymotypical form, on the Amur as well as in the Altai. — In the former locality *sculda* is sometimes one of the commonest butterflies; in the Altai it is plentiful during the first half of July on grassy slopes. It settles in the grass to rest and avoids rocky or boulder-strewn places; its flight is feeble and only for short distances, the wings being so delicate and fragile that the specimens are soon worn (ELWES).

15. Genus: **Satyrus** *Latr.*

Although this genus contains an abundance of forms and is composed of a number of groups which can be separated without difficulty, we deal with them under one generic term as has been done in STAUDINGER-REBEL's catalogue. The first group, separated by MOORE as *Paroeneis*, is a kind of transition towards the preceding genus, as the name implies. The forms of *Kanetisa* come close to *Paroeneis*, being alpine butterflies with often quite vestigial bands and an underside which strongly recalls that of *Oeneis*. The *Karanasa*, which follow, show already obvious similarities with and transitional characters towards the western Asiatic *Satyrus*, of which the most imposing forms, formerly considered most typical, have received by BUTLER the name *Antocera*. KIREY conceives the genus *Satyrus* in the same sense as ourselves, but includes in it under the old name *Hipparchia* the species of *Aphantopus*, which were united with *Epinephete* for a long time, RÜHL-HEYNE following suit.

Antennae delicate, below half the length of the costa, gradually incrassate towards the apex in a number of species, but in most with a thick, short, abruptly enlarged club. Eyes naked. Palpi with brush-like hairs, projecting for the length of the head. Tongue strongly developed. Forelegs aborted, usually strongly hairy; middle and hindlegs strong. Wings entire, the hindwing sometimes with the margin undulate or feebly dentate; the forewing triangular, the costal margin being curved, the subcostal and sometimes also the median strongly inflated at the base. The ground-colour is a brown which is either darkened to a deep black or paled to a grey-yellow or pale yellow; the markings consist of distal bands or apical and submarginal ocelli. The underside of the hindwing and the apex of the forewing beneath are of the same colour, resembling the bark of trees or rocks. — Larva always completely naked, yellowish, greenish, or brownish, longitudinally striped, strongly narrowing behind, without horns on the head, with strong anal processus. It lives on grass, being concealed in day-time, hibernates and early in the summer turns into a short pupa, which tapers to a point at both ends and lies free on the ground among clumps of earth and the roots of grass, the butterfly appearing in summer. There is only one brood. The butterflies suck at flowers, but also at fallen off fruit, at dung as well as puddles on the roads, keeping the wings always tightly closed when thus busy. They have a hopping and irregular, but rather fast flight, and like to settle on tree-trunks and on rocks. Most species are widely distributed, varying often considerably according to the various localities. Their chief territory are the Mediterranean countries, especially the north-eastern districts and Anterior Asia. They are almost restricted to the Palearctic Region, only very few species extending, in the Himalaya, beyond the northern boundary of the Oriental Region. Only one single species reaches the Pacific coast. There are no true *Satyrus* in America, the genus being there represented by *Cereyonis*.

S. pumilus *Flör.* (42 b). This small butterfly is on both sides similar to *Oeneis* in markings and colour, therefore being placed into *Oeneis* by many authors, which has occasionally been the reason for a confusion with the very different *Oeneis sculda pumila* *Stgr.* Upperside almost yellowish brown, with an obsolescent ochreous band across both wings and an apical spot of the same colour on the forewing. The band is interrupted by the dark veins on the forewing, becoming quite indistinct towards the hind angle. Beneath the band is much more prominent, being of almost even width and bordered with dark on both sides, almost white on the hindwing, which is marmorated with grey; fringes chequered. — A form from the Chumbi valley (Tibet), with a distinct apical ocellus, the ochre-yellow proximal area of all wings sharply contrasting with the deep black-brown distal area, may be named **bicolor** *form. nor.* (32 b). — *pumilus* was discovered by STOLICZKA in Kashmir at an altitude of 15000 feet, and after a long time has been found also in Tibet, where it appears

to occur also only at a great height. We leave the species, for which MOORE has erected the genus *Paroeneis*, in *Satyrus*, but bring it immediately after *Oeneis*. It does not appear to be plentiful.

palaearcticus. **S. palaearcticus** *Stgr.* (= *lama Alph.*) (41 b). Much larger, and — especially at the distal margin — darker; the distal band dirty white, straighter, separated into spots on the forewing. The underside more grey, the hindwing being traversed by heavy white veins and the band of this wing being very broad in the centre and strongly narrowed towards the costal and abdominal margins. From the Issy-k-kul, Lob-Nor, *sikkimensis*, and other places in Central Asia, where the species must be abundant in certain localities. — **sikkimensis** *Stgr.* has the band of the upperside of both wings strongly brownish, the band however is very prominent on the darker underside, being bordered with black at both edges: in Tibet, extending in Sikkim into the Oriental *iole*. Region. — **iole** *Leech* (41 a) is a still darker form, in which the ground-colour is blackish-brown, the distal band being only represented by some very obsolescent small spots in the disc of the wings. In Tibet and West China, sparse. The ♀♀ from Amdo are paler (LEECH). — All these forms have hitherto been united with the *pumilus*-forms to a single species, the latter forms being considered the mountain forms of *palae-arecticus*. But as the early stages are not known, the connection cannot be proved.

sybillina. **S. sybillina** *Oberth.* (41 b). Recalling the occidental *circe*, but much smaller, and the white band quite narrow and on the forewing separated into spots. On the underside the band is twice as wide as above and contrasts strongly with the somewhat marmorated black ground. In West China, in June and *bianor*, July, locally abundant. — **bianor** *Gr.-Grsh.* (41 a), from Amdo, differs above but very slightly in the band being somewhat broader; the underside, however, especially on the hindwing, is conspicuously dusted with white and irrorated with pale scaling, so that the white band is not so prominent as in the first described form.

brahminus. **S. brahminus** *Blanch. p. p.* (41 c). Very similar to the preceding species, but the white band of the hindwing does not reach the hindmargin as in *sybillina*, and moreover is not so evenly curved, being somewhat elbowed obtusely below the apex of the cell. In nymotypical *brahminus* the underside of the hindwing is dusted with white and bears distally of the band a row of 3—5 irregular white spots. In *werang* southern Kashmir, in June and July. — **werang** *Lony* (= *veranga aut.*) (41 c) has an almost identical upperside, the band being hardly narrower; but the underside, especially on the hindwing, is dusted and variegated with brown, so that true *werang* looks quite different from *brahminus*; however, all intergradations are known. — **brahminoides** *Moore* has the ground-colour deeper black and more glossy and occurs in *brah-minoides*, Tibet, being however more abundant in those parts of the Himalayas which belong to the Indo-Australian Region, to which another form, *scylla Bthr.*, is entirely restricted.

swaha. **S. swaha** *Koll.* (= *brahminus Blanch. p. p.*) (41 d). Very similar to the preceding, but at once recognizable by the pale rosy red or reddish yellow tint of the band on the forewing. The underside moreover is washed with bronze-brown. — Larva smooth, brownish, on grass. YOUNG, who describes it as being "thickly clothed with yellow hairs, on Iris", has decidedly made a mistake, as already remarked by BINGHAM. In Kashmir and Tibet, from June till October, local, but very abundant in its flight-places.

padma. **S. padma** *Koll.* (= *avatara Moore*) (41 f). Above strongly recalling *circe*, being also of the same size; but the white band of the hindwing is proximally, in the ♂ also distally, quite straight. Beneath the ground-colour is darker and much less marmorated, the underside as a whole therefore resembling the upper much more than in *circe*, especially in the ♂, which formerly was considered a distinct species (*avatara Moore*). In the Himalayas, from Kashmir to Sikkim and West China, locally very plentiful, in *loha*, June. — **loha** *Doh.* (41 f) has the band on the hindwing slightly curved and not straight, the band on the *chumbica*, underside of this wing being yellowish and not narrowed behind, while **chumbica** *Moore* is considerably smaller than all the other forms of *padma* and has a narrow band, from southern Tibet. — The *padma* are powerful fliers, except the smaller ♂♂ (*avatara*) of true *padma*, which are said to fly but short distances and to often settle. Of the other forms YOUNG and LEECH agree in stating that the flight is fast and continuous; their favorite localities are grassy places with single tall trees, on whose stems they alight, not being easy to catch however.

saraswati. **S. saraswati** *Koll.* (41 d). Smaller than the preceding forms, the ground-colour less deep black, the white band very broad, broadest of all white-banded *Satyrus*. The band of the forewing is especially very broad beneath, the ground-colour beneath being light grey with fine black pencilling. — In Kashmir, from 4000 feet upwards, locally common, from July till October. Flies on grassy places with few trees and settles on thistles, on which the insect can be caught in numbers.

merlina. **S. merlina** *Oberth.* (41 e). In size, facies and colour similar to *circe*, but on the forewing the portion of the white band which lies below the apical ocellus is divided by the interposition of black spots, and the cell of the forewing beneath bears a white longitudinal stripe. — In western China, widely distributed, and not rare, from June till August.

magica. **S. magica** *Oberth.* (41 c). Similar to the preceding, but there is a white longitudinal stripe in the cell of both wings on the underside. In the nymotypical form only the cell-stripe of the hindwing appears

also above, while ab. **lativitta** *Leech* (41c) has a white cell-stripe also on the upperside of the forewing, *lativitta*. the upperside of the hindwing being quite white, except the broad black distal margin. — In western China (at Wa-shan and Ta-tsien-lu) and in Tibet, rare, in June and July.

S. circe *F.* (= *proserpina* *W. V.*) (41e). Above deep black, with distinct apical ocellus, the spots *circe*. forming the band ovate and contiguous. Underside marmorated with grey, often variegated with yellowish or brownish. The whole of South Europe, northward to Central Germany (Kassel), and from Portugal eastwards to the Libanon and Mesopotamia. — As **asiatica** *form. nov.* (41e) we designate the form of the *asiatica*. higher parts of the Taurus, in which the connection between the spots of the forewing is very narrow and the rather narrow band of the hindwing is externally saw-like, bearing pointed teeth. — Also a melanotic form with the band obsolescent is known: ab. **silenus** *Stgr.* — Larva yellowish brown, with a light-bordered *silenus*. dark dorsal line, the dirty yellow head being variegated with dark; on the paler sides there are alternately lighter, darker and reddish longitudinal lines; it lives till June on grasses (*Lolium*, *Anthoxanthum odoratum*, etc.) and turns into a chrysalis which lies free on the ground and is thick in the centre and narrowed to a point at both ends, being of a purple brown colour and showing on the wing-cases a chain of yellowish windows about in the place of the white band of the forewing. The butterflies are on the wing from July till September, flying with preference on grassy inclines where single oak-trees grow, and settle on bare places on the ground, mole-hills and on tree-trunks, always with the head upwards and the wings tightly closed and placed one over the other, the underside being adapted to the bark of trees. They rarely visit flowers, and then usually thistles, but one more often finds them on damp places on the roads. The flight of the ♂♂ is slow, searching, but tumbling and rather fast when disturbed. In South Europe the species appears to occur everywhere very commonly, and it is still very abundant also in southern Germany (Darmstadt), being but rare in the north, extending to Waldeck and the Harz Mts.; more abundant and stronger in the west, near Toulouse for instance in giant specimens. At the south coast of Europe the species occurs in countless numbers: I counted once near Genoa more than 30 specimens on one tree.

S. hermione *L.* (= *fagi* *Scop.*) (41f). The ground-colour washed with glossy brown, as is also the *hermione*. light band, especially in the apical area of the forewing and in the ♂♂. Hindwing beneath marmorated, bark-like in markings, variegated with yellowish brown. Distinguished from *alcyone* especially on the underside by the band of the hindwing being more strongly shaded and being covered with striae and speckles, the dark basal area penetrating into the band in a roundish, often double arc. South and Central Europe, from France to the Balcan peninsula, northward to Central Germany. — In Anterior Asia (Syria, Mesopotamia) there occurs the form **syriaca** *Stgr.* (42a), in which the band of the forewing is narrower, being *syriaca*. entirely obsolete in the anal area of the hindwing. — In the still darker **cypriaca** *Stgr.*, from Cyprus, the *cypriaca*. band is almost obsolete. — Transitional forms to these are described by FRUHSTORFER as **tetrica** from *tetrica*. Saratow, the very dull band of the upperside being shaded with slaty-grey scaling, the upperside therefore being still darker than in *cypriaca*, while the underside is somewhat lighter. — The same author gives the name **attikana** to Greek specimens, which are in the degree of darkening of the upperside intermediate *attikana*. between nymotypical *hermione* and *cypriaca*. — Larva brown-grey, with dirty yellow head marked with black, an anteriorly indistinct black dorsal line and dark smears on the sides; till June on grasses. Pupa dark brown, the wing-cases lighter. The butterflies are on the wing in July and August, occurring especially at the edge of woods and in clearings, where they love to settle on the trunks of the forest-giants; they are locally abundant (especially in South Germany and in South Europe), and fly often in the same places as *circe*.

S. alcyone *W. V.* (= *hermione* minor *Esp.*, *jurtina* *Hufn.*) (42a). Similar to the preceding, but mostly *alcyone*. smaller; on the underside the deep dark basal area of both wings contrasts much more sharply with the light band, and the latter, which is almost pure white on the hindwing, contrasts again conspicuously with the broad dark distal margin. The conspicuousness of the pattern on the underside of the hindwing is especially noticeable in the ♂, but even in the duller coloured ♀ the band on the hindwing beneath is still quite distinct, although sparsely irrorated with black. South and Central Europe, occurring much further north than the preceding, extending to Hamburg and Pommerania, also in Asia Minor. — In South Spain the species is represented by **vandalusica** *Oberth.* (42a), which has a narrower, but sharply marked band. — *vandalusica*. In the somewhat smaller **pyrenaea** *Oberth.* the band of the forewing above, though somewhat shaded, is *pyrenaea*. rather broad, being rather narrow on the hindwing; from the French Pyrenees, at higher altitudes. — As ab. **vernetensis** *OBERTHÜR* figures an aberration from the Pyrenees in which the brown basal area extends *vernetensis*. far into the proximally widened white band of the hindwing on account of the cell being entirely brown, with which pattern corresponds a peculiar black design on the underside. — The largest form is the Algerian **ellena** *Oberth.* (42a), which occurs at the coast near Bona and Philippeville and in the Kabylie, but is not *ellena*. very abundant. The band of this race is light, but instead of being straight proximally has an irregular and undulate proximal edge. — Larva ivory-yellow, with a dark dorsal stripe and light side-stripes, the head being dirty yellow marked with black, on the sides dark smear-like stripes; till the end of May on *Brachypodium pinnatum*. The butterfly occurs from June till September in sandy localities, with preference

at the edge of pine-woods and on clearings, and loves to settle on tree-trunks. It is local, but usually abundant where it occurs, not being easy to catch, however, on account of its fast flight.

- briseis*. **S. briseis** L. (= *janthe* Pull., *daedale* Bgstr.) (42 b). Very variable in size and markings; recognizable by the flat triangular club of the antenna and the pale costal margin of the forewing. The dark wings are traversed by a band which is usually composed of narrow transverse spots, bearing a distinct apical ocellus and a second similar spot before and somewhat below the middle of the distal margin. Band of the hindwing sometimes shaded. On the underside the ♂ has large dark angular spots at the base of both wings, the ♀ having the hindwing beneath generally uniformly brownish or grey; North France, Germany, *meridionalis*. Austria, Hungary, and the adjacent districts of Russia. — **meridionalis** Stgr. (42 b) is the South-European form, which is especially common on the Mediterranean coasts of Europe. The white spots composing the *magna*. band of the forewing are broader than in specimens from Central Europe. — **magna** Stgr. is the form from East Europe, which flies also in some districts of Asia Minor; in size like *meridionalis*, but the band somewhat *pirata*. broader and purer white, especially on the hindwing. — ab. **pirata** Esp. (42 f) has the size of the previous, but the band is ochreous; occurs among white-banded specimens in South and East Europe, and Anterior *major*. Asia, being especially large in the last country. — **major** Oberth. (42 c) is still considerably larger than *meridionalis*, the band of the forewing being much narrower, and differs at a glance from all the other forms of *briseis* in the hindwing beneath, on which in the ♂ the dark triangular spot at the middle of the hindmargin is wanting and the dark longitudinal spot above the middle of the cell is quite light green-grey and not sharply *hyrcana*. defined. This large form is locally not rare in North Africa, in the Aurès Mts. and the Kabylie. — **hyrcana** Stgr. (42 b) is similar to *magna*, the white band on the upperside being very narrow and the underside very conspicuously variegated; in Persia and various places of Anterior Asia, especially in the Achal-Tekke country. — *fergana*. **fergana** Stgr. (42 c) is the largest form, which has a rather large white band and in the ♀ a reddish grey *turanica*. underside; from Asia Minor and the Pamir. — **turanica** Stgr. is nearly as large, the band not being very *maracandica*. broad and on the hindwing of the ♂ distinctly tinged with red-brown. — **maracandica** Stgr. (42 b), from Samarkand, is a medium-sized form which has very much white, the median band of both wings being very broad and in addition the distal margin of the hindwing being broadly white. — Larva yellowish grey, with a dark dorsal stripe and dark subdorsal lines; two light lateral lines above the spiracles, the stigmata themselves being black; venter light grey; till June on grasses. Pupa brownish yellow, with a darker dorsal stripe. The butterflies from July till September: they prefer chalky soil and love to settle on bare places of the ground and on boulders. The flight is low and hopping in the small northern form, stately, floating and rather fast in the large forms from Africa and Asia Minor. The butterfly now and again visits scabious, thistles or other composites, keeping the wings tightly closed when resting.
- bischoffii*. **S. bischoffii** H.-Schäff. (42 c, d). Forewing almost exactly as in the forms of *briseis*, but from the white patch enclosing the apical ocellus a white band-like spot projects obliquely upwards to the costa. The latter is dark in the nymotypical *bischoffii*, almost like the ground-colour, the upperside of the hindwing, which is intensely orange-yellow in the ♂ and somewhat duller in the ♀, forming a very remarkable contrast to the forewing. The hindwing beneath is uniformly sand-colour, with a darker submarginal shadow. Armenia and the eastern *nigro-* shores of the Black Sea. — ab. **nigrolimbatus** Stgr., from the neighbourhood of Malatia, has a more or *limbatus*. less dark distal margin to the hindwing. — In ab. **eginus** Stgr. the hindwing is much variegated, being *eginus*. dark brown at the base and distal margin, while the central area is proximally white and distally reddish *kaufmanni*. yellow; from Asia Minor. — **kaufmanni** Ersch. (42 d) has the entire upperside of the hindwing black-brown, *sartha*. even the adjacent portion of the band of the forewing being obsolete; from Turkestan. — **sartha** Stgr. (= *gultschensis* Gr.-Grsh.) has the white band developed on both wing, being on the hindwing sharply separated from the dark brown basal area and distally shaded with reddish yellow; Ferghana. — In *sieversii*. **sieversii** (Christ. (43 a) the white of the upperside is strongly reduced, so that this form is a transition towards *kaufmanni*, the darkest specimens having been distinguished by STAUDINGER as ab. **obscurior**; Turkestan. — In *tadjika*. contrast to these exceptionally dark form there occur also some light-banded ones; for instance **tadjika** Gr.-Grsh. (= *sartha* Gr.-Grsh.), in which the forewing is similar to that of *briseis*, while the hindwing recalls more *circe*, bearing a median band which is of even width and evenly curved. This median band is pure white in the specimens from Bochara, being broader in the examples from Sarafshan and distally reddish yellow. This latter tint occurs only in the ♂♂; the ♀♀ which belong to them have the hindwing above *staudingeri*. entirely white with a dark base and a row of dark submarginal spots; this is **staudingeri** Bang-II. (43 a). —

All these forms are so connected by intergradations that it is difficult to place certain specimens. The underside of all is almost the same: light sand-colour, with a dark submarginal shadow and on the hindwing often a thin indistinct median line parallel to the margin. Nothing is known of the life-history. The butterflies occur from June until August on bare chalk- and sand-hills, and settle always with closed wings on bare places on the ground, resembling small loose stones.

- heydenreichi*. **S. heydenreichi** Led. (42 e). Forewing similar to that of *briseis*, but the cell of both wings above filled up with a large ovate white spot. The nymotypical form is found in the larger mountain ranges

Central Asia, the Altai, the Tarbagatai, Ala-Tau and has rather diffuse margins to the white markings of the hindwing. In the ab. *caliginosa* *Schultz* the band on the forewing and the white centre of the hindwing are obscured. — The form *shandura* *Marsh.* (= *nana* *Rühl*) (42 d), however, has sharply defined white markings on the hindwing: from the Shandur-Pass in the Himalaya and also in the Tian-Shan and on the Pamirs. — The underside of *heydenreichi* is also not unlike that of *briseis*. In the ♂ especially the angulated spots in the basal portion of the wings are clearly defined.

S. priouri *Pier.* (42 d, e). This butterfly resembles the preceding species above, but the transverse patch of white streaks which extends across the forewing above the apical ocellus does not reach the costa; the oval blotch in the cell of the forewing is so strongly shaded with brown that it contrasts but slightly with the ground-colour, and the white discal band is somewhat more distinct than in *heydenreichi*, though it has no smear-like projection towards the base. The underside of the hindwing, particularly in the ♀, is more extensively, though less distinctly, spotted with greyish brown, so that it approaches to a certain extent that of *semele*, the angulated spots not appearing so conspicuous as in *briseis* and *heydenreichi*. Variations in the ocelli have been found in this species also (e. g. *punctata* *Aign.*). In Spain and the opposite portion of North Africa. — The ♀-f. *uhagonis* *Oberth.* (42 e) has ochre-yellow bands, and thus corresponds to the form *picata* of *briseis*; Spain.

S. anthe *O.* (= *persephone* *Hbn.*) (42 e).*) In this species the pale spot in the cell of the forewing above is absent, so that the whole costal half of both wings, with the exception of the ivory yellow costal margin of the forewing, appears to be dark brown. The round black spot in front of the centre of the outer margin is so surrounded with white that it resembles the pupil of a large ocellus. Below the cell of the forewing is conspicuously pencilled transversely, and the underside of the hindwing is marbled, and transversely by pale veins. On the shores of the Black Sea, in South Russia, Armenia and Asia Minor, also in Persia and Afghanistan. — In the ab. *hanifa* *Nordm.* (42 e) the pale bands are bright ochre-yellow. Such specimens with entirely ochre-brown bands are common among the nymotypical form, especially in the ♀; among the ♂♂ mostly transitional specimens are found in which only the centre of the band of the forewing is strongly shaded with brown, the band remaining still rather white costally and posteriorly. — The form *enervata* *Stgr.*, from Central Asia, the Altai, the Tian-Shan, and Turkestan, is above similar to *anthe*, but the underside of the hindwing is not traversed by white veins. — The ab. *analoga* *Alph.* (= *ochracea* *Rühl* [*Stgr. i. l.*]) (42 e) has the bands ochre-yellow, the underside of the hindwing being without white veining; occurs among *enervata*. — *anthe* is a widely spread species in Western Asia, and is very abundant, both there and in South Russia in June and July. It settles principally on the trunks of trees; the ♀ however also often on walls and on the ground.

S. semele *L.* (42 f). The ♀ above similar to the preceding, but the bands above ivory-yellow, often obscured, especially on the hindwing. The ♂ above almost entirely dark, the band being only perceptible on the hindwing in the form of a row of obsolete ochre-yellow spots. Both sexes show, on a pale ochre-ground, before the anal angle a dark ocellus which occasionally is pupilled with white. The underside of the hindwing is marbled with dark, a pale powdering in the form of a band terminating the basal portion distally, this band protruding in a strong tooth below the cell towards the margin. From Madeira, the west coast of Europe and Great Britain to Turkestan and Mesopotamia. — In *maderensis* *Baker*, from Madeira, the upperside in both sexes is strongly obscured and in the ♂ almost without any markings. — The contrary is found in the form *algorica* *Oberth.* (42 f), where the transverse bands are distinct in both sexes, though but slightly tinged with red. — *aristaeus* *Bon.* (42 f), from Sardinia and Corsica, has a heavy red-brown tint in the pale bands, which colour in the ♀ extends far into the disc of the forewing. — In *mersina* *Stgr.* (43 a) the underside of the hindwing is more evenly coloured with grey, and the basal area less sharply separated from the marginal area. In fact the marbling is less variegated. On Cyprus and in Asia Minor, according to *Rühl* also in the South of France, according to *Röber* very constant and sharply differentiated from *semele*. — In addition to the above, forms with an increased or diminished number of eye-spots have been obtained; these are respectively ab. *triocellata* *Rugosa* and ab. *anopenoptera* *Lambrichs.* — *diffusa* *Butl.*, a form which is quite dark both above and below, occurs as far as the North-Western Himalayas, where it touches the Indian Region. — Larva greyish brown, with grey head, dark dorsal line, pale longitudinal stripes, and a reddish lateral line bordered with black below, the stigmata being black. On many grasses, among others on *Aria cespitosa*, a. o.: full fed in May, hiding under stones during the day. Pupa grayish brown, strongly tapering posteriorly. The imago flies from July onwards, already in June at the shores of the Mediterranean. They are everywhere abundant and settle with preference on tree-trunks, on walls, or on the ground. Their underside already so well adapted to tree-bark makes them still less perceptible, because by the folding back of the forewings into the hindwings while at rest the apical ocellus is hidden and the insect further seeks to adapt itself to its surroundings by adopting a peculiar slanting attitude. If disturbed it usually flies but a short distance, often only to the next tree-trunk; but in the mornings of very hot days

*) I retain here, as the most usual, the name "*anthe*" as opposed to the older Hübnerian *persephone*, which was changed as being preoccupied. As we no longer have another *Satyrus persephone* the older name might be restored. But since we are not writing a critical monograph, we retain the name in current use.

the insects come down the hills in numbers with a tearing flight in order to drink at the edge of springs. They are fond of visiting flowers, especially those of Thyme and Betony.

autonoë. **S. autonoë** *Esp.* (43b). Above dark smoky brown. In the ♂ the band contrasts very feebly with the ground-colour, there being however a small paler spot below the apical ocellus. The latter as well as a second ocellus situated proximally to and a little below the centre of the distal margin have a thin white pupil. The hindwing has only a thin semicircular pale arc which touches the apex of the cell, there being beneath three dark, usually pale-edged, dentate stripes and pale veins. In the ♀ the dull yellow band of the forewing is more distinct and more sharply defined, but reaches neither the costal nor the posterior margin. On the hindwing the band is distinctly defined only proximally, disappearing in the ground-colour distally. In the Steppe-district of South-Russia, and in Anterior Asia as far as the Altai and Dauria. — In the form *sibirica*. **S. sibirica** *Stgr.*, which occurs farther east, in Amurland, the bands are somewhat more whitish above, while the underside is not different. — *extrema*. **S. extrema** *Alph.* is larger and has the bands quite white, the ocelli being very large; North-West China and Tibet. — *celaeno*. **S. celaeno** *Leech* (43a) on the contrary has the wings strongly darkened; on the underside the yellow band of the forewing is very prominent and the sole distinct (middle) dentate band of the hindwing is bordered with pure white; Howkow, Tibet, at an elevation of 2–3000 m. — The forms of *autonoë* fly in sterile localities from June till August, being plentiful at their flight-places. The form *celaeno*, described from a single ♂, may be either a mountain-form or an individual aberration.

hippolyte. **S. hippolyte** *Esp.* (= *alcyone* *F.*, *agave* *Esp.*) (43b). Similar to the preceding in size and shape, but the distal band is on both wings broad, sharply defined and yellowish, being distally tinged with yellowish red. In the nymotypical form the hindwing beneath bears 3 distinct dentate lines, the ground-colour being often so darkened between the first two that there appears a dark median band. In Spain and South Russia as well as in Anterior Asia. — The form *mercurius* *Stgr.*, from the Tian-shan district, has the bands brighter yellow, and in *rhena* *H.-Schäff.**), from Tokat, they have a strong orange tint. — On the other hand, Elwes found in the higher Altai a smaller form in which the bands are pure pale yellow, not being tinged with orange, but being traversed by the heavy dark veins; this is *pallida* *Stgr.* (43b), which is distinguished, moreover, by the underside of the hindwing being minutely but evenly irrorated with dust-grey. — *hippolyte* is common in June and July at its flight-places, steppes and sterile meadow: it settles on naked places on the ground and flies only a short distance when disturbed, therefore being easy to catch (ELWES).

arethusa. **S. arethusa** *Esp.* (43b. c). Above dark brown, with a yellow distal band, which is usually separated into spots in the ♂, and paler and broader in the ♀, the apical ocellus being without pupil and the fringes chequered grey and brown. The forewing is yellow beneath, the margin being marmorated with grey like the hindwing, which latter has a dark, in the ♂ sinuous, median line, on the outside of which there is a pale band irrorated with white-grey. The distal band of the upperside varies enormously: it may be broad and continuous, or completely absent from the hindwing and vestigial on the forewing. — In ab. *erythia* *Hbn.*, from South France and the East, the distal band is slightly dentate, the spots being acuminate: — in ab. *dentata*. **S. dentata** *Stgr.*, which is the usual form at the Riviera, the spots are evenly and more strongly acuminate, the band therefore resembling a saw. — In *boabdil* *Rbr.* (43c) the band, above, is so shaded with smoke-colour as to resemble the ground and almost to disappear in the same, only the apical ocellus with very feeble vestiges of the band being more distinct: Spain. — As *obscura* (43c) Ribbe sent me specimens from Andalusia which are quite black above and very vividly marmorated beneath. — Larva bone-colour, with a red-yellow dorsal-stripe in which there is a thin dark line, a yellow side-stripe and feeble, hardly visible, longitudinal lines: till June on Festuca. The butterflies from July till September, the various forms in some places flying together, being separated in other districts, common on lime-stone mountains, in the whole of South Europe, from Portugal to Turkey and South Russia, everywhere at the Black Sea, eastwards to Saisan in the Altai (RUECKBEIL). In Europe the species extends northwards as far as Alsatia, Baden, Hungary (ab. *peszerensis*) and Galizia. The flight-places are often very distant from one another, being sterile hills and fallow-fields, especially on lime-stone.

neomiris. **S. neomiris** *God.* (= *marmorae* *Hbn.*, *jolaus* *Bon.*) (43c). Similar to *alcyone* and doubtless closely related to it. The distal band light orange, being bright above, very broad on the hindwing, proximally sharply defined and distally tinged with reddish yellow. On the underside the orange band of the forewing contrasts sharply with the black-brown basal area. The hindwing beneath with a broad white median band which is bordered with black proximally. The apical ocellus of the forewing centred with white on both sides. On Sardinia and Corsica, also on Elba. Egg almost globular, ivory-white, minutely ribbed, the larva appearing in 14 days. The larva is ivory-yellow, with a thin, black, dorsal double line: above the spirales a black side-line, which is interrupted on each segment. Head pale brown, with black mandibles: on grass (KOLLMORGEN). — The butterflies occur in mountainous districts, from 700 m upwards, from June till August, locally plentiful, settling particularly often on the trunks of Conifers.

azorinus. **S. azorinus** *Streck.* This insect, which is unknown to me in nature, is said to be from the Azores. Dark brown; forewing with paler, yellowish, disc and a small apical ocellus: hindwing with an ill-defined yellow

) *rhena* of HERRICH-SCHÄFFER is composed of orange ♀♀ of the present species and dark ♂♂ of *beroi*.

middle band which is strongly incurved above the anal angle and beneath the apex. Fringes chequered. Underside of hindwing with a pure white, sharply defined median band, at the basal side of which there are two white spots, one irregular near the base, the second quadrangular below the cell. Described form a ♂. This form, with *STRECKER* placed near *neomiris*, appears to be allied to *aleyone*.

S. geyeri *H.-Schöff.* (43c). Recalling *autonoë*, but the upperside is not so dark; the ground-colour is *geyeri*. yellowish grey, the markings of the underside distinctly shining through and the dark veins being quite plain. Underside of forewing light, feebly shaded with yellowish; the hindwing beneath coarsely marmorated and white-veined, bearing beyond the middle a light band which is interrupted above and below the apex of the cell. — On the east coast of the Black Sea, in Asia Minor, Armenia and Kurdistan, in July and August, very abundant.

S. regeli *Alph.* (43d). Much smaller than the preceding forms, the distal band white, dimmed with *regeli*. fuscous, the forewing with two ocelli pupilled on both surfaces, one being situated at the apex, the other larger and placed above the hind angle. Underside of hindwing marmorated and traversed by white veins, there being beyond the middle a narrow white band the costal portion of which is proximally sharply dentate like a saw. Outside this band a row of uniform spots traversed by the white veins. Kuldja. — A broad-banded ♂ from the Sarydshass River, with a yellow tint on both surfaces is named by GRUM-GRSHIMAILO ab. *latefasciata*; *latefasciata*. it is apparently a transition towards the following (*huebneri*-) group. — In the smaller **tancrei** *Gr.-Grsh.* (= *con-* *tancrei*. *radii Alph.*) (43d), from Kashgar, the band is broader and purer white, the cell of the forewing bearing a white longitudinal streak, the base being of a pale colour below the cell. — **abramovi** *Ersch.* (= *regulus Stgr.*) *abramovi*. (43d) is larger, the band is glaring white, but there is always a narrow, black, irregular band between the same and the likewise white base of the wing; from the Pamir and Issyk-kul. — **korlana** *Stgr.*, from the *korlana*. Tian-shan, is similar, but the distal band is shaded with yellowish and distally somewhat brownish. — **boloboricus** *Gr.-Grsh.*, from the south-eastern Pamir, is a small form with the basal area of both wings entirely black-grey, being nowhere lighter, and with the distal band broad and pale yellow. This band bears only the apical ocellus, there being never a second large ocellus above the hind angle, but only now and again a minute dot. — In **hoffmanni** *Christ.*, from Turkestan, the distal band of the upperside is so much darkened *hoffmanni*. that it has only the appearance of shining through from the under surface.

Nothing is known of the early stages of the butterflies of this group. If all belong to one species, as opined by RÜHL, or if all of them are but forms of the next group, or if it is more correct to treat them as representing several different species, as is the opinion of GRUM-GRSHIMAILO, may here be left undecided. So much is certain that we have to do with mountain insects which, as far as we know, are geographically separate, but agree closely in habits. They fly from the end of June till August in rocky localities and occur in the mountains as high up as 10000 feet, not being rare and settling on rocks and among boulders.

S. huebneri. Now follow a whole series of forms of which some intergrade completely. In **calesia** *calesia*. MOORE (= *wilkinsi Ersch.*, *josephi Stgr.*) (43d) the wings are dark brown, the forewing being golden yellow in and below the cell; the reddish yellow distal band is rather narrow, bearing 2 large pupilled ocelli on the forewing, the apical portion being pale yellow: Pamir, Kashgar, and Kashmir. — The form **leechi** MOORE *leechi*. (= *huebneri Gr.-Grsh.*) is similar, but the distal band is pale yellow instead of reddish yellow; from the Pamir. — In ab. **decolorata** *Stgr.* the pale yellow band is sometimes variegated with white and the basal area of the *decolorata*. forewing is not light; Tianshan, Bokhara. — The first described form, **huebneri** *Fldr.*, from Kashmir, has *huebneri*. the distal band dark yellow, the band being intermediate in colour between the bands of the two preceding forms, but is considerably narrower. — In **modesta** MOORE the basal and outermarginal areas are very dark, *modesta*. the bright orange distal band contrasting strongly with this ground-colour; Kashmir. — In **dissoluta** *Stgr.* *dissoluta*. (= *wilkinsi Gr.-Grsh.*) (43d) the forewing is entirely reddish yellow, except a dark costal smear at the edge of the cell, the basal area of the hindwing, however, being still darker. — **intermedia** *Gr.-Grsh.* (43d, e) is *intermedia*. one of the smallest forms, being the most intensely reddish one; from the Altai; the basal area of both wings but very feebly shaded with dark and the forewing is pale at the costal margin. — **pamira** *Stgr.* has the *pamira*. appearance of being a large form of the preceding with an especially large apical ocellus on the forewing; the costal area of the hindwing is black above the cell, which colour contracts strongly with the pale, almost white, patch situated before the apex; Ferghana. — All these forms often completely intergrade. They vary, moreover, in the number and size of the black eye-dots, like all *Satyrus*, and differ probably also according to the altitude at which they have been obtained. They occur still at a very considerable height, up to 13000 feet, being there on the wing not before the end of July and August, and do not appear to occur anywhere in abundance.

S. telephassa *Hbn.* (43e). Dark brown-grey, with a reddish yellow distal band, the band bearing *telephassa*. on the forewing two ocelli, which have an extremely minute or no pupil. The forewing beneath is yellowish brown with a pale band, the hindwing being marmorated, earth-grey. The species resembles several other *Satyrus* from the same country, but is easily recognized by the ♂ having a smear-like black velvety spot in the cell of the forewing. In the ♀ the band of the forewing is very distinct and evenly limited on its proximal side, the ground-colour penetrating as a long straight projection into the band below the apex of the cell; moreover, the yellow band of the upperside of the hindwing has only one minute white-centred eye-spot in the anal area, while other forms have 2 blue-white small spots, which are usually distinct and

are placed one behind the other. — In Anterior Asia, especially Syria, Asia Minor and Armenia, in Persia, Afghanistan, and Beluchistan; in May, locally very abundant.

mniszechii. **S. mniszechii** H.-Schäff. (43 e). Very similar to the preceding, especially in the ♀ sex, but the reddish yellow band of the forewing with the proximal edge less straight, neither being interrupted below the apical ocellus as in the *peloepa*-forms, nor strongly constricted as in *telephassa*. The band of the hindwing more even than in *telephassa*, almost reaching the costal edge. At the anal angle of the hindwing above there are always 2 distinct small white spots. Underside more uniformly sandy grey or sandy brown in both sexes. Size exactly as in *telephassa*. East-coast of the Black Sea, and Asia Minor. — In **herrichii** Stgr., from North Persia and Turkestan, the fringes are white, the bands of the upperside broader and brighter red-yellow; the hindwing beneath grey, the markings being more distinct in the ♂. — **baldiva** Moore closely resembles *telephassa* in the ♂, but is at once recognizable by the brand in the cell of the forewing not being black, but hardly different from the ground-colour and therefore inconspicuous. The ocellus before the outer margin is often wanting or very small; Tibet. — In **sagina** Rühl on the other hand the ocelli of the forewing are exceptionally large; the distal band, moreover, is darker and in the ♂ traversed by dark veins; Turkestan. — **lehana** Moore (43 f) has on the upperside very pure yellowish red bands, which are proximally paler in the ♀; beneath the fore- and hindwing have nearly the same sandy yellow ground-colour; the anal ocellus of the hindwing is completely absent from both sides in ♂ and ♀, or there is in its place only a single small dot; Kashmir, Ferghana. — **turkeстана** Gr.-Grsh. Forewing more obtuse, with the ocelli of the upperside blind, there being no white dots between them; hindwing darker, the markings of the underside being more washed out and less distinct; fringes yellowish brown; in Turkestan and the eastern Tianshan. — In **tarbagata** Stgr. (= *alpina* Stgr.), from the Tianshan, the bands are narrower and darker. — On the contrary **atlantis** Aust. (= *maroccana* Meade-Waldo) (43 f), from higher altitudes of the Moroccan Atlas, has very light and broad bands, the margin of the hindwing being very feebly scalloped. — A form which is very similar to the last, has an extremely broad band, very pale ground-colour and entirely white fringes, occurs in West China; as none of the diagnoses known to me exactly fit this insect, it may be named **clarissima** form. nov. (43 f, g).

All the forms of *mniszechii* occur commonly at their flight-places, many even in large numbers. The flight-time is June and July, in Kashmir again September. In the latter country this second generation has been observed of *lehana*; whether also the forms of Anterior Asia fly again late in the autumn, is not known to me. *atlantis* has been found in July, having most probably only one brood.

peloepa. **S. peloepa** Klug (43 f). Similar to the preceding as well as the *telephassa*-forms; but at once recognized by the reddish yellow distal band of the forewing being widely interrupted below the apical ocellus by the dark ground-colour. On the hindwing the band is duller brownish yellow. The ♂ has a small dark brand in the cell. The underside of the hindwing is dark earth-grey, being in the large Armenian form **caucasica** Led. (= *kirgisa* Gerh.) even entirely deep blackish grey. From the Lebanon. — In the **kurdistan** form **kurdistan** Stgr., from the Taurus, the distal band is so much shaded that it contrasts but slightly with the ground-colour, the band being on the contrary broad and very fiery yellowish red in **tekkensis** persica. Rühl-Heyne from Turkestan. — In **persica** Stgr. (43 f) the costal portion of the band on the forewing is almost obsolete, there remaining in the ♂ only a yellowish red cloud around the eye-dots, and the underside of the hindwing is ash-colour; from the Achal-Tekke district. — **scharuhdensis** Stgr., from Armenia and the highlands of Persia, also has the underside of the hindwing ashy grey, but intermixed with whitish, and has more distinct arcuate zigzag lines. On the upperside the distal band is not only not reduced as in *persica*, but extends in the ♀ far into the disc of the hindwing. — *peloepa* and its forms are on the wing in June and July, occurring on barren heights and rocky plateaus and settling on boulders or bare sandy places. They are not rare in their flight-places, their underside varying in colour according to the tint which the prevalent kind of rock lends to the soil.

alpina. **S. alpina** Stgr. (= *olga* Gerh.). Similar to the preceding species, especially *mniszechii*, of which it is perhaps only a variety. The yellowish red band rather broad, vivid, non-interrupted, proximally very evenly defined; the band is also distinct on the hindwing, not reaching the margins of the wing. On the underside the hindwing is very uniformly dark earth-brown, only the band of the upperside slightly shining through. As in most forms of the present group there are two small white spots between the dark eye-dots, being usually rather large and distinct; specimens in which these white spots are especially small have been named ab. *guriensis* by STAUDINGER. — The species appears to be distributed over the whole chain of the Caucasus, and occurs on stony slopes during the summer till the beginning of August (ROMANOFF).

anthelea. **S. anthelea** Hbn. (= *telephassa* Dup.) (43 g). ♂ with a white band which is only distally shaded with reddish yellow, and with a black smear-like brand in the cell; the hindwing beneath marmorated with grey, bearing on the disc an irregular, band-like, white spot. The ♀ has a bright ochre-yellow distal band, which extends on the forewing as a long and white smear over the disc into the brown-grey ground-colour to near the base. These forms are the commoner ones. There occur, however, also ♂♂ with the bands strongly washed with yellow; this is ab. **syriaca** Rühl; in Asia Minor, especially abundant in the Taurus,

above Adana; also in Lydia and Kurdistan. — The European form, *amalthæa* *Fr.* (43 g), has similar ♂♂ *amalthæa*. as the form from Asia Minor, but entirely different ♀♀; these are like the ♂♂, possessing on the forewing a white macular band, with very large ocelli, the hindwing usually bearing in the middle a white smear: south-eastern districts of the Balcan Peninsula. — The butterflies are extremely abundant in their flight-places, namely barren hills and sterile detritus, and fly in April and May, at higher altitudes not before the end of May.

S. beroë *Fr.* (43 g). Recalling *pelopea* in pattern, but the ground-colour much lighter, being glossy *beroë*. dust-grey, the distal band dull wax-yellow, with 2 rather large dark ocelli on the forewing. Costal margin and fringes of a whitish silky gloss. Hindwing beneath yellowish grey-brown, with a dirty white band beyond the middle. — In ab. *rhena* *H.-Schäff.**) the band is more or less tinged with reddish yellow *rhena*. distally, and in ab. *aurantiaca* *Stgr.* (43 g, 44 a) the bands are entirely orange-yellow. — In Asia Minor, *aurantiaca*. occurring more singly, from June till August.

S. mamurra *H.-Schäff.* (= *pelopea* *H.-Schäff.*) (44 a). The originally clay-coloured bands are in *mamurra*. the ♂ — especially on the forewing — so much shaded with smoky brown dusting that they are reduced to a dull yellowish cloud situated around the large ocelli of the distal band. In the ♀ the band of the hindwing is pale yellow at its proximal edge and reddish yellow distally, the proximal edge not being straight, but projecting in the form of small angles or teeth into the dark basal area. Although ♂♂ even from the same place and date vary rather considerably in the dark dusting of the bands, one has nevertheless based various forms specially on differences in this dark shading. The nymotypical *mamurra* occurs mainly in Asia Minor, where it is very plentiful, especially in the southern districts. — The ♂ of *schakuhensis* *Stgr.* (44 a) is darker above, being on the contrary paler beneath, adapted to yellowish white sand; from *schakuhensis*. Persia. — *graeca* *Stgr.* (44 a), from Greece, is still darker and moreover rather considerably smaller than *graeca*. the previous forms. — ab. *obscura* *Stgr.*, from the Taurus, has in the ♂ the upperside so much darkened *obscura*. that there are only very feeble vestiges of the bands visible: the underside is pale white-grey. — *lydia* *Stgr.* is above much less darkened than the two preceding forms; the band of the hindwing, however, is *lydia*. uniformly ochre-yellow, its proximal edge not being paler than the distal portion of the band; the fringes moreover are dark grey. The white dots are absent from the band, on the fore- as well as the hindwing: on bare heights of the Bosz-Dagh in Asia Minor. — *sintenisi* *Stgr.* (44 a) is doubtless also but a strongly *sintenisi*. darkened form of *mamurra*; from the Hinterland of Trapezunt. — Like most *Satyrus* of this group the butterflies occur in July and August in stony places, settling on the bare ground or on scattered stones, flying but a short distance when disturbed.

S. statilinus *Hufn.* (= fauna *Sulz.*, arachne *Esp.*) (44 b). Above blackish, with silky gloss, the distal *statilinus*. margin darker, the fringes being chequered, the disc with brown sheen and scarcely paler than the margin. ♂ above almost without markings, sometimes with 2 white dots between the hardly visible ocelli; above the anal angle of the hindwing a dark dot. ♀ with silvery grey costal margin and long pale ash-grey fringes; the wings somewhat paler, more brownish black, the band still distinctly visible, around the ocelli pale patches. Underside ashy grey, the disc of the forewing with a brown sheen, the apical ocellus edged with yellow, as is in the ♀ also the second ocellus of the forewing. The whole of Europe with the exception of the North and England, as far as the North and Baltic Seas, but sporadic and only locally common. — *apennina* *Z.* has very dark wings, which, in the live ♂, possess a vivid gloss, the fringes being white. *apennina*. Hindwing strongly scalloped, its underside being brown with 2 more distinct dentate lines; from the Apennines. — *allionia* *F.* (= fauna *Hbn.*) (44 b) is larger and deeper black-brown; beneath more variegated, *allionia*. the exterior dentate line distally accompanied by a white band; at the Riviera, in Andalusia and on the shores of the Black Sea. — The Sicilian form, ab. *martiani* *H.-Schäff.*, has very large ocelli, which are *martiani*. sometimes double; similar characteristics are also met with in specimens from the Black Sea. — A very remarkable form (perhaps more correctly species) is *hansii* *Aust.* (44 b), of which we figure the types, which *hansii*. were very kindly lent us. The ocelli of the forewing are in the ♂ of this insect more narrowly, in the ♀ more broadly bordered with yellow, in the ♂ also the anal ocellus of the hindwing having a bright yellow border. The underside is very prominently variegated, the hindwing bearing a dark middle band which is distally broadly white. In the Atlas, in western Algeria and Morocco. — Larva velvety, being short-haired, clay-colour, with 5 brown longitudinal stripes; head brownish; spiracles red (BRANTS). Adult in June on *Poa annua*, *Festuca* and other grasses. Pupa brownish, with long wing-cases. — The butterflies occur from July onwards at the edge of pine-woods and on open places in the same, settling with preference in the middle of the roads. In the small pine-woods which crown the sunny hills of the Riviera, one meets in August sometimes with astonishing numbers of this butterfly.

S. fatua *Fr.* (= *allionii* *Hbn.*). Very similar to the preceding, mostly larger; differs on the upper- *fatua*. side in having a dark submarginal line, and on the underside in the hindwing being more unicolorous and bearing mostly 2 deeply dentate black curved lines across the central area. Hindwing above often very

*) See foot-note p. 126.

- sidhaea*. pale in the distal area. Greece: Asia Minor. — **sichaea** *Led.* (44c) is a very large form from Syria, with *wyssi*. the underside of the hindwing prominently marmorated. — **wyssi** *Christ.* (44c), from the Canaries, is midway between the last two forms, some specimens approaching nymotypical *fatua*, others being nearer to *sylicola*. *sichaea*. — **sylicola** *Aust.* (44c) resembles above the nymotypical form, the underside of the hindwing, however, being entirely uniformly brown-grey and completely without markings. It occurs in West Algeria and was obtained at the same place as *hansii*, but flies in September, while *hansii* was caught in July. The status of these North African forms has not yet completely been cleared up. — The species, like the *statilinus*-forms, prefer sandy soil and pine forests. On the Canary Islands the butterflies have been observed flying about the rocks on the coast and settling with preference on that side of the trunks of *Pinus canariensis* which faces the sun. According to STAUDINGER specimens of *fatua* are sometimes on the wing at night, entering the lit up windows and coming to the lantern.
- fidia*. **S. fidia** *L.* (44d). Above similar to the preceding, but the underside much more variegated and brighter: the ocelli of the forewing large, broadly bordered with yellow, there being before them white smears which are proximally bordered by a black line. On the underside of the hindwing the exterior black discal line projects behind the apex of the cell as a broad tooth: it is externally broadly white and beyond it there are moreover strong white smears extending towards the distal margin. In Southern France and on the Iberian Peninsula. — In North Africa, from Morocco to Tunis, there occurs the form **albovenosa** *Aust.* (44d), whose underside of the hindwing is still more prominently marked with white, the tooth of the median line *albovenosa*. moreover being longer and more pointed. — **monticola** *Mieg.* a mountain form from the Eastern Pyrenees, *calabra*. on the contrary has the white on the underside of the hindwing reduced. — In **calabra** *Costa*, from the Abruzzi, the apical ocellus is absent, and the yellow border of the ocelli of the forewing is dulled or obsolete. — Larva reddish brown, with obsolescent dorsal stripe and yellow lateral one; head marked with black; stigmata black; on *Milium multiflorum* and other grasses. Pupa light brown, with darker wing-cases. The butterflies occur in pine-woods crowning sandy hills: on the wing from July till September, settling on the ground covered with needles or on the trunks: they are abundant in their flight-places.
- pisidice*. **S. pisidice** *Klug* (44d). Above very similar to the preceding forms, but darker, with less markings, both wings with long fringes, which are not chequered on the forewing. Underside quite different from that of *fidia*, being yellowish dust-grey; the discal line of the forewing almost straight, the proximal one of the hindwing quite straight, the discal one but slightly dentate, the teeth not being long. The underside of the hindwing, moreover, bears extremely minute transverse striae. — In July on the Lebanon, the Sinai and other Syrian mountains.
- stulta*. **S. stulta** *Stgr.* (44d). Above black: similar to the preceding insect, but along the costa with a white streak, which is somewhat dilated before the apex. The ocelli of the forewing contrast but feebly with the dark ground, while the two white dots situated between them are very prominent. Hindwing very strongly dentate, with a very broad white distal margin, which band encloses the small black anal ocellus, but does not quite reach the inner margin. Underside dust-grey, the black discal lines absent or only vestigial and interrupted. — In Turkestan, in July at altitudes from 1500 to 4000 feet, very common.
- parisatis*. **S. parisatis** *Koll.* (44e). Like the previons, but the white dots between the ocelli of the forewing above smaller, being sometimes completely obsolete in the ♂. The costal margin is less extended white than the distal margin, the latter being very broadly white in the nymotypical form. Transcaucasia, Persia, Turkestan and the Pamir. — **macrophthalma** *Er.* (44e) is the south-eastern form, from Kashmir and Afghanistan: *macrophthalma*. it differs in the narrower white marginal band to the forewing, consisting only of the long fringes, and in the narrower and proximally less indented marginal band to the hindwing, and in the much larger ocelli of *laeta*. the underside. — The ab. **laeta** *Christ.* (44e) is distinguished by the white marginal band not becoming obsolete before the anal angle, but extending broadly into the same. — These butterflies, which, when alive, have a wonderful blue sheen, are extremely abundant in their flight-places, rugged rocky mountain-sides, but are often very difficult to catch on account of the unfavorable ground (LANG). They have a Nymphalidian swift flight and settle on rocks and stones. At Kandahar ROBERTS found the insect very common in shady and moist localities, where they might be obtained by the dozen. As the dates of capture extend from May till September, there appear to be several broods, or the time of appearance may vary considerably according to the altitude of the localities.
- digna*. **S. digna** *Marsh.* This species is unknown to me from nature: it resembles certain forms of *actaea*, having a broad orange distal band, which encloses the apical ocellus of the forewing. The second ocellus before the inner angle is absent. On the hindwing beneath there is before the distal margin a zigzag line which is proximally and distally shaded with dark scaling (BLIGHAM). — From the Shandur-Plateau in Kashmir, and Chitral.
- S. abdelkader**. As large as the largest *cordula*: above similar to the latter, the wings more elongate, both wings with small bluish white smears between the ocelli; underside of hindwing with a dark, rectangularly elbowed median band and pale veins. — **lambessana** *Stgr.* (44e), from the Aurès Mts., differs *lambessana*.

from nymotypical **abdelkader** *Pier.*, from the Province of Oran and Morocco, in the darker ground-colour, *abdelkader*. more distinct blue centres to the ocelli and larger smears between the latter. — The ab. **serrata** *Aust.*, from *serrata*. Magenta, with the band on the underside of the hindwing not being angulate but more rounded and externally undulate, is probably nothing but an individual aberration of the West Algerian form, somewhat approaching the European *cordula*, of which *abdelkader* in the North African representative. — The larva feeds doubtless on a knee-deep grass with large panicles, which grows everywhere the butterfly occurs, and may be very similar to the larva of *cordula*. The ♂♂ float in a fluttering flight probing from one tuft of grass after the other and visit especially thistles and dandelion. In certain flight-places, for instance at the mill on the Pic des Cèdres near Batna, the butterflies are abundant in May and June; but one finds them singly also in other places, especially in rocky shady beds of brooks.

S. actaea. Upperside of ♂ black-brown, with a dark sheen in live specimens; the 2 ocelli of the forewing mostly represented only by the small bluish white pupils. In old specimens, with the ground-colour faded, the pupil is bordered with deep black. Between the ocelli of the forewing sometimes 2 minute white dots. The number of the ocelli may be enlarged or diminished as in all *Satyrus*, e. g. *merula* *Schultz.*, *ornata* *Schultz.* In the ♀ the distal band is indicated by a paler, sometimes yellowish brown tint, and the ocelli are considerably larger than in the ♂. Underside different in the various forms, with a distinctly defined distal band, a dark dentate line in the cell and across the hindwing, and a somewhat irregular submarginal line. — The best known form is **cordula** *F.* (= *hippodice* *Hbn.*, *bryce* *God.*) (44f); the ♂ deep black, often with a brownish violet sheen, the pupils of the ocelli distinct and prominent and the underside of the hindwing almost uniformly dark. The ♂♂ and especially the ♀♀ are among the largest known *actaea*-forms. In Switzerland and the Tyrol, especially on the southern slopes of the Alps, in Northern Italy, the Apennines and at the Italian Riviera. — In the ♀-f. **peas** *Hbn.*, which is the prevalent form in certain valleys of the Alps (being said to occur also in Portugal) the distal bands are bright ochre-yellow. — **virbius** *H.-Schäff.*, from South Russia, especially the Caucasus, has likewise a very unicolorous dark underside to the hindwing in the ♂, as in *cordula*, but is smaller than the latter. — The first-described form, **actaea** *Esp.* (44f), has a whitish, irregular, median band on the underside of the hindwing; it occurs in South France, in especially typical specimens at Digne. — **podarce** *O.*, from Portugal, the south-eastern districts of Asia Minor, and Syria, is a smaller form with a network of pale veins on the underside of the hindwing. — **cordulina** *Stgr.*, from Central Asia, differs from *cordula* only in being smaller. — **bryce** *Hbn.* (44f), from the Altai, Fergana, and the interjacent mountains, as well as from Tibet, has a pale brown or dusty grey upperside, without black or dark blue sheen, size and shape being the same as in *cordula*. — ab. **ganssuensis** *Gr.*, from Tibet, has large ocelli and its ♀ a very distinctly defined greyish brown band; the wings beneath pale, with a prominent band and sharp markings, the forewing being variegated with white at the apex and the hindwing in the basal area. — **favonia** *Stgr.* resembles *bryce*, but has only the size of *actaea*. Forewing beneath with yellow disc. The chief distinction is that the white dots situated between the ocelli of the forewing are somewhat shifted towards the margin. In the ♂ the scent-streak is distinct, while it is often absent in the other forms of *actaea*. Hadjin. — **nevadensis** *Ribbe* (44e), from Andalusia, is the smallest form, with the underside of the hindwing brightly marked and similar to that of *actaea*, but without white median band. — **mattozi** *Mont.*, from the heights of the Serra da Estrella, is considerably smaller than *actaea*, darker; the forewing of the ♂ with a stronger sheen, but without white dots between the ocelli, in the ♀ with a stronger ochreous tint; recalling *podarce*, being a transition from that form to the very closely allied *nevadensis*. — **amasina** *Stgr.*, has the upperside duller in colour, the underside of the hindwing bearing a network of white veins; below the size of *cordula*; from Asia Minor. — **parthica** *Led.*, from Persia and the adjacent districts of Transcaspia, has likewise a white-veined underside to the hindwing, but the upper surface is deep black with an intensely dark sheen as in *cordula*. The forewing beneath is bright russet-yellow on the disc. — **pimpla** *Fldr.* is similar to *parthica*, the ♂ being very difficult to distinguish from the same; the ♀, however, has the very large apical ocellus edged with ochre-yellow and bears below it an ochreous band-like smear, so that there is a superficial resemblance to *arethusa*; but *pimpla* is always without the second black ocellus above the anal angle. Afghanistan, Beluchistan and Kashmir, everywhere very rare; the ♂ became known long after the ♀. — In **alaica** *Stgr.*, which is otherwise very similar to *parthica*, the russet-yellow colour is absent from the underside or at least duller, so that this form resembles *amasina*, but differs in the ocelli of the upperside being less distinctly pupilled: a mountain form from the Alai Mts. — **nana** *Stgr.* has the disc of the forewing beneath more reddish yellow than *alaica*, but the apical ocellus of the upperside is strongly reduced and usually blind; Turkestan. — **hadjina** *Rühl-Heyne*, from the Taurus and Lydia, is above dull in colour, like *bryce*, but is much smaller than that form, being also less variegated beneath, the underside of the hindwing being dark variegated with whitish. — **penketia** *Fruhst.*, from Greece, is similar to the South Russian *virbius*, but has larger ocelli and on the hindwing beneath a more diffuse white middle band. — The specimens of *cordula* from Zermatt have been separated by FRUHSTORFER as **milada**; they stand midway between *actaea* and *cordula* and the ♀ approaches ab. *peas* in the median band having an ochre-yellow sheen. — Larva brown, with 5 dark longitudinal lines, which are partly pale-bor-

dered; the black spiracles separated from the lighter underside by a dark side-line above which there is a pale line; head marked with black (GRIEBEL); till May or June on grasses. Pupa brownish yellow, anteriorly dark. The butterflies are on the wing from the end of June onwards, occurring in open stony places, affecting slopes which are covered with boulders and bear a but scanty vegetation. During the forenoon the ♂♂ are busy visiting thistle-heads, on which they settle with the wings half open, while the ♀♀ keep more near the ground, resting with entirely closed wings on bare spots of the ground and on stones. The ♂♂ have an irregular hopping flight; they are generally very abundant in their flight-places, but hard to catch on account of the difficulties of the ground.

stheno. **S. stheno** *Gr.-Grsh.* Differs from medium-sized *cordula* in the forewing bearing 2—3 white smears beyond the apex of the cell, besides the eye-spots. The middle band on the pale-veined underside of the hindwing is very regular and bordered by a quite evenly curved whitish band. — In the Karategin Mts., Turkestan, 4000—4500 ft., plentiful, in July.

S. dryas. Black-brown, larger and paler than most *actaea*-forms, the pupils of the 2 ocelli of the forewing above more blue than white and mostly larger than in *actaea*; the underside of the hindwing more unicolorous, not strongly marked, only occasionally slightly clouded or with a pale middle band, but often with a distinct anal ocellus. One of the most widely distributed butterflies; from North Spain throughout Europe and Asia as far as the east coast of Japan, from the Baltic to the Mediterranean, and in Asia southward to the boundary of the Palaearctic Region. On the whole the size of the specimens diminishes from East to West and likewise from the lowlands to the mountains. On the other hand the size of the ocelli increases from North to South. From these directions of variation result a number of varieties. — The

dryas. nymotypical **dryas** *Scop.* (= *phaedra* *L.*, *briseis* *Esp.*, *athene* *Bkh.*) (44 f) has rather small ocelli with feeble pupils, and a uniform underside; Central and South Europe. — Specimens from the Southern Tyrol with the ocelli conspicuously stronger developed have been named **drymeia** *Fruhst.* — Intermediate between these and North European specimens are the individuals from Southern Bavaria, which FRUHSTORFER describes from Würishofen under the name of **tassilo**. — As in North Europe, there is also in the north of the *sibirica.* Asiatic Continent a special form, **sibirica** *Stgr.*, which is very much larger, but still is of rather uniformly dark colour and has moderately large ocelli; throughout Northern Asia, southward to the Yang-tse-kiang, *agda.* extremely common near Peking, Hankow and I-chang; in Kiou-chou, northwards to Amurland. — **agda** *Fruhst.* is the name for a small form — presumably a mountain form — from South-West China, with a quite small ocellus between the median veins and very indistinctly marked underside of the hindwing. — *paupera.* **paupera** *Alph.* (44 f), from the interior of China, has the underside of the hindwing entirely without markings and the coloration is on the whole dull, the size hardly equalling that of specimens from Central *astraea.* Europe. — **astraea** *Leech* (= *tibetanus* *Rühl-Heyne*) is a small form with large ocelli, the markings on the *bipunctatus.* underside of the hindwing being feeble; from Se-chuen and the adjacent districts of Tibet. — **bipunctatus** *okumi.* *Motsch.* is the Korean form; very large, with strongly enlarged, heavily blue-centred ocelli, **okumi** *Fruhst.* (44 f), from the main island of Japan, differing in the ocelli being still a little larger. These last two forms have the pale middle band of the underside of the hindwing best developed. — In the smaller form from *kawara.* Hokkaido (Yezo), **kawara** *Fruhst.*, the whitish band of the hindwing beneath is absent. — In all these East Asiatic forms there occur exceptional specimens which have whole rows of ocelli on the fore- or hindwing. To give names to all these variations in the number of the ocelli (as has already been done in some cases, e. g. *tripunctata* *Neubgr.*, etc.) would be of no value. — Larva greyish yellow above, light grey beneath, with the head reddish marked with black, and with thin dark longitudinal lines and a brown side-stripe; till June on grasses, for instance *Avena elatior*, a. o. Pupa brown-grey, anteriorly dark brown, with a tuft of bristles at the apex of the abdomen. The butterflies fly from July till September in leaved woods; they affect the shade and fly slowly, with a flapping flight, over the undergrowth, in which they occasionally take refuge. While the small European specimens recall *Erebia*, the gigantic East Asiatic forms are hardly distinguishable on the wing from *Lethe schrenkii*, which occurs at the same time in the same localities.

16. Genus: **Callarge** *Leech.*

This genus is based on a single Chinese species. The antenna quite gradually and but slightly thickened, nearly as in *Melanargia*. Palpus long, with brush-like hairs. Eye naked. Neuration very similar to that of *Melanargia*, but the cell of the forewing narrower. — The genus apparently approaches *Zethenia*, a genus of the Indo-Australian fauna consisting of but few species, some of which are strongly mimetic.

C. sagitta. Whitish, yellowish beneath, with dark veins, longitudinal shadows at the costal and hind margins, and feeble angle-shaped markings before the margin. On the Yang-tse-kiang. Two forms are known:

sagitta. **sagitta** *Leech* (41 a), from Chang-Yang on the middle Yang-tse-kiang, is the light-coloured form, while *occidentalis.* **occidentalis** *Leech*, the western form from Wa-su-kow, has the ground-colour slightly shaded with ochre-yellow, and bears strong dark vein-streaks, the distal area of both wings being shaded with fuscous. According to LEECH the nymotypical form appears to be very abundant at Chang-Yang.

17. Genus: **Pararge** Hbn.

We place into this genus some 40, almost exclusively Palaearctic forms, which belong perhaps to about a dozen species and are distributed from Madeira and the Canaries throughout Europe, North Africa and North Asia to the east coast of Japan. There is, we think, no real necessity for splitting up this genus into several and applying special names for the few groups (*Amecera*, *Lasionmata*, *Satyrus*, etc.). These groups come very near each other morphologically and biologically. All *Pararge* generally have thin antennae, with a feebly marked and somewhat flattened club. The palpi are moderately long, erect, beneath rough with bristly hairs, the end-segment being short. Eye hairy. Wings entire, the hindwing with the margin undulate, sometimes dentate. On the forewing the bases of the subcostal, median and sometimes, but to a lesser degree, of the submedian are inflated, the precostal of the hindwing is forked. The colour of the species of *Pararge* varies from dark brown to red-yellow, the wings being differently marked with spots of these tints, sometimes one tint being prevalent. The forewing has always an apical ocellus, which is mostly isolated and distinctly prominent, or may also become indistinct among the spots appearing on the surrounding area. The hindwing has a row of ocelli which are always distinct beneath, but sometimes only vestigial above. On both wings there appear accessory ocelli, as in most Satyrids, which has been an inducement for proposing a number of names. But since the most multifarious combinations of such individual deviations may be repeated in all forms of *Pararge*, hundreds of new names would have to be introduced, if the naming of all known variations were strictly carried through. As in the case of *Satyrus* we confine ourselves to mentioning only those varieties which are of some importance, being either geographical races, or showing some local characteristic, or being commonly recurring aberrations. — The larvae taper in front and behind, bear a dense, thin and very short pubescence, are of green colour and live on grass, their head being globular. The pupae are rounded in front, suspended by the tail, the abdomen being strongly convex. The butterflies occur rarely in one brood only, having generally 2, sometimes several broods, which exhibit remarkably little seasonal variation. They are often local, but nearly always abundant. They fly in sunshine, settling either on the bare ground in the woods, on rocks, boulders and walls, or pitch on shrubs and leaves. They visit flowers and also imbibe the sap exuding from wounds of the forest-trees. The flight is not swift, but unsteady, rocking or tottering. In South Europe some appear to hibernate, at least I met at the Riviera, on exceptionally warm and sunny days in December and January, with worn specimens of *P. megera*, which disappeared again when the cold set in.

P. aegeria. Dark brown, spotted with pale or brownish yellow, the spots being smaller in the ♂, larger in the ♀; forewing on both sides with a pupilled apical ocellus; hindwing with a submarginal row of 3—7 eye-rings, above dark in the disc, marmorated beneath, bearing sometimes an irregular median band. From Madeira and the Canaries throughout Europe (except the highest North) and Africa north of the Sahara to Asia Minor, the Caucasus and Ural. — **egerides** Stgr. (= *aegeria* Esp.) (45a) is the pale spotted form *egerides*, from Central and North Europe, the underside of the hindwing being olive-green, variegated with brown. Early in the spring and again from July onwards. — **intermedia** Weism. (45a), from the Riviera, especially *intermedia*, the neighbourhood of Genova, has some of the spots whitish yellow, the others being shaded with brownish yellow, at least at their edges. On road-sides in the woods and in the beds of brooks, throughout the summer, in several broods. — In the first-described form, **aegeria** L. (= *meone* Esp.) (45a), all the spots of the *aegeria*, upperside are reddish yellow, the dark ground-colour as well as the whole underside being tinged with red-yellow. This southern form occurs everywhere on the Mediterranean coasts, in Spain, Portugal, South Italy, North Africa, Sicily, Sardinia, etc., in the south of the Balkan Peninsula, Syria and Asia Minor. In the warmer districts the butterfly is on the wing all through the year, the numerous broods overlapping. — **xiphioides** Stgr. (45a), from the Canary Islands, has the upperside darker on account of the smaller and *xiphioides*, more red-brown spots, while the underside of the hindwing is lighter, less marmorated and provided with a distinct median band, the costal part of which is shaded with white. — **xiphia** F. (45a), from Madeira, is *xiphia*, the largest and darkest form, with the almost unicolorous underside brilliantly shaded with golden red, the median band of the hindwing being but indicated by vestigial spots at the costa. — Egg round, white, reticulated. Larva very minutely and densely pubescent, with a globular head; green, with a pale-edged dark dorsal line and a yellowish lateral double stripe; spiracles yellow. Pupa green or brown-yellow, the wing-cases being pale at the edges; very close the ground, often fastened on stones, etc., hibernating. The butterfly belongs all through Europe to one of the commonest species. From April into June and again from July through the summer in woods of leaved trees, the butterflies playing together on the roads and in places where the sun penetrates through the leafy roof. The flight is irregular, tottering or flopping. In most localities in North Africa the form *aegeria* flying there is the commonest butterfly, but does not occur there in the woods, but is found in the shade of single bushes on sunny hill-sides. On Teneriffe I met with the form occurring there, *xiphioides*, especially often on the fallow-fields of the former Cochenille-plantations where single Opuntias were growing.

- thibetana.* **P. thibetana** Oberth. (45 a, b). Much larger than the preceding; above dark brown, in the ♂ with pale and obsolescent, in the ♀ with red-yellow, partly confluent, spots in the apical area of the forewing; on the rest of the upperside, especially on the hindwing, the markings of the underside shine through. These markings consist of angular spots and dark rings on an ivory-yellow ground, the forewing having a reddish yellow tint before the hind-angle. The individuals are rather variable in the markings of the apex of the forewing above, but are at once recognized by the peculiar under surface. — In West China and Tibet, from June till August, very common and widely distributed, up to 10000 ft.
- episcopalis.* **P. episcopalis** Oberth. (45 b). Black-brown, with chequered fringes, before the apex an undulate white oblique band: ♂ with a purple-brown tint on the disc of the forewing. Underside of hindwing similar to that of *maera*. — In the same localities as *thibetana*: in West China and Tibet, widely distributed and plentiful, in rocky places, from June till August.
- praeusta.* **P. praeusta** Leech (45 b). Similar to the preceding, but the oblique subapical band is not white but reddish yellow and projects towards the distal margin below the apical ocellus in the shape of a large tooth. — Distributed throughout West China, and common, from June till August.
- roxelana.* **P. roxelana** Cr. (45 c). The largest *Pararge*, with the margin of the hindwing strongly dentate, especially in the ♀. ♂ black-brown, ♀ grey-brown, with the disc of the forewing reddish yellow. Underside of forewing fiery yellowish red with the margins grey-brown: hindwing beneath with dark dentate lines and a curved row of unequal ocelli beyond the centre. — From South-East Hungary to the Black Sea, on the Balcan Peninsula, Cyprus, in Asia Minor and Mesopotamia, in the plains as well as the mountains, in June and July, not rare.
- climene.* **P. climene** Esp. (= *clymene* O., *synclimene* Hbn.) (45 c). Much smaller than the preceding, the hindwing not so large as compared with the forewing as in *roxelana*, with the distal margin non-dentate. Ocelli of the hindwing beneath much smaller and less distinct on a unicolorous ground. On the lower parts of the Danube and Volga, in South Russia, Turkey and Asia Minor, said to occur also in the Altai-district. —
- roxandra.* **roxandra** H.-Schäff. (= *caucasica* Nordm.), from Armenia, is beneath brighter and more variegated, there being a white silky spot at the apex of the cell of the hindwing. — The butterflies occur in May and June; they are true insects of the steppes, being also not rare in the plains, especially in stony places, and resemble an *Epinephele* when on the wing.
- eversmanni.* **P. eversmanni** Er. (45 c). Upperside orange-yellow, the margins and some spots in the apex, at the end of the cell and in the centre of the distal margin of the forewing black, the upperside being more extended black in the ♀. Underside of hindwing marmorated with grey, bearing a median band and white spots. In Central Asia: the Mts. of Turkestan, the Pamir and Altai. —
- cashmirensis.* **cashmirensis** Moore (45 c), from Kashmir, has the basal area of the forewing and the whole hindwing except the eye-rings dulled with dark brown. — ab. **unicolor** Gr.-Grsh., from Bokhara, has the marginal band of the forewing narrower and paler, beneath almost obsolete: the underside of the hindwing is brownish yellow, not being variegated with grey. — Sporadic and generally in single specimens, being plentiful only in some mountain-passes (Kok-su), from May till July.
- megea.* **P. megea** L. (= *xiphie* Boisd. pt.) (45 d). Above reddish yellow, with a black mark which traverses the distal band from the cell of the forewing to the abdominal margin of the hindwing, short black stripes crossing the disc and the cell of the forewing. Hindwing beneath rather evenly marmorated with brown. Throughout Europe, from the west coast (incl. of England) to Asia Minor, Persia and the Ural. — The form
- mediolugens.* **mediolugens** Fuchs has the black median stripe of the forewing strongly broadened, the stripe also being more glossy and deeper black, so that the aspect of the insect is quite changed, which already is easily noticed when on the wing; local on the Middle Rhine, in the lanes of the vineyards at the Bergstrasse the
- megaerina.* prevalent form in some places. — **megaerina** H.-Schäff. on the other hand has the black markings of the
- lyssa.* upperside reduced; from Armenia. — **lyssa** Boisd. (45 d) has the underside of the hindwing purer, not being variegated with brown and the markings being less numerous and thinner: from the Balcan Peninsula and
- tigelius.* Asia Minor. — In **tigelius** Bon. (= *paramegea* Hbn.) (45 d) the black stripe which traverses the reddish yellow distal band of the upperside is absent; the underside of the hindwing is variegated with brown, but the ashy grey middle band, which is bordered on each side by a dark dentate line, contrasts with the very confusedly marked surface of the wing: Sardinia and Corsica, — Egg elliptic, whitish green, with pale reticulation. Larva pale green, with a pale-edged dark dorsal line and bluish green head; lateral stripe white, washed with yellow: stigmata yellow: all through the summer on grasses. Pupa yellowish brown or brownish grey, an obtuse protuberance on the back. The butterflies are on the wing from the end of April till September, on gravel-paths, dunes, etc., affecting precipices and walls. One nearly always meets with some ♂♂ on the stony summit of bare hills. The flight is strongly tottering, irregular, but rather swift. The butterflies show a preference for resting on flowers, stones or clods of sand, the wings being held half open. Towards evening they congregate in holes and fissures of rocks, in which sometimes dozens may be found

together asleep. They belong to the commonest butterflies in Europe, and occur in the plains as well as in the mountains. Specimens which vary in the number or position of the ocelli (ab. *alberti*, a. o.) may everywhere be found singly among the normal forms.

P. hiera F. (45 d). Above very similar to the next species, *maera*, but always black-brown, of the *hiera*. colour of the darkest *maera*-form, the forewing less pointed, with straighter distal margin; on the underside of the forewing the russet-yellow distal band does not extend without interruption to the anal angle, but stops at the lower median vein or is there interrupted. The apical ocellus, moreover, has less often a double pupil, being mostly quite circular and not always accompanied by a small accessory eye-dot (towards the apex), as is nearly always the case in *maera*. Besides, *hiera* is usually of lesser size than the smallest *maera*, and the black markings, which are very similar to those of *megeva*, shine through on the completely darkened upperside. In the higher mountains of Southern Europe: the Black Forest, Alps, Carpathians, Apennines, and the Balcan; also in Asia Minor, the mountains of Central Asia, the Altai, and the Kentei Mts. Further, in the North and here often in the plains, as for instance in North Russia, Finland, Livonia and Amurland, but also in the mountains of the North, e. g. in Scandinavia. — The northern specimens are on the whole darker and more unicolorous, sometimes almost without markings; NEUBURGER named such specimens **fin-** *finmarchica*. **marchica**. — Larva uniformly green, the dark dorsal line being only distinct posteriorly; on Festuca. The butterflies are on the wing in the plains in May and June, in the high mountains not until June and July, not rare in most places; it affects resting under overhanging rocks and settles on stones and walls; the flight is similar to that of *megeva* and *maera*.

P. maera L. (= *adrasta* Dup.) (45 d). On an average larger than *hiera*, more evenly coloured, the *maera*. black markings of the ground less prominent in the nymotypical form with a sooty brown disc; the forewing of the ♂ more pointed, with longer costal margin and more oblique distal margin; on the underside of the forewing the distal band extends without interruption across the median veins to the hindmargin. The underside of the hindwing has a much purer ground-colour, i. e. there are less clouds and shadows between the various dentate lines which cross the disc. The apical ocellus has a stronger tendency towards duplication, being usually somewhat distorted obliquely and — at least beneath — bearing two pupils. Between this ocellus and the apex there is nearly always a minute eye-dot, there occurring also often specimens with other accessory ocelli (ab. *triops* Fuchs). Moreover, the ocelli of the hindwing are as a rule somewhat larger than in the same sex of *hiera*. — A very large material proves that it is hardly possible to find definite trenchant distinctions, especially if one takes into account the large number of local forms of *maera*, all the various kinds of pattern and coloration exhibiting a great variability. In North and East Europe to the coast of the Mediterranean Sea, in Morocco, in Anterior and Central Asia to the Altai. — In the form **monotonia** Schilde the upperside entirely unicolorous, without ochre-yellow area around the *monotonia*. ocelli; of regular occurrence in the high North, prevalent in several high mountains (Alai-Tau, Balcan, Ararat), and in many districts as a rare aberration. — **adrasta** Hbn. (45 d), an especially West European *adrasta*. form, has entirely yellow ♀♀, while the ♂♂ have a very bright yellow distal band, less dark ground-colour, and usually light-coloured scaling in the disc of the forewing. Proceeding towards the North and East one meets with all grades of darkening from the very yellow *adrasta*-forms, as they are found west of the Rhine, to the nymotypical form and even to *monotonia*. — **maja** Fuchs is only a small *adrasta* from the *maja*. Rhine. — **sicula** Stgr. (45 e) is a large, somewhat pale *maera*-form from Sicily, with very light underside, *sicula*. the band of the forewing being crossed by very distinct dark veins: the ♀♀ strongly recall by their pale colour the Asiatic *schakra*. — In **orientalis** Stgr., from Asia Minor, Syria and Armenia, the ochre-yellow of *orientalis*. the upperside replaced by brown-yellow. — **adrastoides** Bien. is a very aberrant form from Persia which *adrastoides*. is deep black-brown above and ornamented with a bright reddish yellow band, therefore almost resembling an *Erebia*; the underside, too, is more variegated than in all the other *maera*-forms. — In **maerula** Fldr. *maerula*. (45 f) the distal band is cut up by the veins as in *sicula*, but so strongly that the band of the forewing is separated into completely isolated rounded spots. On the underside of the hindwing there appears a light grey distal band in consequence of the darkening of the basal area and distal margin; in Kashmir, extending into the Oriental Region in the western Himalaya; rare. — **schakra** Koll. (45 e) resembles the *schakra*. previous form in colour and pattern so closely that MARSHALL and NICÉVILLE regarded it to be possibly an aberration of *schakra*. But the ♂ of *schakra* has always a very broad and conspicuous scent-streak below the cell of the forewing, which is never present in *maerula*. — **montana** Hormuz., from the moun- *montana*. tains of the Bukovina, is a very dark form: the ground-colour of the upperside approaches that of the following form, *menava*; the hindwing beneath is brown instead of grey. — The ♂ of **menava** Moore *menava*. (= *nashreddini* Christ.) (45 f) has no distal band, but a scent-organ which becomes distinct in a certain light, being a glossy black wedge-shaped patch, the tip of which lies at the apex of the cell, while its broad base rests on the hindmargin; the ♀ has a broad, but short distal band which has a dark proximal border. Persia, Afghanistan, Beluchistan, Kashmir, Chitral and Turkestan. — **maeroides** Fldr. comes so *maeroides*. close to *menava* that they have been united by some authors. BINGHAM believes it to be an accidental aberration, but the ♂ constantly differs from *maeroides* in the upperside of the forewing bearing below the

apical ocellus a reddish yellow quadrate spot. Kashmir. — Larva light green above, blue-green beneath, with a pale-edged dark dorsal line, light longitudinal and grey lateral stripes; spiracles yellow; in June and the autumn on grasses. Pupa light to dark olive-green, with double-pointed head and pointed yellow tubercles on the abdominal segments; hung up at the foot of walls and on stones. The butterflies, apart from the north of their distribution-area, have everywhere two broods, but do not exhibit distinct seasonal dimorphism. On the Rhine there occur among *adrasta* in August individuals which have more yellow than the May specimens. The butterflies are found in day-time along walls and rocks, their flight being restless, tumbling hither and thither. They are busy visiting the flowers growing out of the rocks, settling on them with the wings half open, the latter being closed when the butterfly alights on a stone-wall, to which the underside is adapted. They are local, being restricted to mountainous places in the south of the distribution-area, but are plentiful in their flight-places.

majuscula. **P. majuscula** Leech (45 f). As large as the largest *schakra*-♀ or even larger, at once recognized by the apical ocellus being enormously enlarged, especially in the ♀. The ocelli of the hindwing below are also very regular and large. — In West China and Tibet, in the mountains up to 10000 ft., not plentiful, in June and July. In spite of the difference in the development of the eye-spots this form might be considered the eastern representative of *maera*.

deidamia. **P. deidamia** Er. (= *menetriesi* Brem.) (45 f). The ♂ above somewhat similar to the *menara*-♂, the ♀ with white spots proximally to as well as below the apical ocellus; both sexes recognizable by the underside, which is dark blackish brown and without the dentate lines found in the *megea*- and *maera*-groups of forms. Very widely distributed, from the Ural throughout Asia, Siberia, Tibet, China and Japan. — In

erebina. Korea occurs the dark form **erebina** Btlr., which is characterized by the more pointed forewing and strongly enlarged apical ocellus. — More singly, in some countries restricted to mountainous districts, the insect flying under trees and on road-sides, settling at puddles, the flight being weak and lazy. In the south of its area in May and again from August onward, in certain districts of China and in Amurland in July: usually rare. As in the case of *maera* a whole series of special forms might be separated in accordance with locality and season.

dumetorum. **P. dumetorum** Oberth. (45 f). Above similar to the ♀ of the previous species, but the white smears in the apical area of the forewing differently placed: the basal area of the hindwing beneath irrorated with small white spots. In ab. **fulvescens** Alph., from Tsa-tsi-ku, the spots of the forewing are brown-yellow; the form *nemorum* Oberth., in which these spots are partly absent, comes from Yunnan (South China), not being Palearctic. Widely distributed in the mountainous districts of West China, at altitudes of from 5000 to 10000 ft., locally not rare, in June and July.

achine. **P. achine** Scop. (= *dejanira* L.) (45 g). Dark brown: forewing with 5–6 eye-rings forming a chain, hindwing with 2–4 such rings. Underside proximally to the ocelli with a white distal band which is variable and may be so much reduced that the row of ocelli is placed within the ground-colour. Deviations in the band occur especially often in alpine specimens, though singly also in other places, ab. **mendelensis** Lowe being based on such variation. From West Europe throughout Central and North Europe, Siberia and North China to Japan, northward to Livonia, North Russia and Amurland, southward to Northern Italy. —

achinoides. In the east of the area there occur specimens with the eye-rings on the upperside enlarged, ab. **achinoides** Btlr. (= *eximia* Stgr.), the specimens being moreover often of a brighter colour: but they fly together with individuals which are not distinguishable from European ones. — Larva green, with yellowish brown head, 3 dark dorsal lines and pale double lateral stripe; till May on Lolium, Poa, Triticum, etc. Pupa green, with angular head and a thoracic tubercle. The butterflies occur in woods of tall leaved trees, especially if there is a luxurious undergrowth, in June and July, the flight being dancing. They pitch on bushes, drink on damp places of the roads and imbibe the sap of wounded trees. Widely distributed in Europe, but sporadic and usually not very plentiful, being on the contrary extremely common in East Asia, assembling sometimes in swarms. They even occur in abundance on the islands near the Pacific coast (Yjezo, Askold). The ♂♂ appear so much earlier than the ♀♀ that they usually are already worn when the first ♀♀ emerge.

catena. **P. catena** Leech (45 g). Similar to *achine*, differing in the light distal band on the underside being more strongly developed and showing through on the upperside, and in the basal area of the hindwing beneath bearing several white spots. — This form from Chang-Yang just enters the Palearctic Region; it does not appear to be plentiful and is local, being perhaps, as already suggested by LEECH, the south-eastern form of *achine*.

18. Genus: **Aphantopus** Wallgr.

A few blackish brown, medium-sized species compose this genus. The antennae hardly incrassate at the tip. The palpi long, porrect. The eyes naked. The wings regular in shape, rounded, the anal angle hindwing not produced. Subcostal and median nervures of the forewing inflated at the base. Unicolorous

in tint, the pattern consisting of some ocelli which may be pupilled. — The larvae are spindle-shaped, with a small globular head and a very minute velvety pubescence. They hibernate, and feed on grass, changing into a pupa which lies on the ground being protected by some threads of silk, and has a short abdomen bearing at the tip a small brush. There is only one brood. The butterflies have a flapping, somewhat jerky flight, and settle on flowers or the leaves of bushes always with the wings closed. The genus extends from the west coast of Europe through Europe and Asia to the Pacific coast; not yet found in North Africa.

A. maculosa *Leech* (45 g). Forewing above and beneath with 3 eye-rings; hindwing above with 2, *maculosa*. beneath with 5 eye-rings; all the ocelli without ocelli above. — Chang-Yang, singly, in July.

A. arvensis *Oberth.* (45 g). Similar to the preceding; forewing on both sides as a rule with but 2 *arvensis*. eye-spots, which are unequal in size. Ocelli of both wings partly pupilled also above. From West China: Mupin, Wa-shan, etc. — The form **campana** *Leech*, from Ta-t sien-lu, is darker above and has much smaller ocelli. *campana*. On the underside of the hindwing there is a white spot before the costal ocellus and the white distal band which interrupts the chain of ocelli is lighter and more prominent. In May and June.

A. hyperantus *L.* (= *polymeda* *Hbn.*) (46 a). Uniformly dark brown above, with light fringes, *hyperantus*. beneath dusted with yellowish and bearing thin eye-rings. Europe, from Finland to the Mediterranean, and from the Atlantic coast to East Asia*). — In ab. **arete** *Müll.* (46 a) the small rings of the underside are *arete*. reduced to small pale dots, while in *lanceolata* they are drawn out transversely; *arete* is nearly everywhere rather rare among the nymotypical form, being more plentiful in certain restricted localities. — In ab. **caeca** *Fuchs* also these dots are absent. — In East Asia occurs the larger form **ocellatus** *Bth.* (= *amurensis* *Stgr.*) *ocellatus*. (46 a), in which the rings are considerably widened. From Amurland and Korea. — The form from the highest North, which we figure as **arctica** *form. nov.* (46 a), is quite small. — As **bieti** *Oberth.* specimens are *bieti*. sold and stand in collections with the small rings filled in with white dots, which usually are also visible *arctica*. on the upperside. The true *bieti* of OBERTHÜR, however, does not show this character, being nothing but a small discoloured *hyperantus*-form which appears to be identical with *minor* *Fuchs* from Oberstdorf, as already suggested by RÜHL. The form with the white eye-centres, which is figured 46 a, therefore would have to receive another name, and we propose to call it **centrifera** *nom. nov.* (46 a). — Larva grey-green or yellowish brown, with dark dorsal line and yellow side-stripe; till June on *Poa annua* and other grasses. This is one of the commonest butterflies in temperate Europe. *centrifera*.

19. Genus: **Epinephele** *Hbn.*

The Palearctic forms of this genus, about 70 of which have received names, belong to about 25 species, whose relationship to one another is not yet well known in very instance. They are closely related to *Satyrus*. The antennae are delicate, gradually incrassate, and without distinct club. The palpi are strongly bristly and project a head's length. Eyes naked. Body weak in comparison with the width of the wings, the abdomen of the ♀♀ not nearly so stout as for instance in *Erebia*, *Oeneis*, etc. Forewing very broad, with the costal margin strongly convex, the subcostal very strongly and the median a little less inflated at the base; the submedian, though a little incrassate at the base, is not inflated. The anal angle of the hindwing often very strongly produced, the external margin being excised above the angle.

The species of *Epinephele* are medium-sized to rather small dark brown and russet-yellow butterflies, which have as a rule only one ocellus on the upperside. On the hindwing beneath there occur often smaller ocelli, which exceptionally appear in certain forms in whole rows. Since they are equally often absent, quite a number of names have been published. As such differences in the ocelli are of no importance whatever among the Satyrids — this variation has lately been attributed to atmospheric differences —, we have abstained from enumerating the named aberrations and from adding to the list according to our materials, which contain an abundance of aberrations in the eye-spots. Otherwise a large number of new names would have to be proposed, as we have, for instance, of *E. janiroides* specimens with 1, 2, 3, 4, 5 and 6 ocelli, the individuals having all been caught at the same place, partly in the same year.

Nearly all the *Epinephele* are plentiful at their flight-places, some even occurring in great abundance. They fly about on sunny grassy slopes and on meadows; both sexes have an equally light, low and hopping flight, the wings being alternately opened and completely closed. They visit flowers of all kinds, especially Umbellifers, and keep the wings usually tightly closed when at rest. They have only one brood, which extends, however, mostly over a large part of the summer. Their green larvae have a minute velvety pubescence, with the head globular and the anal processes short. They feed on grasses, being concealed during the day, and hibernate as young larvae. The pupa mostly green, suspended close to the ground.

*) The species extends to the Pacific coast, but not to Japan. The statement that it occurs there was certainly occasioned by the large Japanese *Coen. oedipus* having been confounded with it.

The *Epinephele*, on account of the large number of individuals, belong to the characteristic insects of the Palaearctic summer-landscape. It is very remarkable that they are almost entirely absent from North America, only one single species, *E. xicaque*, occurring in Mexico and the adjacent Arizona. The genus, however, is represented by quite a number of species in temperate South America, in the valleys of the Andes of Chile, which forms agree entirely with their Palaearctic congeners in the character of the pattern and colour, of the flight, habits, time of appearance, etc. Whereas the Palaearctic forms can be separated into two distinct groups — ♂♂ with and without brand —, recent researches on the South American species have had a negative result as regards the generic separation American from the Palaearctic forms.

- janiroides* **E. janiroides** H.-Schöff. (46b ♀). Dark brown, with reddish yellow pubescence; forewing with a red-yellow distal band which does not reach the margins, encloses the apical ocellus and is proximally bordered by the scent-stripe, which is difficult to perceive; ♀ paler on the disc. On the hindwing a reddish yellow distal band which posteriorly is strongly widened. Underside of the hindwing with a median band which is proximally and distally well-defined and distally to which there may be 1—5 pale ill-defined ocelli, some or all of which sometimes bear dark pupils. — In ab. **abbreviata** form. nov. (46b) the band on the forewing does not extend to the apical ocellus, but disappears below the same, the ocellus therefore being isolated. — On the northern slopes of the Atlas, in the Kabylie, from May till July, on hill-sides with vegetation, plentiful. During the hot noon the butterflies assemble in large numbers in holes of the ground and ditches.
- passiphaë* **E. passiphaë** Esp. (= bathseba Godt.) (46b, c). Above similar to the preceding species, but much smaller and the underside of the hindwing quite different; the latter uniformly earth-brown, with a white middle band, beyond which there is a variable number of ocelli. In South France and the Pyrenean Peninsula, in June and July. — In the specimens from North Africa (Algeria, Morocco) the band on the underside of the hindwing often much reduced in width; this is the form **philippina** Aust. (46c), of which we figure the nymotype; we add, however, that also in Europe there occur not rarely ♂♂ with the band strongly narrowed. — In the form **tessalensis** Aust. (46c), which usually stands as *philippina* in collections and which is likewise from Mauretania, this narrowed band is moreover dulled with smoky brown or almost the same colour as the ground. — A light yellow form has been described by WHEELER as ab. **flava**. — Larva short, brown-grey, with pale longitudinal lines and brown head; till June on grasses. Pupa red-brown, with lighter markings. The butterflies are local, flying singly as a rule and sometimes occur in the same place as *ida*, which they resemble, but fly earlier (RÜHL).
- ida* **E. ida** Esp. (= actaea Lang) (46c). Bright red-yellow, the apical ocellus bearing two pupils; hindwing beneath clouded with brown, striated, with bands. The much smaller ♂ has in the disc a black brand, which is traversed by a number of yellow veins. In South Europe, Asia Minor and North Africa, northwards extending into the Alps and Roumania. — **cecilia** Val. is the form from the northern slopes of the eastern Atlas, hardly deserving a name of its own. The ground-colour is somewhat deeper red-yellow, the underside of the hindwing, especially in the smaller ♂, more uniform in colour, but the forewing is more pointed than in European specimens, in contrast with the following form. — **lapidipeta** form. nov. (46d) is a very small form with rounded forewing, widened brand in the ♂, and unicolorous underside: only in the south of Algeria where there is hardly any vegetation, in the oases of the Sahara. Flying in stony places. — ab. **albomarginata** is the name given by FALLOU to an albino which was obtained in South France. The red-yellow colour is not changed, but all black is replaced by dull white, not only the margins of the wings but also the basal area and the brand being of this colour; the underside of the hindwing is likewise whitish and the apical ocellus pale-bordered. — Larva dull reddish grey, with grey head, dark dorsal line, pale longitudinal lines and white double side-stripe bearing dark dots; till April on grasses. Pupa brown, with dark dorsal dots and yellowish grey wing-cases. The butterflies fly from June till August, in the plains as well as the mountains, having a hopping and rather slow flight. They always keep near the ground and settle with preference on the ground in the shade of tufts of grass and low shrubs. They are mostly very common, being the commonest butterflies in the densely overgrown northern slopes of the Atlas.
- tithonus* **E. tithonus** L. (= tithonius Hbst., tiphon Kühn, pilosellae F., herse W. F., phaedra Esp., amaryllis Bkh.) (46d). ♀ above like *ida*; the ♂ too is similar to *ida*-♂, but the brand is not divided up by yellow veins. Underside of hindwing brownish olive-green, somewhat diluted in the distal area, often bearing dot-like ocelli. Central and South Europe, Sardinia, Southern Italy, Greece, northward to Great Britain, the Netherlands and the Baltic provinces; also in Asia Minor. — There occur various degrees of albinism in this species, such specimens being apparently most often found near the sea-coast (England, Portugal); for instance, individuals are known in which the ochre-yellow of the ground-colour is replaced by light yellow (ab. **mincki** Seebom), pale yellowish white (ab. **subalbida** Verity) or white (ab. **albida** Russel). — On the other hand, ab. **obscura** Schultz has the basal area of the forewing and the upperside of the hindwing darkened. — Moreover, the ocelli may all be absent except the apical one, or, as in nearly all Satyrids, accessory ocelli may appear on either wing (ab. **excessa** Tutt), ♂♂ being known which have up to

7 eye-dots on the upperside. — Larva greenish grey, with reddish dorsal line, white subdorsal ones and yellow side-stripe; head greyish green with brown lines; stigma yellow: until June on grasses. Pupa greenish grey, posteriorly spotted with red brown and black. The butterflies from June till August on road-sides in woods and on the edges of meadows, flying among the undergrowth of leaved woods, and being plentiful throughout the distribution-area.

E. narica *Hbn.* (46 d). Above there is a very conspicuous scent-stripe in the ♂ below the posterior portion of the cell of the forewing. Beneath both sexes have on the hindwing a sinuous median band which on both sides is shaded with white and sharply bordered with dark. South Russia, distributed throughout the steppes to Turkestan and Saisan. — In the smaller, but otherwise similar **naricina** *Stgr.* (46 e), from the shores of the Caspian Sea, the ♂ has a much narrower scent-stripe and the ♀ a smaller apical ocellus. In June and July, on flowering tamarinds.

E. kirghisa. Smaller than *narica*, with more obtuse wings; the ♂ has usually below the apical eye a smaller accessory ocellus: the eye-dot in the anal angle of the hindwing distinct in the ♂. The underside of the hindwing is crossed by 3 curved dentate lines. — In the nymotypical **kirghisa** *Alph.* (46 e), from the western Tian-shan, the blackish grey scent-stripe of the ♂ contrasts sharply with the ground-colour. — In the form **chamyla** *Stgr.* (46 e) the whole basal area as far as the centre of the forewing is darkened in the ♂, the dark scent-stripe hardly contrasting. The black margins of the wings, moreover, are broader, there remaining on the hindwing only a small central yellow cloud on the disc. The end of May and June in Turkestan, at Kuldja and in the Tian-shan; on flowering tamarinds. — **haberhaueri** *Stgr.* (46 f) is quite similar on the underside, but is above so much darkened that there is only in the disc of the forewing an ochre-yellow smear through which the median vein runs as a black curved streak. At Kuldja, in the Alai-Dagh, from 3000 to 6000 ft. — **sartha** *Gr.-Grsh.*, from the Pamir, is about midway between the last two forms: the dark margin is much broader than in *kirghisa*, but there still remains even on the hindwing an ochre-yellow discal patch. — **maureri** *Stgr.* (= *galtscha Gr.-Grsh.*) (47 a) is essentially smaller and has the upperside so much darkened that in the ♂ even on the forewing there is hardly any ochre-yellow colour visible on the disc. In the Pamir district, Karategin Mts., Alai-Dagh. — **germana** *Stgr.* (46 f) has the size of *kirghisa*, but the dark upperside of the hindwing; the yellow colour of the disc, however, remains as distinct rings around the ocelli; Alexander Mts. — **ab. rubriceps** *Herz* flies in June in Northern Bokhara among nymotypical *kirghisa*; beneath exactly like *haberhaueri*, but the hindwing above is red-brown on the disc, the forewing, too, showing above still some red-brown, which extends to the hindmargin. — The butterflies of these forms are not rare in their flight-places. They are fond of hot sunny mountain-sides with sparse vegetation, and fly only a few yards when disturbed; in June and July, in especially hot localities already in May.

E. rueckbeili *Stgr.* (46 f, g). Ground-colour ochre-yellow, all the wings margined with black-brown and darkened in very different degrees, the upperside now resembling one form of *kirghisa*, now another. At once recognized by the underside of the hindwing bearing on an almost uniformly earth-grey ground a row of 4—6 partly contiguous ocelli. Kuldja.

E. naubidensis *Ersch.* (46 f). ♂ dark above, recalling the ♂ of *E. lycaon*, but the underside of the hindwing mostly with some ocelli, also not being unicolorous as in the previous species, but having a distinct dark irregular median band, which is distally broadly pale. ♀ beneath usually with the apical eye very large and pupilled, there being a second, blind, ocellus between the median veins. — Pamir: Turkestan, in June and July, on hot mountain-sides, but also in the steppes where *Stipa* grows; plentiful.

E. amardaea *Led.* (46 g). The upperside in the ♂ dark, as in *lycaon*, in the ♀ with an abbreviated ochre-yellow band nearly as in a small *jurtina*-♀. Easily recognizable by the underside of the hindwing, which in typical specimens has distinct and prominent markings, and is crossed by a median band which is bordered with black at both edges. Achal-Tekke district and Persia, rather widely distributed and locally plentiful, in July. — In Ferghana also specimens occur with the underside more unicolorous; this is **glasunovi** *Gr.-Grsh.*

E. capella *Christ.* (46 g). Similar to the preceding, larger; the upperside in the ♂ with a reddish golden coppery gloss, in the ♀ similar to the *jurtina*-♀. On the underside of the hindwing the paler distal area is clouded with white, being separated by a feeble sinuous line from the but slightly darker basal area, which is finely pencilled with brown. — In the Pamirs, Turkestan and North Persia, in the high mountains, at about 10000 ft., on slopes covered with detritus, in June and July.

E. hilaris *Stgr.* (= *pulchella Gr.-Grsh.*) (46 g). One of the smallest species, not larger than the ♂ of *ida*. Forewing light ochre-yellow, their margin and the whole hindwing brown-grey. The apical ocellus rather large, non-pupilled above. Underside of hindwing earth-grey, with 2 or 3 partly obsolescent or incomplete undulate curved lines. — **bori** *Herz* are specimens with the underside of the hindwing entirely without markings and the disc of the forewing very pale: in Northern Bokhara. In the ♂ there is between

the cell of the forewing and the hindmargin a rather large scent-patch, which contrasts with the dull ground of the hindwing not by its colour, but by its silky, in certain light silvery grey gloss. Turkestan, very abundant in the Koksus Pass, in July. In specimens from Samarkand the ground-colour of the forewing is of a darker brown-yellow.

pulchella. **E. pulchella** *Fldr.* (48a). Some specimens so closely resemble *hilaris* that both insects have several times been considered the same: larger, the ♂ without the silky patch in the disc of the forewing. The apical ocellus stands a very little more remote from the apex than in *hilaris* and is often very slightly transversely oval, being always without pupil above. Turkestan, Hindukush. **neoza** *Lang* (47a) has the disc of the forewing more dark brown than ochre-yellow, and is generally considerably larger than *pulchella*. (In the figure 47a the anal angle of the hindwing is too much produced, projecting actually much less than in most *Epinephele*; the figure 47a named *neoza* U. is moreover erroneously so named, it represents the underside of the Kashmirian form of *lycaon*.) — **pulchra** *Fldr.* is somewhat less dark in tint and has a transverse discal band; Kashmir and the North-Western Himalayas, extending into North India. — The butterflies are alpine insects which fly in July on high steppes overgrown with *Festuca*.

coenonympha. **E. coenonympha** *Fldr.* (47a). ♂ above quite uniformly dark brown, the basal area being but slightly paler than the outer area. The ♀ has 2 dark eye dots thinly margined with light scaling. The forewing beneath bears a red-yellow distal band, in which there are 2 ocelli in the ♀, the hindwing showing small pale smears in the disc and at the cell. — The ab. **maiza** *Lang* has a dark discal line on the under-side of the forewing. — In ab. **goolmurga** *Lang* the disc of the forewing beneath is more extended yellow and the black-brown margins of the wings are considerably narrower. — The butterflies, about which little is as yet known, occur in Kashmir, where they are found at an altitude of about 10000 ft. They either are rare or restricted to less accessible mountains.

cadusia. **E. cadusia** *Led.* (46e, f). Both sexes recall above small Central European ♀♀ of *jurtina*; they are dark brown, with an abbreviated ochreous band on the forewing; the fringes very pale. Underside of hindwing with a distinctly marked middle band, which, however, very slightly contrasts in colour with the ground. Persia. Turkestan. ♀♀ from Aschabad are larger than Persian ones. — **cadusina** *Stgr.* is perhaps a distinct species, the ♂ of which has the disc of the forewing strongly darkened, there being hardly a trace of the yellow half-band. There is never any yellow in the cell; the scent-organ of the ♂ narrower than in *cadusia*, sometimes strongly reduced. The underside of the hindwing as a rule much darker than in *laeta*. *cadusia*, almost as in *naubidensis*; in Turkestan, at Lake Balkash. — **laeta** *Stgr.* (47a) is a larger form; the dark-edged forewing bright yellowish brown bearing below the cell a very conspicuous scent-stripe in the ♂; Turkestan, especially North Bokhara. — **monotoma** *Stgr.* (47a) is very similar to the preceding, but differs in the basal area of the forewing being darker and the light underside of the hindwing more uniform in colour; Samarkand.

cheena. **E. cheena** *Moore* (47a, b). Far larger than the previous forms, in both sexes uniformly dark brown above with an apical ocellus, there being below it another ocellus which is of the same size in the ♀ and hardly perceptible or even absent in the ♂. These eyes are thinly bordered with yellowish red or (in ♂) light brown. A difference in the development of this border has been the reason for separating from *cheena* another form, **kashmirica** *Moore*, in which the eye-rings are but very diffuse, their colour contrasting but slightly with the ground. (The figures Pl. 47a, b represent more the latter form; the figure of the underside erroneously bears the name *neoza*). Underside of hindwing brownish, with a sinuous discal stripe and a black feebly undulate submarginal line. — **deiphobe** *Leech* is a *cheena*-form from the plateau north of Ta-t sien-lu, in which the ocelli of the ♀ bear a minute white pupil, the spaces between the ocelli being filled with ochre-yellow; the underside of the hindwing has frequently ocelli in the anal as well as the apical area. — From Kashmir throughout the whole North-Western Himalayas into the Oriental Region, very plentiful, from June till August, the most abundant *Epinephele* in its country.

jurtina. **E. jurtina** *L.* (= *janira* *L.*, *lemur* *Schrk.*, *pamphilus* *Hufn.*) (47b). Above dark brown: the apical ocellus minutely centred with white, being in the ♂ bordered with dull dark yellow, and standing in the ♀ in an ochre-yellow halfband, which becomes narrower behind and does not reach the hindmargin. The upperside of the live ♂ has often a splendid metallic gloss and bears a broad scent-patch below the cell. Underside of hindwing in the ♂ dark brown, with a hardly perceptible middle band, in the ♀ grey-brown, with a broad, pale, proximally golden-brown-bordered curved band. In several forms throughout Europe except the highest North, even occurring on many islands (Canaries, Sylt, etc.), also in Western Siberia, and Anterior Asia as far as Kurdistan and Persia. Quite a number of names have been given according to the geographical position of the locality as well to accidental differences in pattern and coloration. Apart from the form characterized by the disappearance of ocelli or the appearance of accessory ones (e. g. *brigitta*, *erymanthea* *Esp.*, *obliterans* *Schultz*), there are firstly the albinos which have received a name, ab. **brigitta** *Ljungh.* being the form in which the blackish ground-colour is replaced by dirty white, while the reddish *pallens*, yellow halfband has remained as such. — ab. **pallens** *Mieg.* a much less rare form, has on the contrary, *cinerascens*, the reddish yellow halfband on the forewing of the ♀ faded to ivory-white. — As ab. **cinerascens** *Fuchs*

specimens have been described in which the brand of the ♂ is very prominent on a silky dust-grey upper-side. — **cinerea** *Cosmor.* has a bluish gloss on the dark upperside; the hindwing is strongly dentate, tinged with pink on the underside, and bears two eye-dots; Roumania. — In hot summers one not seldom meets with specimens in which the reddish yellow colour has increased, this colour being represented by a yellowish red dusting on the apical area in the ♂, and in the ♀ by a yellowish red area in the disc of the hindwing. FUCHS calls this form, which is similar to a small *hispulla*, ab. **rufocincta**. — **hispulla** *Hbn.* (47b) itself, from Southern Europe, has these characteristics in a still more pronounced degree, and is, besides, generally broader-winged than the nymotypical *jurtina*. — **fortunata** *Alph.* (47c) is a yet paler form. The live ♂ has in its apical area a magnificent golden gloss on a deep black ground, in the ♀ the ground-colour above is reduced by the extension of the reddish yellow. Moreover, the form is much larger and the basal area of the hindwing is so darkened below that the light discal band contrasts vividly. This form was described from the Canary Isles, but I also found it in Southern Portugal and in North Africa. — **telmessia** *Z.* (47b, 48a) finally is a form from Cyprus and the district of Asia Minor lying opposite and is distinguished by a differently shaped scent-patch in the ♂. Around the tip of this patch the ground-colour is of a lighter brown, so that the patch appears much brighter, more velvety, and more prominent. In the ♀ the disc is not ochre-yellow, but bright foxy brown; in both sexes the underside is also a little different from the nymotypical *jurtina*. Specimens from Cyprus are said to have a much more rounded forewing, but such variations in shape occur also elsewhere in Europe, though as rather rare exceptions. The specimens usually sold as *telmessia* belong doubtless generally to the south-eastern local forms of *hispulla*, the direction of variation of which has still to be more accurately ascertained. We figure 47b true Cyprian specimens, 48a a specimen from the Danube in which specimen the characteristics of *telmessia* are much more strongly expressed. — Here belongs also the form **kurdistana** *Rühl*, in the ♀ of which the half-band of the forewing is separated into spots. — Larva dark green, with a pale green head bearing two eye-dots, a dark dorsal line and a light lateral one. Underside greyish green. Until June on grasses. Pupa greenish yellow, with brown markings. The butterflies are on the wing from June until August, and are common everywhere in meadows, on bare places in woods, along the ditches of roads, on railway-banks and even in gardens and the plantations of towns. They have an irregular, flapping flight, and settle on stones, bare patches of ground, molehills, etc. In the mountains they ascend to about 5000 feet.

E. nurag *Ghil.* (47c). Considerably smaller than the *jurtina*-forms, otherwise closely allied to them. Both sexes with an ochre-yellow distal band, which in the ♂ is sometimes reduced to an interrupted half-band of the forewing, but usually, as always in the ♀, continues through both the wings; the ground-colour a very pale brown. The underside of the hindwing greyish brown, with a sometimes obsolete, mostly but slightly prominent median band. — In Sardinia and Corsica, in June and July, very local, apparently only flying in localities of a certain definite character which are covered with hard grasses.

E. lycaon. ♂ blackish-brown with a dot-like apical ocellus in a scarcely lighter field, live specimens having on the wings a magnificent silky gloss, which has sometimes a golden green shimmer. ♀ with two large ocelli bordered with yellowish brown on the forewing, and an irregularly curved pale discal line always edged with a darker colour. The underside of the forewing reddish yellow edged with greyish brown; that of the hindwing dusty grey with an almost imperceptible discal band. From Finland and Northern Russia to North Africa, and from Spain to the Amur. — The nymotypical form **lycaon** *Rott.* (= *jurtina* *Hbn.* ♂, endora *Esp.*) (47c, d) occurs everywhere in the North of the district, in Europe it often goes as far south as the coast of the Mediterranean Sea, and in Asia as far as the southern Palearctic boundary. The upper side of the ♂♂ is deep blackish brown, and during lifetime has a silky gloss on account of the shining hairs on the surface of the wings; around the apical ocellus there is a reddish shimmer. The underside of the hindwing is of a uniform earth-brown, finely dusted with a darker colour. The ♀♀ have an ochre-coloured distal band on the forewing, in which stand the large eye-dots, which are blind above: the hindwing is dark brown with a yellowish red golden gloss and a pale distal band; on the underside it is dark brown, the light discal band being sharply defined only on the basal side. — Besides the well-known variations in the ocelli, which occur in most of the *Epinephele* (*schlosseri*, *paronia* *Voelschow*; *biocellatus*, *lusea* *Schultz*) albinism also occurs, as for instance ab. **subalbida** *Schultz* with whitish spots in the forewing; the not very rare dwarfs, which are sometimes met with in particularly dry and at the same time high-lying districts, and singly also in the plains, have received the name **janirula** *Esp.*, based on a ♂. — **catamelas** *Stgr.* (47d) is on the upper side distinguished only by its longer silky hairs; the underside of the hindwing is of an even dark brown colour, in the male without the dusting, in the ♀ without the pale discal band; South-East Siberia, Altai and Tian-shan. — **pasimelas** *Stgr.* from Irkutsk and the Amur, is larger and the yellowish red on the underside of the forewing much reduced or entirely replaced by dark brown. — **erebiformis** *Cosmor.* was described from a specimen from Bahiceni in Roumania, which is said to recall *Erebia* by a very vivid yellowish red distal band on the very dark upper side of the wings. — In **catalampra** *Stgr.* (47d) both ocelli on the upper side of the forewing appear in ♂ on a dull yellowish brown ground, and the underside of the hindwing of the ♀ is grey with a scarcely lighter margin; from Mongolia. — In **mauritanica** *Oberth.* (47e), from North Africa, the upper side of the ♂

is very deep black, the live specimens having a brilliant bronze and copper sheen; also the ♀ is darker than all the other forms, and the reddish yellow is reduced to two rings around the ocelli and only appears exceptionally as a small faint cloud on the disc. — *intermedia* Stgr. (47 d) has very strongly scalloped hindwings: the upper side is darker than in *lycaon*, but lighter than in *mauritanica*. The underside of the hindwing is much more brightly coloured than in the preceding and forms a transition to *rhamnusia*. In South-East Europe and Anterior Asia. — *collina* Rüb. is a form coming from the mountains of the same countries; the upperside of its ♀ and the underside of both sexes is of a paler colour. — *lanata* Alph., from the Caucasus, has longer hairs and darker colouring than the nymotypical form, especially the underside of the forewing of the ♂ is often quite dark brown. — *turanica* Rühl, from Turkestan, resembles the nymotypical form, but has a lighter underside and in the ♂ a broader scent-stripe. — *libanotica* Stgr. on the other hand is an extremely pale form, which especially on the underside appears as if powdered with white; from the Lebanon, but I obtained specimens exactly similar, though as single exceptions, from Digne in Southern France, and such specimens may oftener occur on limestone soil. — *lupinus* Costa (47 e) is rather considerably larger than the forms so far named; the rusty yellow on the underside of the forewing is brighter, the underside of the hindwing strongly speckled. Southern Italy, Greece. — *rhamnusia* Frr. (47 e) finally is the largest form, as large as the form *fortunata* of *jurtina*. The forewing is, on the upper side, covered with a yellowish brown shining silky felt-like pile which is modified to a smooth patch of hairs above the very prominent scent-organ. The underside of the very strongly dentate hindwing is in both sexes variegated with little clouds of whitish grey. Sicily. — The upper side of *sifanica* Gr.-Grsh. (47 f), from Zibat, is very similar that of to the nymotypical form; but the scent-stripe of the ♂ is not present, although the tuft of hair lying above it has remained; the apical ocellus on the underside of the forewing is enlarged and often has two pupils, and on the underside of the hindwing there are a few ocelli edged with yellow. — *interposita* Ersch. Closely allied to the preceding; the forewing of the ♂ has a bright coppery sheen which is, however, only noticeable in a certain light, and a very broad scent-stripe below the cell. The ♀♀ seldom have another ocellus besides the apical one on the forewing; but some small anal ocelli on the hindwing are almost always perceptible. The latter is, on the underside, grey mixed with white, with more or less obsolescent discal lines. Widely distributed over Central Asia, in the Tian-shan, Ala-tau and Karategin mountains, also in Afghanistan and in Baluchistan, extending into Indian territory. — Larva bright green; the head green with black eye-spots: dorsal line dark, subdorsal lines white and lateral lines yellowish; tip of the anal fork red. Pupa green or brown, with white markings. The butterflies are on the wing in July and August in stony places, and are fond of settling on the ground. In the South I found them in numbers sucking at the flowers of small blue thistles. When disturbed they only fly short distances, and are exceedingly common in their flight-places, though their occurrence is quite local. According to a communication from Herr KRÜGER, *rhamnusia* often settles in trees, which I also have observed in the form *mauritanica*, which I beat in quantities out of the branches of the cork-oak.

wagneri. **E. wagneri** H.-Schöff. (47 b ♀, not ♂) is at once recognizable by the apical ocellus in both sexes being modified into an elongated transverse oval. But this is only so on the upperside, the apical ocellus on the underside being large and round. The hindwing below with two blind anal ocelli edged with yellow, and a dark discal line distally shaded with a lighter colour. In Armenia, and the neighbouring countries of Asia Minor and Mesopotamia. — *mandane* Koll. (47 f), from Persia, is distinguished by the still greater elongation of the apical ocellus, which is almost reduced to a bar, and the paler upperside of the wing, which is especially noticeable in the ♂ and lends greater prominence to the scent-patch. — Particularly in mountainous regions the butterflies are not rare; they are on the wing from May until July, are very numerous in their flight-places and found in the heat of day in ditches and rocky fissures.

dysdora. **E. dysdora** Led. (= *tristis* Gr.-Grsh.) (47 g). Upperside of the forewing with an ochre-yellow distal band even in the ♂. Underside not unlike that of *wagneri*, paler yellow, the hindwing not so strongly dentate, without anal ocelli below, and with a straighter discal line. From Persia and Ferghana to Kuldscha and the Altai mountains. — *dysdorina* Rühl (41 g), from the Tian-shan, has in the ♂ the forewing more strongly reddish yellow, this colour extending almost to the base, there being two large black eye-dots edged with yellow on the underside of the hindwing. — In July and August, on bare, sunny and rocky slopes (RÜHL).

davendra. **E. davendra** Moore (= *roxane* Fldr.) (47 g). In the ♂ the forewing above quite pale orange-yellow, in the ♀ with a half-band of the same colour, in which stand two eye-spots. Below, the forewing of a rather duller yellow, the discal line being angulate behind the cell, beyond it several ocelli. Ferghana; Kashmir; Afghanistan to the Indian territory of the North-Western Himalaya, and Baluchistan. According to the extension of the scent-stripe in the ♂♂, MOORE distinguishes the forms with an especially broad scent-stripe as ab. **latistigma**, while he calls the ♂♂ with a shortened scent-stripe ab. **brevistigma** and those with a narrow one **tenuistigma**. — *comara* Led. (= *cyri* Bien.) (47 g) is the dull dark orange-coloured form from Turkestan and Persia. — The butterflies are on the wing in June and July on stony slopes and are not rare.

20. Genus: **Coenonympha** *Hbn.*

Small dull-coloured butterflies, having sometimes, however, on the underside of the wings some shining metallic lines or eye-pupils. Eye naked. Palpus long, upright, pointed, with long bristling hairs. Antenna delicate, less than half the length of the costa, almost imperceptibly thickened at the tip. Subcostal, median and submedian veins inflated at the base to a fusiform bladder. The upper and middle discocellulars together form an angle directed towards the base, from the apex of which a small branch penetrates into the cell. Hindwing almost circular, rarely with a slightly undulating margin, sometimes produced at the anal angle.

The *Coenonympha* are yellowish brown to dark brown, seldom whitish, butterflies, and have no ocelli on the upperside, but sometimes possess one apical ocellus and some ocelli on the hindwing. The underside of the hindwing is usually adapted to grey sand, or bears, especially in the species inhabiting woods, a number of ocelli, sometimes beautifully pupilled.

The larvae are delicate, green, with a globular head, and are pointed behind, living on grass; many hibernate. The pupa is green or grey and hangs suspended near the ground on stalks or stones. While a few species belong to the commonest of all the butterflies known, others only occur as great rarities, sometimes in well explored countries in which they were unknown before. The area of their distribution is mostly very large; one species, *C. tiphon* in various local forms, seems to occur all round the Earth. — 70 forms are known to-day, which are limited in their occurrence to the Palaearctic region and Central and North America. Most of the species have only one brood, but some have numerous broods, which overlap.

C. oedippus *F.* (= *oedipus* *O.*, *geticus* *Esp.*, *pylargo* *Hbn.*) (48a). Without markings on the upper- *oedippus*. side, dark sooty brown. Underside rusty brown washed with yellow; on the hindwing one ocellus before the apex and a straight row of pale-edged ocelli before the distal margin. In Central Europe, very sporadic, in Belgium, France, Northern Italy, Austria, Hungary; in Southern Russia and the Ural Mts. ab. *miris* *F.* *miris*. has on the underside of the forewing an increased number of enlarged ocelli; among the nymotypical form. — **amurensis** *Rühl* (48a) is considerably larger, on the upperside especially dark-coloured, with a very distinct *amurensis*. metallic line on the underside; from Eastern Siberia, particularly Amurland. — **annulifer** *Btlr.* (48a) is still *annulifer*. larger, the ocelli on the underside strongly enlarged, sometimes elongated transversely; Japan. — Larva pale green with a dark dorsal line and light lateral stripe; head dark olive-green. From July until May on reeds (said to feed also on Iris). Pupa yellowish green with the caputal processes brownish and the wing-cases yellowish with pale borders. The butterflies are on the wing in June and July; they have a hopping flight and are found in damp meadows, especially such as are occasionally flooded. There they prefer stony hillocks. They are generally not numerous in their flight places and the latter are not always accessible because often situated in swamps.

C. hero *L.* (48b). On the upperside resembles the preceding, smaller and just as dark, but on the *hero*. hindwing 2 or 3 ocelli shine through from beneath as yellowish brown rings. On the underside itself the ocelli are placed in orange rings, and on their basal side there is a straight white line, which is thickened into knots on the veins. Northern and Central Europe and the whole of Northern Asia, from Sweden as far as the Alps, and from Belgium eastwards to the Pacific Ocean and Japan. ab. **stolida** *Schilde*, from *stolida*. Scandinavia, is smaller and darker, and the forewing bears a white distal band on their underside. In ab. **perseis** *Led.* (= *sibirica* *Stgr.*) (48a), which in Eastern Asia occurs among the nymotypical form, but locally *perseis*. also flies alone, the white band before the row of ocelli on the underside of the hindwing is much widened. — **FRUHSTORFER** separates from this form, as **neoperseis**, the specimens from Hokkaido, which are larger. — In ab. **areteoides** *Fol.*, which is recorded from Belgium, the ocelli on the hindwing are obsolete. — Larva pale green, *areteoides*. on lyme-grass (*Elymus*) and wood-grasses. In Europe the butterflies are on the wing in June and July, in Eastern Asia according to **GRAESER** in two broods: in woods of leaved trees and in meadows overgrown with bushes. The specimens of *hero* rise higher in the air in their flight than the pale species of *Coenonympha*, and slightly recall small *Erebias*; they occur more singly and usually very locally, and one does not easily catch more than a few specimens in one day.

C. nolckenii *Ersch.* (48b). Larger, upper side dark washed with a coppery tint; the disc of the fore- *nolckenii*. wing a dark copper-colour, hindwing black with a fiery copper-coloured distal margin. Underside dark yellowish grey, the disc of the forewing and margin of the hindwing coppery-red; forewing with but few ocelli, hindwing with a complete row before the margin. — Ferghana. In meadows and open spaces in woods, in May and June, common.

C. myops *Stgr.* Above quite similar to *Erebia lappona*, forewing with a strong coppery sheen. The *myops*. underside also recalls *Erebia*; forewing with a large apical ocellus, hindwing with a dark median band, beyond which are the ocelli reduced to light dots. From Ala-tau and the Altai Mts. — **tekkensis** *Stgr.* (48b), *tekkensis*. from the Achal-Tekke district, has a larger, more pronounced apical ocellus on the upperside of the forewing also; the ground-colour of the underside of the hindwing is so much darkened that the median band is hardly distinct. End of July.

- leander.* **C. leander** *Esp.* (48c). Upperside of the ♂ almost like *arcania*, forewing yellowish red edged with black; hindwing dark sooty brown, with the ocelli shining through faintly from the underside. ♀ rather paler, with a narrower margin on the forewing. Underside yellowish brown, hindwing tinged with greyish green, with 6 similar ocelli, the one situated at the anal angle being sometimes double. From Hungary through Bulgaria to the Black Sea, in the Crimea, the Ural and Volga districts, Asia Minor and Persia. — The form **obscura** *Rühl* (48c) is smaller and washed with a dark colour, so that the upperside appears uniformly sooty brown; from Armenia. — **iphioides** *Stgr.* (48c), from Castilia, is on the upperside similar to *iphis*, but the ocelli on the underside of the hindwing are very large and complete, touching one another with their outer borders. The thinly black edge of the wing on the underside, which bears the pale fringes, contrasts strongly with a pale ochre-yellow marginal band, which is limited proximally by the metallic line. Caught near San Ildefonso. — In May and June.
- iphis.* **C. iphis** *W. V.* (= *amyntas* *Btlr.*, *mandane* *Ky.*) (48c). Disc of the forewing of the ♂ on the upperside washed with copper-brown, of the ♀ with yellowish brown, this colour being sometimes of a darker (ab. *subnigra*), sometimes of a lighter shade (ab. *pallida*). Hindwing uniformly blackish brown. Underside of forewing entirely without ocelli, rarely with a small, pale, apical ocellus. Hindwing with a few scattered and reduced ocelli on the underside. Beyond the middle are 2 large irregular white sinuous patches, either separate or thinly connected, by which the nymotypical form is recognized at a glance. The whole of Central and a large part of Northern Europe, and North and Central Asia; from England and Belgium to the Pacific Ocean, and from Finland and Livonia to Dalmatia. In ab. **anaxagoras** *Assmus*, which occurs singly in Central Europe and is prevalent in Eastern Europe, the metallic line on the underside is absent, and the ocelli on the hindwing are reduced. — In **iphicles** *Stgr.* (= *heroides* *Christ.*) (48c), on the other hand, the ocelli of the hindwing are very regular and distinct and appear on the upperside in the shape of brownish rings, so that there is a resemblance to *hero*; from Central Asia.
- carpathica.* — **carpathica** *Horn.* is a smaller mountain form the ocelli of whose hindwing are entirely or almost entirely obsolete; from the Carpathian Mts. — **mahometana** *Alph.* (84a) also has no ocelli, or at the most a few white dots in their place; moreover, the upperside is uniformly soot-brown, and the whole underside dusted over with white; from the Tian-shan. ab. **iphina** *Stgr.* is a Central-Asiatic form in which the ocelli on the underside are bordered with brown; it most probably does not occur anywhere as the only form of the species. — Larva dull green with a blue-green head, dark dorsal stripe and pale lateral one, as well as a red anal fork; spiracles yellowish red. Until May on grasses. Pupa green with white-spotted abdomen and dark-edged wing-cases. The butterflies are on the wing in June and July; they are found on grassy roads in woods and in damp meadows and are not rare, although there are not often large numbers of them together. The very big-bodied females do not often rise more than 1 or 2 feet above the ground. When disturbed they usually fly on only a few paces, following the direction of the road and settling again in the grass.
- arcania.* **C. arcania** *L.* (48d). Forewing fiery reddish yellow with black distal margin, hindwing dark brown. Easily recognised by the underside of the hindwing, whose marginal portion is occupied by a broad white band, which in the nymotypical form interrupts the row of ocelli below the apical eye, the latter therefore appearing to be placed on the inside of the white band. All Europe except great Britain, from Scandinavia to the Mediterranean sea and from Spain and France to the Black sea and Armenia. — Specimens with a very broadly black margin to the forewing and a narrowed and slightly dentate band on the underside of the hindwing, which probably occur among nymotypical specimens everywhere, but especially in the South, are considered as ab. **insubrica** *Frey* (48d). — **satyrion** *Esp.* (48d) is a mountain form from the Alps and Carpathian Mts., which differs greatly from the nymotype: on the upperside the ♂ is mouse-grey and the ♀ brownish-grey, almost unicolorous; on the underside the white distal band is of even width and bears the very regular row of distinct ocelli exactly in its centre; from about 4000—7000 feet. — Transitions between the two have been named ab. **darwiniana** *Stgr.* (48d) (= *philea* *Frey*); in the true **satyrion** the apical ocellus on the underside of the hindwing stands quite at the distal edge of the white submarginal band, while in *darwiniana* it is shifted inwards beyond the middle of the latter or even stands altogether proximally of the band. Alps: Visp, Simplon, Piemont. — ab. **melania** *Oberth.* is based on a specimen in which the distal band on the underside of the hindwing is shaded with grey, so that it only contrasts very slightly with the ground-colour. — ab. **badensis** *Reutti* is an unimportant aberration, possibly occurring in all flight-places, with anomalous ocelli, distally of which stands a little white. — Larva green with dark dorsal stripe bordered with a yellowish tint, light subdorsal stripe and pale yellow lateral stripe; head blue-green, mouth and anal fork red. Until May on grasses. Pupa brown, with whitish wing-cases edged with red. Butterflies very common in June and July and often flying together in large numbers. At the edge of woods full of undergrowth, but also in the open country and on hills. They affect flying round bushes and settle on the tip of low twigs, but sometimes also fly up into the higher branches of trees. The ♀♀ are much less numerous than the ♂♂ and appear later.
- arcanioides.* **C. arcanioides** *Pier.* (48e). This butterfly occurs in 2 forms, one smaller and darker and the other larger and paler (*forma major*, 48e). The former is sooty brown on the upperside with the exception of a rounded patch of yellowish brown on the disc of the forewing, while the whole disc of the forewing of

the latter is a fiery yellowish red. On the underside both forms have reddish yellow forewings with black inner margin and anal angle; the reddish brown hindwings bear a somewhat curved white distal band, beyond which stand some distinct but very small ocelli. The small form, which belongs to the summer brood, has on the underside a pale stripe before the apical ocellus. The butterflies are on the wing from May to the beginning of July in North Africa (Algeria, Morocco) and stray specimens are known from South Spain. They are not rare in the districts of the Atlas countries which have an abundant vegetation, but are rather local and never together in large numbers. The two broods overlap, and in the first days of June I often caught fresh specimens of the 2. brood together with worn ones of the 1. The butterflies are beaten out of the bushes overhanging the roads; they have a special preference for blackberry bushes. They have exactly the same habits as the small *Epin. ida* ♂♂ occurring in such places in Algeria, and can hardly be distinguished from these when on the wing. During the hottest part of the day they hide in the dried-up beds of streams and in ditches. They always fly close to the ground, and so often among thorny bushes that they are difficult to get at.

C. vaucheri *Blach.* (48e). This is the most remarkable of all known forms of *Coenonympha*. On *vaucheri*. the upperside ochre-yellow with a deep black distal edge; the forewing bearing a huge apical ocellus without a pupil, hindwing with 4 or 5 black submarginal spots in a straight row. On the underside the apical ocellus is pupilled. Pupils as well as eye-dots may be increased in number (ab. *geminipuncta* *Blach.*). The basal portion of the hindwing is a blackish olive-colour with a white apex to the cell; the distal portion is dirty white and bears 6 equally large pupilled ocelli. — From Morocco, where the insect was found in June, occurring very locally.

C. thyrsis *Frr.* (48e). Nearest to the preceding, but the apical ocellus not particularly large; the *thyrsis*. 5 dots at the distal margin of the hindwing very minute. On the underside much less variegated and contrasting than *vaucheri*; the apex of the cell not white; the dirty white distal portion of the hindwing reduced to a pale band on account of the distal margin being broadly dark. — In Candia, in May and June.

C. corinna *Hbn.* (= *norax* *Bon.*) (48f). The smallest *Coenonympha*. Upperside brilliant yellowish *corinna*. red with broad black apex on all the wings; on the forewing the black colour extends as a submarginal stripe as far as the inner angle. On the underside the hindwing is uniformly yellowish red with a small apical ocellus; the hindwing has a darker basal area, and in the lighter marginal portion bears small ocelli of a very diverse development. — **elbana** *Stgr.*, from the island of Elba, has the apical ocellus of the *elbana*. upperside without pupil and the ocelli of the underside of the hindwing are larger. In Sardinia, Corsica and Sicily, locally very plentiful, in May and June and again from July onward. — Larva light green with a pale-bordered dark dorsal line and a dark shaded yellowish side-line. On *Carex gynomane*, and *Triticum cespitosum*. Pupa reddish grey with white smears and markings.

C. dorus *Esp.* (= *dorilis* *Bkh.*, *dorion* *Hbn.*) (48f). ♂ above entirely shaded with soot-colour, *dorus*. except the posterior portion of the disc of the hindwing; ♀ reddish yellow with a broad black apex and distal margin to both wings. The hindwing above has a curved, proximally convex row of ocelli, which is very irregular on the underside. In South France, Spain and Portugal as well as in Italy, in stony places, not rare, in June and July. — The form **austauti** *Oberth.* has ochre-yellow smears on the forewing *austauti*. above, the white band on the underside of the hindwing is much more prominent; from western Algeria. — **bieli** *Stgr.*, from Portugal, has the hindwing above strongly sooty in both sexes, nearly all the reddish *bieli*. yellow having disappeared from the disc, and the hindwing beneath has the ocelli as well as the metallic line strongly reduced. — **andalusica** *Ribbe* has likewise the ocelli on the hindwing beneath strongly reduced, *andalusica*. whereas the upperside, especially of the ♀, is still bright clay-colour; from South Spain. — In ab. **caeca** *Oberth.* (48f) the ocelli are entirely absent from beneath, but the light distal band is present as a uni-colourous area; from the Pyrenees. — The ab. **fulvia** *Oberth.* (from the Lozère), on the contrary, has the *fulvia*. ocelli developed, but there is no light scaling around them, so that they are situated direct in the ground-colour. — Nothing is known of the larva of *dorus* except that it is said (Rühl) to feed on bent-grass (*Agrostis*).

C. fettigii *Oberth.* (48f). On the upperside almost like *C. dorus austauti*, except that the ♂ has more *fettigii*. distinct reddish yellow smears below the apical ocellus and the latter is bordered with bright reddish yellow. On the underside the hindwing is dusty grey, in the ♂ without, in the ♀ almost without, markings; in the ♀ there are usually only obsolescent traces of ocelli in the shape of minute rings, and a slight indication of a discal band. — In Algeria, dispersed, but locally common, as at Tlemcen, Sebdou, and also in Morocco; from June until August; is fond of settling on oak-bushes.

C. saadi *Koll.* (= *iphias* *Er.*) (48e). Upperside pale sandy yellow like the ♀ of *pamphilus*, and at *saadi*. the most a minute dot in the place of the apical ocellus of the forewing. On the other hand there is a blind ocellus, which is sometimes accompanied by another, before and above the hinder angle of the forewing. On the underside of both wings a pale line, basally shaded with a darker colour, runs from the costa of the forewing to the anal margin of the hindwing. In Transcaucasia and Persia. — **mesopotamica** *meso-* *Stgr.* is a much paler sandy yellow, lighter also on the underside, with the markings fainter and the accessory *potamica*.

eye-dot situated above the anal one always absent; Mesopotamia. — The butterflies are on the wing in May and June in sandy places, settle on the bare ground, are not rare, and less restricted to certain flight-places.

C. amaryllis. Upperside uniformly sandy yellow as in *pamphilus*, sometimes, especially in the ♀, slightly shaded at the distal margin. Underside pale honey-yellow, hindwing washed with greyish green; a faint line runs through the disc of the forewing. Rows of ocelli of very diverse development are situated before the distal margin. These are most distinct in the form **accrescens** *Stgr.* from North China and *accrescens*. Korea. This form, which is especially common around Pekin (where specimens are found flying about in gardens, yards, and even in the streets), bears on the underside of the forewing 3 or 4 and on the hindwings 6 almost similar large ocelli with a metallic centre, which appear above as heavy black spots or small rings. — The first-described form, **amaryllis** *Cr.* (= *amarillis* *Hbst.*) (48 g), which occurs throughout *amaryllis*. Siberia and Mongolia, from the Ural to the Amur, has still the complete number of ocelli, but they are rather smaller, and only a few of them shine through above as minute black dots. — In **rinda** *Mén.* (48 g), *rinda*. from Central and Eastern Siberia, the black ground of the ocelli has almost disappeared, so that the latter are very light, and the whole underside of all the wings is strongly dulled with grey. — In **evanescens** *Alph.*, finally, the ocelli on the underside are obsolete except for a few traces, and on the upperside no pupils can be seen shining through. The metallic line on the underside is also absent. Amdo. — Small *evanescens*. specimens from Ordos with especially washed-out markings on the underside have been designated **ordossi** *Alph.* by ALPHÉRAKY. — The butterflies are on the wing in June and July, are common and fond of settling on sandy places and stony mountain-roads or field-paths. *ordossi*.

C. pavonina *Alph.*, which is unknown to me from nature, is said to be golden yellow on the upper-side with a blind apical ocellus and a small dark spot before the distal margin of the forewing; on the hindwing there is a row of blind, brown, distomarginal spots. Underside pale ochre-yellow, the basal area of the hindwing being dusted with grey. All the ocelli below are pupilled. — From the Hei-ho river (N. W. China). Perhaps only a strongly diverging form of *amaryllis*. *pavonina*.

C. pamphilus. Small butterflies which on the upper side are the colour of reddish yellow sand. Forewing beneath reddish yellow, bordered with grey and bearing a small pupilled apical ocellus; hindwing diluted with grey, with a shortened, curved, whitish median band shaded with brown. The ocelli are generally completely absent or only indicated by faint and indistinct vestiges of dots or rings. — The ground-colour of the hindwing of the Northern form, **pamphilus** *L.* (= *nephele* *Hbn.*, *menalcas* *Podu.*, *gardetta* *Loche*) (48 g) is mouse-grey beneath; it is the only form in the North, and extends throughout North and Central Europe to *pamphilus*. Anterior Asia, Turkestan, Ferghana and Persia. — In ab. **bipupillata** *Cosm.* the apical ocellus is greatly enlarged and doubly pupilled. — **marginata** *Stgr.* (48 g) has a very broad dark distal margin on all the wings, but its underside resembles that of *lyllus*. (A broadening of the blackish distal margin occurs in the summer brood *marginata*. in many localities.) — **lyllus** *Esp.* is the summer form from Southern Europe, North Africa and the southern part of Anterior Asia. In this form the wings are broader, the apex of the forewing is more rounded, the margin of the hindwing often undulating, the underside of the hindwing not mouse-grey but also sandy yellow with a fine, curved, median line. — In **thyrsides** *Stgr.* (48 g), from Sicily, Dalmatia and the southern portion of Anterior Asia, of which I also found typical specimens in the valleys of the Atlas, the hindwing on both sides bears a submarginal row of ocelli, which are sometimes pupilled. — Larva bright green with a thin, double, white dorsal stripe and yellow lateral one. Head pale green; throughout the summer on grasses. Pupa stout, green, with darker markings. The butterflies are the commonest Satyrids in the whole of Europe and are on the wing from the end of April until October, everywhere on meadows and fallow fields, corn-fields and bare summits of hills. They almost fly only when disturbed, and soon settle again, affecting roads and bare patches of ground, sometimes inclining their always closed wings to one side. Their flight is jumping, slow, and low. They even fly into the towns, wandering over gardens and yards, and one sometimes sees them hopping along on paved streets for traffic, and settling for a moment on the pavement. *thyrsides*.

C. symphita *Led.* (48 g). Forewing on both sides as well as the upperside of the hindwing as in *pamphilus*; but the underside of the hindwing yellowish brown, broadly pale grey at the margin, basally washed with verdigris-colour, with a submarginal row of 6 very small ocelli. In the Caucasus and Armenia. — The form **tiphonides** *Stgr.*, from Bulgaria, has whitish smears on the underside of the hindwing, and the ocelli, which are already very small in the nymotypical form, are reduced in number. *symphita*. *tiphonides*.

C. tiphon *Rott.* (= *davus* *F.*, *tullia* *Hbn.*) (48 h). Upperside sandy yellow, similar to the preceding, rather duller; ♂ without markings, ♀ with the ocelli shining through. On the underside of the hindwing whitish smears are joined together forming a more or less incomplete median band, beyond which there are some ocelli in the ♂ and often a complete row in the ♀. In Central Europe, especially the Alps, Central and Southern Germany and the Danube countries. — **philoxenus** *Esp.* (= *rothliebi* *Stgr.*) (48 h) is a rather large northern form, dulled with grey above and strongly ocellated below, from the continental shores of the North Sea and Great Britain, (said to have occurred also at Lemberg). — ab. **laidion** *Bkh.* is a slight deviation from the type, which is a little paler ochre-yellow on the upperside; it is probably found every- *philoxenus*. *laidion*.

where exceptionally among the nymotypical form. — *isis* *Thunb.* (= *demophile* *Frr.*) (48 h) has instead of a *isis*. brown underside a grey one with fewer and smaller ocelli, and its upperside, which is absolutely without markings, is also of a greyish colour. Scandinavia, North Russia, as far as Central Asia. — *viluensis* *Mén.* *viluensis*. (= *griscens* *Christ.*), from the Vilui river in Siberia and from the mountains of Werehojansk, north of Jakutsk, is on both sides bright grey, not yellow; the whitish median band of the underside of the hindwing shines through above and is shaded with grey towards the base; the base of the hindwing beneath washed with green. — *caeca* *Stgr.*, from the Namangan Mts., is a small form without a trace of ocelli, so that it is *caeca*. superficially similar to *pamphilus*. — *mixturata* *Alph.* is the most eastern form of the Old World, from Kam- *mixturata*. schatka, and is without ocelli on both sides, like the American *ochracea*, but instead of being pale yellowish brown, like the latter, is pale grey above; on the underside the hindwing is grey, the forewing ochre-yellow with a grey margin. — Across the Behring Sea, in Alaska, the species is represented by the closely allied form *kodiak* *Edw.* — The most western old-world form is *scotica* *Stgr.*, which above has a dull grey *scotica*. ground-colour and dark edges, and beneath is without ocelli; from Ireland and Scotland. — *subcaecata* *Rühl.* *subcaecata*. *Rühl.*, from the higher Altai, is an intermediate form, closely allied to *ochracea* from Colorado; it is darker and larger than *caeca*, but paler than *isis*; single specimens show vestiges of ocelli. — *rhodopensis* *Edw.* is *rhodopensis*. a form from the Danubian countries, closely allied to *isis*, but yellowish brown on the upperside and rarely darker in the ♂. Of the ocelli on the underside only the pupil of the apical one and sometimes of one of the eyes on the hindwing shines through above. But on the underside of the hindwing this form mostly exhibits a complete row of ocelli, while in an otherwise closely related form, *occupata* *Reb.*, they are entirely absent; *occupata*. the latter form occurs in Bosnia and Herzegovina. — Larva pale green, covered with minute dot-like warts, with a globular green head and yellow mouth, dark light-edged dorsal line, whitish subdorsal lines and pale yellow lateral stripe; anal claspers and anal fork rosy red. From September until May on rushes and reeds, such as *Carex*, *Rhynchospora*, *Festuca*, etc. Pupa pale green, abdomen whitish. — The butterflies are on the wing in June and July, singly, and on most flight-places not common. Sometimes quite fresh specimens are found in places where no single individual had been met with before in spite of decades of ardent collecting, and from where the species again disappeared for a long time. The flight-places are usually peat-bogs and meadows flooded from time to time, according to *Rühl.*, especially such on which *Eriophorum* grows.

C. sinica *Alph.* (= *tydeus* *Leech*) (48h) is doubtless very closely allied to *tiphon* and might perhaps *sinica*. be better united with it. Upperside exactly like that of the nymotypical *tiphon*, but with long bluish white fringes (the latter are yellowish white in *tiphon*). Underside of the hindwing mouse-grey with few unequal ocelli; from the apex of the cell a longish white oblique smear runs in the direction of the middle of the distal margin, which, however, it does not reach. — Common in Tibet, in Juli and August, up to 10000 feet.

C. semenovi *Alph.* (48i). One of the smallest forms, dull ochre-yellow above in the ♂ and dirty *semenovi*. white in the ♀. On the underside of the hindwing a number of very conspicuous white spots, which shine through above. — In Tibet and Western China, in July and August. The butterflies are very common in their flight-places, and in Central Asia are found as far up as 10000 feet. According to *Leech* they vary very little, but ♂♂ occur which are dark on the upperside like the ♂♂.

C. sunbecca *Er.* (48h, i). Above, both sexes a dull milky white colour, through which the pattern *sunbecca*. of the underside shines; this pattern consists of a large number of white spots on a grey green ground, which in the nymotypical form cover the whole hindwing, but which in the form *alexandra* *Rühl.* from Tur- *alexandra*. kestan are greatly reduced in number and size. From Ferghana, Tian-shan and Ala-tau, at a considerable height, in June and July.

C. mongolica *Alph.* (48h). By far the largest *Coenonympha*. All the wings thickly dusted with *mongolica*. bluish white, so that the sooty brown ground-colour only appears in the distal margin of the forewing and the apical area of the hindwing. Both wings bear several ocelli on the upperside. Underside lead-grey; a white smear runs from the apex of the cell of the hindwing towards the distal margin. — In the Tian-shan, in the Kuldseha district and the neighbouring districts of Mongolia; not rare.

21. Genus: **Triphysa** Z.

Similar to the preceding in size and shape, the bladder-like inflation at the base of the veins of the forewing is also present. But the antennae are quite short and terminate in a sharply defined heavy knob. The palpi are transformed into brush-like tufts. The anal angle is never produced, but on the contrary quite rounded off, its outline being but slightly arched, so that the hindwing is longish oval in shape instead of being almost circular. The forewing, moreover, is more elongate, especially in the ♀. The colouring in the ♂ is a dark sooty brown, in the ♀♀ a dull pearly white; the underside in both sexes is greyish brown, traversed by a network of the pale veins. 5 forms only are known, which are very similar to each other and are restricted to the Palearctic Region.

T. phryne *Pall.* (= *tyreis* *Cr.*) (48i) is blackish brown-grey, the wings of the ♂ having a fine golden *phryne*. margin. Between the veins on the underside there is a row of submarginal ocelli, which in the ♀ shine

through above. From South-Eastern Russia through Transcaucasia, Armenia and Western Siberia to Kuldsha *dohrni*. and the Altai. — The form from Eastern Siberia and Tibet, *dohrni* Z., has a broader, more whitish metallic *biocellata*. margin. — In the form *biocellata* Stgr. two ocelli of the underside shine through above, where they sometimes *striatula*. appear as pupilled ocelli, and in *striatula* Elw. there are distinct light veins even on the upperside of the wings and the row of ocelli on the underside is surrounded with pale scaling and is thus placed in a kind *nervosa*. of light band. — *nervosa* Motsch. (= *albovenosa* Ersch.) (48i) is very like the preceding, but in both sexes without ocelli on the underside; from the Amur, and, it is said, also from Japan. I did not succeed in finding it there, and the nature of the country appears to me to exclude its occurrence. — Nothing is known to me about the early life-history of *Triphysa*. They are insects of the steppes, where they appear in June and July, and are locally not rare. The ♀♀ seem to fly very little, and are not even easily disturbed; the ♂♂ fly low down over the ground, probing one tuft of grass after another: when disturbed they fly up a few yards into the air, but soon come down again to the ground.

22. Genus: **Palaeonympha** Btlr.

At the end of the Satyrids we place a genus based on a single moderately small brown species which seems rather out of place among the Satyrids of the Old World. A superficial resemblance connects it with *Mycalesis*, *Ypthima* and *Aphantopus*. BUTLER draws attention to the similarity with the purely American genus *Euptychia*. He gives the brand-spot present in the ♂♂ of *Palaeonympha* as a distinguishing characteristic between the two genera, but LEECH points out that this scent-organ in Asiatic Satyrids is generally very variable, and some ♂♂ of *P. opalina* from the Tring Museum now before me indeed prove the scent-organ to be inconstant. Therefore there remain as essential differences from *Euptychia* the shape of the cell of the forewing and the greater length of the last palpal segment in *Palaeonympha*. Indeed, all species of *Euptychia* known to me have a much more slenderly built body, and, instead of the dense hairs covering the body of the Palearctic Satyrids, are clothed with much finer, often scale-like hairs, the bristles of the palpi, moreover, have a different direction, etc. Nothing more is known [of the life-history except that the only species is widely distributed and is common from the mouth of the Yang-tse-kiang to its upper course.

opalina. **P. opalina** Btlr. (48i). Upperside uniformly dark brown, with an apical ocellus on the forewing and an anal one on the hindwing. A blackish line runs through the middle of both wings, which is curved-angulate in the middle of the hindwing. On the underside of the forewing, on the pale distal area, there are below the yellow-bordered ocellus some transverse dark spots partly with opalescent centres; the hindwing bears 2 anal and one apical ocellus, to which may be added some more, accessory, rudimentary ocelli or similar opalescent spots as on the forewing. A dark line separates the pale marginal portion from the darker disc, and the latter is again traversed by a blackish line.

Corrections and Additions.

Melanargia hylata iranica is on Plate 39b erroneously named *parthica*.

Alphabetical List

with references to the original descriptions of the Palearctic forms of Satyrids.

* signifies that the form is figured in the place quoted.

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achine Par. Scop. Ent. Carn. p. 156.
achinoides Par. Btlr. Cist. Entom. II, p. 283.
actaea Sat. Esp. Schmett. Abbild. *
adrasta Par. Hbn. Sammlg. Eur. Schmett. *
adrastoides Par. Bien. Diss., p. 30.
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aëlio Oen. Hbn. Sammlg. Eur. Schmett. *
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 also Oen. *Möschl.* Wien. Ent. Mon. 1860, p. 342.
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altajana Er. *Stgr.-Reb.* Cat. Lep. Pal., p. 50.
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amardaea Epin. *Led.* Hor. Ent. Ross. 6, p. 84. *
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amasina Sat. *Stgr.* Cat. Lep. Pal. (I), p. 13.
ammon Oen. *Elw.* Trans. Ent. Soc. Lond. 1899, p. 356. *
amphithea Ypth. *Mén.* Bull. Acad. Pét. 17, p. 216.
amurensis Coen. *Rühl.* Pal. Grossschmettl., p. 607.
analoga Sat. *Alph.* Hor. Ent. Ross. 16, p. 418.
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angulata Lethe *Seitz.* Macrol. I, vol. 1, p. 83.
annada Caller. *Moore.* Cat. Lep. E. I. C. I, p. 226.
annulifer Coen. *Pryer.* Rhop. Nippon., p. 32. *
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ypthimoides Caller. *Oberth.* Ét. d'Ent. 15, p. 14. *
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5. Family: Morphidae.

The family of the Morphids or Giant-Butterflies is composed of a number of modifications of the Satyrid type of rather unequal value. The various groups here placed show hardly any closer affinities to each other than to the true Satyrids, which was the reason why E. HAASE united them with the American Brassolids and the true Satyrids to one large division, which he called the Satyrimorphae. The genus *Morpho* in particular, from which the family derives its name, is very remote from those Asiatics which are being classified as "Morphids". The genus *Morpho* is purely American and contains delicate butterflies with enormous wings, flying exclusively in day-time, their exterior being adapted to a life in the hottest sunshine. The magnificent blue gloss, which does not recur anywhere among the Lepidoptera in such brilliancy, the flight-time between 9 o'clock in the morning and 4 o'clock in the afternoon and the flight along the sunny side of the roads in the woods or on hills-sides fully exposed to the sun, are characteristics in which the *Morphos* contrast sharply with the shade-loving, partly even nocturnal, dark-coloured *Amathusiinae* and *Brassolidae*. In its primitive neurulation and the lesser specialization in the structure of the head the genus *Morpho* is of a more ancestral type, while it possesses on the other hand in the habit of its furry caterpillars to feed on Dicotyledons a characteristic according to which the *Morphos* appear to be the more advanced group. Quite a number of excellent systematists, like HERRICH-SCHÄFFER, BATES and BURMEISTER, did not know how to do better than placing the genus *Morpho* with the Nymphalids. A satisfactory solution, however, was impossible for the simple reason that the Morphids as then conceived were not a homogeneous group. REUTER even found that the genus *Bia*, which stands among the Satyrids — some authors, as WESTWOOD and LUCAS, even placed it among the Nymphalids — has close affinities to the Morphids.

We should have cut this Gordian knot by suppressing the collective name "*Morphidae*" and thus have avoided this dilemma in systematics, if we did not wish to abstain from any alteration of the current classification as long as we are not able to put definite facts in the place of the present hypotheses. We retain therefore the old designation *Morphidae* for the family, but emphasize that it is impossible to give a common definition which is more than an enumeration of characters of a general satyroid nature. As regards the Asiatic "Morphids" in particular the descriptions of the groups will be found under the various subfamilies.

A. Subfamily: Amathusiinae.

Body and neurulation not particularly strong as compared with the size of the butterflies, but usually well proportioned. Size of the wing varying, their outline rather diverse, but simple in the Palaearctic species. As regards the markings, we find in many species a peculiar ornamental marginal pattern, and most members of the family bear on the underside ocelli, which partly resemble or are equal in arrangement to those found in certain Satyrids and American Morphids. The eyes are large, either naked or hairy. The palpi usually ascend a little above the head, being densely scaled and hairy. Antennae of moderate length, commonly less than half the length of the forewing, thin, slightly incrassate towards the apex in the shape of a club or spindle. Forelegs of the ♂♂ vestigial, the tarsus being one-jointed, while it is spiny and consists of 5 segments in the ♀. Cell closed in the forewing, open in the hindwing; subcostal of the forewing five-branched, with the exception of *Stichophthalma*, one branch only originating proximally to the end of the cell.

The *Amathusiinae* are inhabitants of the woods, flying in high virgin forest as well as in dense shrubs and bushes, bamboo jungle, etc., at any rate preferring shady localities; they are concealed in day-time resting and only become lively at sunset. An exception are the genera *Faunis*, *Xanthotaenia* and *Taenaris*, of which only the first is represented in the Palaearctic Region. The species of these genera are fond of flying about in day-time with a restless and tumbling flight in woods and open places in forests (beds of rivers). All the *Amathusiinae* love to feed on fallen-off aromatic fruit; some species are to be met with at the exuding sap of the sugar-palm (exotic species of *Amathusia*) or on refuse-heaps in the neighbourhood of human dwellings. The flight of most is at dusk strong and swift, but not continuous. The butterflies settle with the wings closed in bushes or on the ground among dry leaves and are difficult to perceive for the human eye. If disturbed in day-time they flutter away, almost touching the ground, seeking another place of concealment in the undergrowth. Some species are said to spread an agreeable scent which issues from the scent-organ of the hindwing (♂). e. g. *Amathuridia plateni* (exotic) is said to smell like violets, *Thaumantis diorea* (exotic) like Vanilla, and *Stichophthalma canadensis* (also exotic) like fresh-tanned sable.

Little is known of the life-history of the *Amathusiinae*. To judge from the habits of the well-known representative of the nymotypical genus, *Amathusia phidippus* (exotic), the larvae feed on Monocotyledons (species of Palms), being gregarious when young. The body of the larva is cylindrical, hairy, bearing an anal fork, the head having 2 horn-like processes. The pupa is suspended, boat-shaped, with 2 horns on the head.

Until 1865 the genera which belong here were placed with the Neotropical *Morphidae* s. str. ("Morphids of the Old World" according to SCHATZ). They have, however, hardly anything else in common with them than some peculiarities in habitus, this external similarity moreover being really distinct only in *Stichophthalma*, while other genera form a group of their own (*Amathusia*, *Zeuxidia*, etc.) and others again recall *Satyridae* (*Faunis*, *Xanthotaenia*). At any rate, the habits, life-history (as far as known), and the structure of the wings and body deviate so much from those of the true Morphids that F. MOORE was quite justified in classifying the *Amathusiinae* as a separate unit. STICHEL (1906) divided this subfamily in 2 tribes: *Amathusiini* and *Taenarini*, representatives only of the first occurring in the Palaearctic Region.

1. Genus: **Stichophthalma** Fldr.

Head rather small, eyes broadly ovate-convex, naked. Palpi densely and smoothly scaled and hairy. Thorax small, abdomen moderately large, about half the length of the hindwing. Forewing broad, forming a right-angled triangle. Subcostal with four branches, the first of which branches off proximally to the apex of the cell. Cell broad and short, the two angles about equally distant from the base of the wing. Only the posterior one of the discocellular veins long. Hindwing almost ovate, costal margin straight, apex rounded off. Praecostal simple, curved towards the base. Cell narrow, open. Near the base of the hindwing, close behind the median, there is in ♂ a small tuft of hairs (scent-tuft), directed forward, which is brush-like and can be erected.

Large pale-tinted butterflies, with blackish brown, usually ornamental, marginal markings; underside with more or less strongly developed discal eye-spots: in shape and markings of the underside the butterflies resemble the South American genus *Morpho*. Chiefly inhabitants of the northern districts of India; 2 forms penetrate northward into the Palaearctic region.

howqua. **S. howqua** Westw. (49a) is of considerable size, upperside of the wings ochre-yellow with black marginal marking, underside of forewing with 3, of hindwing with 5 reddish eye-spots with white pupils and black border. ♀ larger and of a more yellowish grey colour. North and Central China, Formosa. —
suffusa. **suffusa** Leech (= *tonkiniana* Fruhst.) (49a) is a form of the preceding with broader and confluent black marking, the basal half of the wing moreover is washed with reddish brown. Western China: Washan, Chiakouhow, Kweichow, Omei-shan. Tonkin.

neumogeni. **S. neumogeni** Leech (49b) is similar to the preceding, but smaller; the hindwing beneath bears two blackish marks in the cell. In the ♀ the apex of the forewing is broadly shaded with black, and bears a white spot, which in the ♂ is sometimes only indicated. — Western China: Omei-shan, Tientsuen.

2. Genus: **Amoena** Westw.

Head small, eyes ovate-convex, naked; frons with short hairs. Palpi small, densely scaled and hairy, not projecting beyond the head. Antennae thin, less than half the length of the wing, at the tip slightly fusiformly thickened. Thorax and abdomen comparatively normal in size. Forewing forming a right-angled triangle, costal margin curved, apex pointed. Costal vein long, subcostal with five branches. Subcostal joining the costal. Cell short and broad, the anterior discocellular vein short, the posterior one much longer. Hindwing nearly ovate, costal margin straightened, apex slightly angulate, distal margin toothed at the anterior median branch. Precostal simple, curved towards the base, cell open. In the anal area of the wing in the ♂ the submedian vein has a sharp excurvature in which is situated a fold with a longish tuft of scent-hairs.

Butterflies of median size and inconspicuous coloration, about the habits and life-history of which nothing definite is known. Inhabit Northern India and China; only one Palaearctic form:

oberthueri. **A. oberthueri** Stich. (49c, ♀) is a subspecies of the Indian *A. amathusia* Hew. ♂ above light yellow-ochre to pale smoky brown, a little darker towards the base, with dark brown markings, of which a prominent spot in the shape of an acute angle is especially characteristic. Underside yellow-ochre, both wings with two brown transverse lines, between which the ground is shaded with a brownish colour, sometimes the shading being so plentiful that it appears like a broad band. Spots in the distal area of both wings variable in development and number: in the forewing sometimes only a simple small ring in the posterior area or 3 or 4 rings or a row of dot-like spots, in the hindwing generally a complete row of 6 spots, which partly have white pupils. ♀ smoke-brown, otherwise on the whole agreeing with the ♂; the arcs at the edge of the hindwing are only distinct anteriorly, and are filled up with greyish yellow-ochre. Western China: Siaolu, Ta-tsien-lu.

3. Genus: **Faunis** Hbn.

Head broad, eyes ovate-convex, naked; frons with short hairs. Palpi short, smoothly scaled and hairy, scarcely projecting beyond the head. Antennae thin, only very slightly thickened towards the tip. Forewing almost forming a right-angled triangle, distal margin slightly lobed at the base. Subcostal with five branches, the first one branching off near the upper angle of the cell. Cell narrow and long, the two anterior discocellular veins short, the posterior one considerably longer, curved in the shape of an S, posteriorly much produced towards the distal margin. Hindwing almost ovate, costal margin straight, apex rounded. Praecostal simple, curved towards the base. Cell narrow, open.

Butterflies of medium size and generally inconspicuous colouring. Of the two sections *Agroeci* and *Thaumaturgi* erected by STICHEL according to tertiary sexual characters (scent-patches), only the former is represented in the Palaearctic region and only by a single form:

aerope. **F. aerope** Leech (49c). In both sexes pale grey with a slightly silky gloss; underside in the ♂ pale brownish grey with reddish transverse lines, of which the outer ones are undulating and dentate, and with a row of spots in the distal area of both wings. Beyond the cell of the forewing near the base in the ♂ a shiny friction-patch, and on the upperside of the hindwing at the subcostal a tuft of hair directed forward. In the ♀

colour and pattern of the underside as a rule darker and heavier, the lines stronger, the light dots more sharply defined. Length of forewing up to 48 mm. Central and West China, in July.

B. Subfamily: **Discophorinae**.

Butterflies with the body and wings strongly built, in size somewhat above the average of butterflies. Pattern of the upperside consisting as a rule of light bands and spots of whitish, blue or brown tints on a dark ground, there being usually 2 eye-spots on the underside of the hindwing. Head and body normal. Eyes large, naked. Palpi but little ascending above the head, densely scaled and hairy. Antennae thin, slightly thickened towards the end in the shape of a spindle, of about half the length of the forewing. Forelegs of the ♂♂ much reduced, the tarsus having but one segment, while that of the ♀ is spinose and consists of 5 segments. Abdomen of ♂ ventrally compressed to form a keel, this place not hairy, bearing on each side a distinct velvety swelling for friction. Forewing with the cell closed, the middle discocellular absent, the subcostal 4- or 5-branched, only one branch originating proximally to the cell-end, anastomosing with the costa and usually also with the second subcostal. Hindwing with open cell, the precostal simple, slightly curved basad.

The *Discophorinae* fly at day-time, but are fond of shady localities in the woods or bamboo-jungle, and do not visit flowers, but suck at faeces and rotting matter. When thus busy they keep the wings closed, but are very shy and flee for shelter into the bushes, settling there on the underside of leaves and returning to the abandoned place when their confidence is restored. The ♀♀, which are rarer, seem to rest during the day, appearing towards sunset. The flight of these insects is swift, energetic and jerky, but not continuous.

The egg of the *Discophorinae* is globular, with smooth surface. The larvae feed on Palms, Sugarcane, Bamboo and other grass-like Monocotyledons. They are cylindrical, finely pubescent, with two short anal processes; head without horns. Pupa suspended, boat-shaped, head-piece with two projections.

The separation of this subfamily as a classificatory unit from the *Amathusiinae* was carried out by STICHEL in 1902 based on natural distinguishing characters. Of the two genera which belong here, *Discophora* and *Enispe*, only the latter is represented in the Palaearctic Region, by one species.

1. Genus: **Enispe** Westw.

Head large. Eye oval, convex, naked. Palpus long, very smoothly scaled and hairy, somewhat ascending beyond the head. Antennae thin, slightly thickened towards the apex in spindle-form. Forewing a right-angled triangle, the apex pointed, in the ♀ sometimes slightly produced; subcostal 4-branched, the 1. branch originating near the cell-end, shortly anastomosing with the costa, the 2. branch absent, the last 3 branches (here subcostals 2—4) originate one from the other not far from the apex of wing; cell rather broad, but short, the 2 anterior disco-cellulars absent. Hindwing pointed-ovate, costal margin somewhat arched, apex rounded, anal angle produced, acute, precostal simple, nearly straight, its tip somewhat curved basad; cell narrow, open. ♂ with a glossy friction-spot in the anterior portion of the hindmarginal area, bearing a small brush or patch of short bristles.

Only one Palaearctic species.

E. lunatus Leech (49b). Upperside red-brown, with blackish markings, which consist of narrow arc-like halfmoons near the distal margin. Underside pale brownish yellow, somewhat darker in the basal area; across the cell of the forewing two brown angulate lines, across the centre of the wing a narrow brown transverse band, distally the markings of the upperside feebly shining through. Hindwing with an elongate brownish spot in the cell, then follows a dentate line extending from the costal margin to the submedian vein, and further a narrow brown transverse band across the centre of the wing, the outer-marginal area with the markings of the upperside feebly indicated and a row of small brown halfmoons, between which and the middle band there are two small black dots, the posterior one bearing a silvery white centre. ♀ larger; upperside ochreous, distally paler, shading into a broad whitish costodistal area. Pattern as in ♂, but heavier. Western China, East Tibet. — In both sexes there occurs a smaller form, **enervata** Stich. (49c), with the markings essentially reduced. Length of forewing 35 mm in ♂, upperside uniformly reddish yellow, only the indented distal marginal band, the sub-marginal row of lunules, and the spot in the apex of the cell are developed of the normal markings, but are strongly paled. Hindwing at the margin with a row of shadowy halfmoons and more proximally a row of four blackish elongate spots. Underside almost uniformly chrome-yellow, the basal area somewhat darker, being feebly reddish, the markings of the upperside slightly shining through. ♀ differing still more from the main form, almost like its ♂, in contradistinction to the sexual dimorphism of the previous form; colour somewhat paler, the markings greyish black, underside yellow. West-China: Siao-lu, Ta-tsien-lu; East Tibet. Perhaps dry-season form.

Alphabetical List

with references to the original descriptions of the Palaearctic forms of Morphids.

* signifies that the form is figured in the place quoted.

aerope Fau. Leech, Entomologist 23, p. 31.

enervata En. Stich., Gen. Insector. Fasc. 31, p. 12. *

howqua Stich. Westw., Trans. Ent. Soc. Lond. 1851, p. 174. *

lunatus En. Leech, Entomologist 24, Suppl. 26.

neumogeni Stich. Leech, Butt. China I, p. 114. *

oberthueri Am. Stich., Gen. Insector. Fasc. 36, p. 30. *

suffusa Stich. Leech, Butt. China I, p. 114. *

6. Family: **Nymphalidae.**

When giving in the Introduction an exposition of the systems of classification, as well as on p. 79 in the general characterization of the Satyrids, we have already mentioned E. HAASE's principle of division according to which the large section of the *Nymphalina* falls into 3 groups. To these Nymphalina belong all the butterflies with the forelegs vestigial in both sexes. The 3 groups are the *Danaomorphae* and *Satyromorphae* already dealt with, and the *Acraeomorphae* described below.

The *Acraeomorphae* comprise 3 families according to HAASE: *Nymphalidae* s. str., *Acraeidae* and *Heliconiidae*. The last is exclusively American; the Acraeids contain one species from the Palaearctic Region, the great mass of forms inhabiting chiefly Africa and the warmer countries of America. Several authors (E. REUTTER, a. o.) give to these 3 groups only the rank of subfamilies, and indeed the Acraeas are so close to the Melitaeas, and *Heliconius* to *Colaenis* and *Cethosia*, that a more trenchant separation is only possible if one neglects certain morpho- and biological distinctions of great weight. For the sake of conformity with former works on Lepidoptera we too shall separate the Acraeids as well as *Cethosia* from the Nymphalids, but draw attention to such a proceeding being in our opinion but doubtfully correct.

The Nymphalids are most sharply characterized, as follows: The butterflies have the forelegs in both sexes atrophied, the pupae are suspended by the tail only, and the larvae bear either well-developed, often branched thorns (e. g. *Vanessa*), or reduced excrescences, which are present only on the head (*Apatura*, *Charaxes*) or on the sides (*Euthalia*), being atrophied to minute setiferous warts elsewhere on the body.

The Nymphalids are represented in the Palaearctic Region by nearly 40 genera and a very large number of species, some forms extending to the highest North of the explored regions of the globe. Although not so numerous in species as the Satyrids, the Nymphalids are very conspicuous in our countries on account of their size and their often imposing colouration. This bright-coloured and often strikingly beautiful pattern stands in close phyletic connection in the various species, inclusive even of the forms with very aberrant markings, as has been proved by the fundamental experiments of Standfuss and Fischer. The original pattern of the colouration of the Nymphalids are bands according *Eimer*, or bands and spots according to *Haase*, such pattern being still recognizable in *Neptis* (black, banded with white) and *Argynnis* (red, spotted with black). Protective colouration on the underside of the wings is of rather frequent occurrence.

The *Nymphalidae*, with the exception of the Heliconius-like genus *Cethosia* and the Acraeids, are not protected by internal properties. They have correspondingly a swift and adroit flight, which becomes still more rapid when the insect is chased. An exception are only those forms which are mimetically adapted to certain slow-flying Danaids, whose flight they imitate, as for instance the genus *Hestina* and the ♀♀ of *Hypolimnas*. The butterflies have but a feeble vital power as regards enduring injuries to their body, the strong thorax breaking in many species even under the slightest pressure, the butterfly then being immediately dead or dying, not reviving and flying away as do the Danaids. The larvae and pupae of many species are strongly liable to get infested with parasites, especially *Microgaster*, which deposit the eggs on the chrysalis the moment the latter sheds the larval skin. The larvae are largely gregarious, often till pupation, and many hibernate. They feed mostly on non-poisonous plants (leaved trees, nettles, *Violaceae*, etc.), and are only defended by protective resemblance and external thorns against many of their enemies.

The butterflies without exception are day-fliers; in contradistinction to the often shade-loving Satyrids they prefer sunny roads and hillsides. As regards their distribution they are by no means restricted to the mountains, but on the contrary are much more inhabitants of the low lands and hills. Some species live almost exclusively at the height of the tree-tops, visiting the ground only to feed at certain hours of the day, when they may be baited. Others are fond of flowers and rove about everywhere in fields and gardens, being among the most abundant Lepidoptera. Some pass the cold season as imago even in the northern districts, becoming lethargic in the autumn in their hiding-places and reviving to renewed activity in the spring, sometimes also on abnormally warm winter-days, not attending to the function of propagation until the spring.

A. Subfamily: **Nymphalinae**.

Antennae long, straight, gradually incrassate to an elongate-ovate club. Eyes usually naked. Body extremely strong in built, the skeleton rigid and hard, in some *Charaxes* almost as hard as in beetles. Wings rigid and hard, entire, the hindwing nearly always with the cell open. The larvae spindle-shaped, shagreened; body without thorns, terminating in two processes; head with horns. They are usually green, being exactly adapted to the colour of the leaves of the food-plant, and hence difficult to see. The pupae are also difficult to find, being either semitransparent, as if of dull green glass, or resembling some small fruit. The butterflies are on the wing when the sun shines; they do not feed on the honey of flowers, but suck at the exuding sap of wounded trees, at damp places on roads and strong-smelling decaying matter. They are rather shy and mostly remain at a considerable height above the ground except when they are feeding. Their flight is very powerful and may be extremely swift in the fugitive insect.

a. Group **Apaturidi**.

Medium-sized butterflies, with strong, clubbed antennae, porrect pointed palpi, strong thorax and slender abdomen. The tongue of many genera is not pigmented with black-brown, but rather transparent, pale green in life, later yellowish. The cell in both wings mostly open, being closed only in *Dilipa* and *Thaleropsis*. The larva with 2 horns on the head, which are directed forward when at rest, while they are erect in the feeding insect (slug-caterpillars); they live on leaved trees and shrubs, the species which occur in the higher latitudes hibernating as larvae. The butterflies are found in the mountains as well in the low-lands. They are on the wing in midsummer, and have a swimming or rushing flight, during which the wings are kept horizontally expanded and only occasionally moved in a short abrupt stroke. With the exception of the high North they are distributed throughout the Old World north of the Equator, extending but little southwards beyond it. In North America they are represented by *Doxocampa*, in South America by *Chlorippe*; they are entirely wanting in North Africa and Australia, being replaced in Ethiopian Africa by the genus *Crenis*, containing a dozen forms.

1. Genus: **Apatura** F.

The whole genus is commonly known as „Purple Emperors“, which name is derived from the ♂♂ of certain species having a purple gloss on the upperside of the wings in a certain light. The eyes are naked; the antennae strong, about half the length of the forewing, clubbed; the palpi project beyond the head, their end-segment is short and pointed, being smoothly scaled. The outline of the wings is simple, the forewing being almost a right-angled triangle with pointed apex; subcostal 5-branched, 2 branches proximally of the cell-end, branch 3 at a considerable distance beyond the apex of the cell; anterior discocellular absent, the middle one joining with a short curve the posterior radial. Cell of both wings open. Hindwing almost triangular, costal margin straight, apex feebly pointed, anal angle acute, distal margin undulate, posteriorly sometimes dentate; precostal simple and curved outwards or forked.

We abstain from adopting the „genera“ separated by F. MOORE (Lep. Ind. vol. III), where there is no necessity to do otherwise. Moore divided the genus as follows: *Potamis* Hbn. (Type: *P. iris*), *Limina* Moore (Type: *L. subalba*), *Mimathyma* Moore (Type: *M. chevana*), *Chitoria* Moore (Type: *C. sordida*), *Dravira* Moore (Type: *D. ulupi*), *Narsenga* Moore (Type: *N. parvata*), *Rohana* Moore (*R. parisatis*), *Eulaeura* Btlr. (Type: *E. osteria*).

The species of *Apatura* have a strong and impetuous flight and are fond of coming down to the ground early in the morning in order to drink at wet places or puddles on the forest-roads or at the edge of the woods or at decaying animal matter (excrements, urine and refuse). They rest, with the wings spread out, on the leaves of shrubs and trees; the ♀♀ are much less often met with flying low than the ♂♂. — The larva is slug-like with horns on the head and an anal fork. Pupa suspended, stout, somewhat angular, strongly tapering towards the head, which is divided into two short pointed projections.

The genus is distributed over Europe and Asia to the northern districts of India, occurring also in North America.

ambica.

A. ambica Koll. (= *namouna* Dbl.) (50a ♂, 55d ♀) is a species with white bands, whose ♂ is shot with blue on the upperside. It is somewhat variable in the width of the bands and the extension of the blue gloss, which difference in character, however, is not connected with a change in locality, but probably with the season.*) In some specimens from Kutabul, Pangai (Kashmir), the gloss is not sharply limited, being also duller, the bands are widened on account of additional white dusting, especially on the hindwing, all the spots are larger, those standing in the distal marginal area of the hindwing being changed into a continuous row of whitish lunules; on the underside the red-brown band is broader, distally sharply limited, less curved, not bearing a black spot near the anal angle; on the forewing the dark spots in the cell enlarged, sometimes con-

*) The original specimen of KOLLAR's *ambica* came from Masuri (N.W. Himalaya). Should the individuals from there and the adjacent districts of Kashmir prove to belong to a special race, the name *namouna* Dbl. would have to be employed for the race from the central Himalaya (see fig. 50a). MOORE's description of the specimens from Kashmir (Kutabul) does not quite agree with the figure given by KOLLAR, which appears to be due to individual variability.

fluent (*Moore*). ab. **bhavana** *Moore* has but 2 white subapical spots on the forewing, the distal spots being *bhavana*. represented on both wings by a reddish brown band of lunules, and the blue gloss more reduced in extent. The ♀ of the species is smoky brown, with broader white bands and larger, purer white submarginal spots on both wings. — The ♂ is a strong restless flier, which shares with the European „Purple Emperors“ the peculiarity of always returning to exactly the same spot when disturbed (*ELVES*). It is really a species of the Indian territory, but extends in the North-West into Kashmir; eastwards it is distributed as far as Assam and Upper Burma, there being in the adjacent countries some more subspecies and individual varieties, which will be dealt with among the Exotics (Vol. 9).

A. iris *L.* (50a) is shot with violet-blue in the ♂, and is distinguished by the white band of the hindwing *iris*. bearing distally a sharp tooth at the anterior median vein; the outer margin of the forewing is but slightly incurved below the apex. ♀ larger than the ♂, somewhat more broad-winged, brown, without blue gloss. The nymotypical subspecies is somewhat variable individually, there occurring for instance ♂♂ with a pure blue gloss (*Hungary*), instead of violet-blue, or with the white markings flushed with rosy red, the marginal band of the hindwing being cinnamon-brown. Of known aberrations the following have received names: ab. **thau-** *thaumantis*. **mantis** *Schultz*, the white markings enlarged and widened, the elsewhere but feebly marked pale spots larger and sharper, especially at the margin of the hindwing, on the underside of the forewing the russet-red scaling restricted by the widening of the black markings; in the hindwing the narrow dark marginal line is wanting, the white median band is more or less shaded with black; so far only ♂♂ have been found at large, and but rarely, also artificially produced by experiments with temperature. — ab. **jole** *Schiff.* (50b, transition), the *jole*. counter-part of the preceding: the white markings obsolescent except the subapical spots of the forewing, the latter also sometimes absent, the whole black wing-surface shot with blue. In all transitions towards the main form, also asymmetric specimens occur; occasionally with pale radiating smears in the distal area of the hindwing. Everywhere rare among the main form, both sexes being known. — ab. **lutescens** *Schultz*, only the ♀ *lutescens*. observed, the white bands and spots shaded with darker or paler brownish yellow; likewise rarely met with at large. — Very singly there occur in this species ♀♀ in which the upperside is irrorated with golden scales, which are more condensed in the posterior area of the forewing and the anterior area of the hindwing; this is ab. **aurosquamosa** *Gillm.* — The distribution of the nymotypical subspecies with its aberrations is as follows: Central *auro-* *squamosa*. Europe, Southern England, southwards to Spain, North Italy, Dalmatia, Roumania, Bosnia; Asiatic Russia, Asia Minor (Amasia). — Egg cylindrical, ribbed, yellowish or greenish, somewhat tinged with red. Larva on *Salix caprea* (sallow), *Salix cinerea* and *aurita*; when young brown, slug-like; after the first moult there appear 2 horns on the head, the colour becomes greenish; hibernates young on a pad of silk on a branch of the food-plant near a bud; in the spring (May) the third moult takes place, the body becomes leaf-green with yellow dots and side-stripes on the anterior segments, the head blue-green with red mandibles and white stripes, the horns green, anteriorly blue, edged with yellow laterally, reddish at the tip, forked; two reddish anal processes. Pupation the end of May or in June. Pupa compressed, bluish green or whitish, head with 2 projections, abdomen with yellowish oblique stripes, duration of pupal stage about 2 weeks. The butterfly at the edge of and in leaved woods, in the early morning found drinking on dewy roads in the woods and at puddles; it becomes more restless at a later hour, flying at a considerable height, is fond of foul-smelling matter (excrements, dung, urine, cheese) and is easily baited with them. The flight is strong and graceful. The butterfly rests with spread wings on a leaf of a tree or shrub and has, like the preceding species, the habit of returning to its resting-place or near it, if disturbed. The ♀♀ rarely come down to the ground, remaining generally in the tree-tops. — In Amurland the brownish colour of the bands and spots is the rule in the ♀ (cf. *lutescens*); the ♂ is of especially large size, the ground-colour of the wings being less dark and the gloss stronger and of a lighter reddish blue. We have here do with a local form, for which it appears expedient to introduce the name **amurensis** *subsp. nov.* — In **bieti** *Oberth.* the markings are brownish yellow in the ♂, and resemble in shape and position those of the European form; but the blackish spot in the anal area of the forewing is eye-like, having a blue pupil, the eye-spot of the hindwing is enlarged and this wing bears, besides median band two other brownish transverse bands situated in the distal area. In the ♀ the markings are yellowish, except the white subapical spots of the forewing. Tibet, West and Central China, in June and July, up to about 3000 m. — Along with this brown main-form there flies in the same districts a form which is white-spotted in both sexes, but is much larger than the European race and has a deeper chocolate-brown underside; it approaches the Amur-form and may be named **recidiva** *form. nov.*; in the ♀ of this form there is usually still a dull, ochreous, *recidiva*. marginal band visible on the hindwing.

A. ilia *Schiff.* (= *Pap. iris* *Esp.*) (50c) is characterized by the distal margin of the forewing being obtusely *ilia*. angulate below the apex; in the anal area of this wing there is an ocellus ringed with yellowish, and the median band of the hindwing has no tooth-like projection on the outer side; the ♂ with violet gloss, the ♀ dull black-brown or grey-brown, the bands and spots pure white in both sexes. Very variable in colour and pattern, the ♂ as in the preceding species being sometimes shot with pure blue instead of violet. — A female form in which the markings are normally developed but have a yellowish tint, and in which (in contradistinction to dark specimens

iliona. of *clytie*) the hindwing has no marginal spots, is ♀-ab. *iliona* *Schultz*; it corresponds to ab. *lutescens* of *A. iris* *distincta*. and occurs as a rarity among the ordinary form. — In ab. *distincta* *Schultz* the band of the hindwing is separated into isolated spots by broad vein streaks of the ground-colour. — ab. *pallescens* *Schultz* is the name for paler coloured specimens of both sexes, with the ground-colour pale ashy-grey, the ♂ being but feebly glossy; the underside of these not properly developed individuals is paler, having a yellowish tint; most specimens are, it seems, artificial products of temperature-experiments, but similar specimens are also now and again met with in the open. — ab. *inspersa* *Schultz* is characterized by the bands and spots of both wings being shaded with sooty-black, the markings, however, neither disappearing nor becoming diffuse. — ab. *iliades* *Mitis* is black without any markings, at the most bearing the white subapical spots on the forewing, the ♂ being shot with blue; it occurs everywhere among the main-form, the extreme as well as all intergradations, mostly in the ♂, more rarely in the ♀. — Sometimes there appear in otherwise normal specimens some yellowish spots in the anal angle of the forewing, a brownish macular band at the margin of the hindwing and between this band and the white median one some brownish smears; this form is ab. *asta* *Schultz*, which resembles to a certain extent *bunea magnifica* *H.-Schäff.* — A broad yellow margin traversed by black veins distinguishes ab. *magnifica* *Schultz*. In the type of name (♂) the other white markings are strongly sooty as in ab. *inspersa*. A female form which belongs here has on a very dark ground the spots and median bands ivory-colour and the outer margin of the hindwing broadly brownish. Rare in nature, otherwise known as product of temperature-experiments. — ab. *clytie* *Schiff.* (= *iris* *Esp.*, *julia* *Schrk.*, *astasia* *Hbn.*) (50c) is the form in which all the otherwise normal markings are brownish, except the subapical spots of the forewing, and in which the hindwing bears a brownish, entire or macular, submarginal band. Everywhere with the main form, the ground-colour varying from lighter to darker tints in transitions to the main form, there occurring single specimens which approach, or are even identical with, the brown local races dealt with below, and which, in the southern districts of the area, are locally prevalent or the only form, merging into those brown subspecies. — In ab. *astasioides* *Stgr.* the brown bands and spots of the upperside are entirely, or almost, absent; this form takes the same position among *clytie* as ab. *iliades* among *phryne*. *ilia*. Here and there among the main form. — ab. *phryne* *Aigner* (50c) is a transition towards the previous; the markings in the central area of the forewing and a submarginal macular band on the hindwing as well as the median band are reddish brown and vestigial. Recorded from Hungary, also in other countries, together with *clytie*. — Larva of the species adult 4—5 cm, dirty green, similar to that of *iris* in shape and markings, but the reddish horns on the head with black stripe, the anterior part of the body with two red-edged yellow lines, the body from the centre backwards on each side with 5 red-margined yellow oblique stripes which extend over 2 segments, anal processes and legs blue-green. Its habits similar to those of *A. iris*; feeding especially on *Populus tremula*, *P. pyramidalis*, and on various willows, like *Salix caprea*, *viminialis* and *rosmarinifolia*. Pupa greenish, carinate dorsally; the back, the wing-cases and the processes of the head edged with yellow. The habits of the butterfly are similar to those of the preceding species; the nymotypical subspecies with the individual forms mentioned above is distributed over Germany, Belgium, France, Switzerland, Austria, Bosnia, Serbia, western and northern Hungary, Finland, the Baltic Provinces of Russia, and South Russia (Volga districts). — As already mentioned, the white-marked form becomes less abundant already in certain southern districts of West and Central Europe, brown specimens appearing as the prevalent or only form, even representing special local races (see below). It is therefore a very remarkable fact that in Portugal flies a white-spotted race which differs but very slightly from the northern form, being characterised by the white spots situated at the eye-spot of the forewing being enlarged and the hindwing bearing, nearly as in ab. *asta*, a row of small brownish spots between the whitish submarginal spots and the median band. This race, apparently the most southern one, may be introduced as *lusitanica* *subsp. nov.* Porto, Portugal. Of brown subspecies two have received names: *eos* *Rossi* (= *heos* *Meigen*, *dilutior* *Stgr.*) (50d) and *budensis* *Fuchs*. In the former the dark ground-colour is everywhere paler, being shaded and dusted with brown, especially at the base of the wings, the violet gloss is almost entirely absent, the ochre-yellow markings are dilated, being partly ill-defined, in the hindwing there is near the light submarginal band a row of roundish black-brown spots which shade off proximally. South France (Provence), Northern Italy. — The second race, *budensis* *Fuchs*, is similar, the blue gloss is entirely absent, the basal area of the hindwing is bright yellow; the dark border to the wings, usually present in *clytie*, is sometimes absent or is replaced by a heavy brown-grey arched stripe. Hungary, especially from Budapest south- and eastward, towards north less constant and characteristic, here in transitions towards *clytie* and in some places with a colouration approaching *cos* (Eperjes). Moreover known from Bulgaria and the Bukovina, and sometimes considered identical with *metis* *here*. *Freyer*, which is apparently erroneous. — The wings are still lighter in colour in *here* *Fldr.* (50e); the places of the wings which have remained dark are feebly shot with violet in the ♂, but the whole wing has a brilliant red-violet gloss when viewed at an acute angle; the median band of the hindwing is sometimes so much dilated towards the distal margin that it forms with the submarginal band a deep ochre-yellow area bearing a row of isolated rounded dark spots, from which radiate basad slight dark shadows. There occur, however, also individuals, especially among the ♀♀, in which the middle band is separated from the submarginal one by a grey-brown area, the submarginal band in this case being very broad and quite continuous. On the other hand there is a ♀-form with whitish bands and spots which has the ground of the wings light ochreous and but here and there

feebly shaded with blackish, the dark spots of the hindwing being reduced in size, roundish and entirely isolated. This conspicuous form may be introduced as ♀-ab. **sobrina** form. nov. (50e). Eastern Central and North China *sobrina*. (by *Felder* also recorded from Japan, apparently erroneously). There occur, with the yellow main form as well as in West China and in apparently identical specimens also in the Shan-States and Upper Burma (Bingham), individuals of a darker tint with the band whitish or (forewing) partly white, approaching **serarum** *Oberth.* *serarum*. (♂ = *phaedra* *Leech*) (50d). In this subspecies the ground-colour is dark, shot with deep blue in ♂, the markings white, the bands broadened, straight in the hindwing, sharply defined on both sides the hindwing bearing a row of small whitish submarginal spots; the ground-colour of the ♀ is paler, without gloss. West China (Ta-tzien-lu, Omei-shan, etc.) and Central China (Chang-yang), also Yunnan. — Another line of development is represented by a form in which the eye-spots in the anal area of the hind- and also the forewing disappear and the band of the hindwing, though remaining of the same width as before, is more sharply defined. This form, which is found in the most southern districts of Russia, is **metis** *Frr.** (55e ♀). It is somewhat smaller *metis*. than typical specimens of the species, and has the wings more sharply angulate, all the markings being ochreous as in *clytie* and more or less extended; the ocellus-like spot is sometimes altogether wanting in the hindwing, being usually reduced to a dot in the forewing. The ♀ paler, with a more or less abundant yellow dusting. — With this main-form (so called on account of its being the first-described) occurs another in which only the submarginal band of the hindwing and certain spots in the outer area of the forewing are golden yellow, the markings of the central area remaining white. This is ab. **bunea** *H.-Schäff.* (55d) and appears to be found only among the *bunea*. ♂♂.** — There occur thirdly specimens of both sexes which correspond to the main-form of *ilia*, having white markings and bearing at the margin of the hindwing only a row of obsolescent whitish spots. We name this form **gertraudis** form. nov. (55d). It is easily distinguished from *ilia* by the band of the hindwing being of even *gertraudis*. width and sharply defined and by the anal ocelli being reduced; the ground-colour of the ♀ of this form is more or less dark, sometimes almost ashy grey, the markings being diffuse. — Lastly, with the name **coelestina** *Gr.-* *coelestina*. *Grsh.* are to be designated such ♂♂ of the main-form (*metis*) which have on the upperside a stronger, delicately sky-blue not violet, gloss. In this form the light marginal band of the hindwing is broadened and extends to the spots, with which it is united. South-East Russia (Sarepta), Caucasus, and the Altai. — In Japan the species is represented by **substituta** *Btlr.* (50d), which is very similar to *metis* (and therefore often confounded with it). *substituta*. The ground-colour of this form is generally darker, the eye-like spots of both wings are not obsolescent, the submarginal spots of the hindwing elongate-ovate or rounded-quadrate, instead of arrowhead-shaped or luniform as in *metis*, and on the underside the band of the hindwing is more distinctly white, contrasting with the ground. Some specimens (from Corea) have the bands of the upperside whitish and therefore recall *bunea*. *Pryer* says of this race that the butterflies love to circle around the tops of tall willows, on which feed the larvae, and that they now and again come down to damp places on the road or are resting on the leaves of their chosen tree. The green pupa is not dissimilar in shape and colour to a young willow-leaf. The butterfly, which varies in the depth of the colour, is more abundant in the mountains than in the plains. Tokio, on the Asamayama and Oyama, in Hokaido; according to *Leech* also in North China and Corea, and according to *Staudinger* and *Heyne* on the Amur, Askold, in Suifun and Su-chan.

A. subcaerulea *Leech* (50e) is a large and magnificent species, which is not dissimilar on the upperside to *subcaerulea*. the previous species. However, the basal half is shaded with blue-green in the ♂; hindwing without band, the blue-green gloss extended to three-fourths the length; where it fades into the black-brown marginal area there are some brownish spots and in the anal area a black spot, the pale band of the distal margin is spotted with yellow at the veins, and near the edge there is a brownish line, the ground-colour of the underside being whitish blue. The ♀ is similar to the ♂, but has on the hindwing a more distinct whitish band, which is narrowed towards the hind margin. It greatly resembles an *A. iris*-♀, differing in the shape of the band of the hindwing and in a greenish tint of the dark ground-colour. — West China: Omei-shan, in June and July, and in the province of Kwei-chow.

A. laverna *Leech* (51a) recalls *A. ilia* here in the shape of the wings, but the distal margin of the fore- *laverna*. wing is more distinctly angulate below the apex and more deeply incurved below this angle. Ground-colour deep ochreous-brown, the markings blackish and similar to those of the subspecies of *A. ilia* mentioned above, but the rounded spots in the distal area of the hindwing are absent, there being here a narrow blackish band at the outer side of which stands a row of whitish spots. ♀ not known. — West China: Pu-tsu-fong, Wa-ssu-kow, Omei-shan, in June and July, at altitudes of from 1200—3000 m.

A. pallas *Leech* (51a) is a species with more pointed forewing, somewhat resembling in markings the ♂ of *pallas*. *A. iris bieti*, but the brownish spots are paler and the black spot in the anal area of the forewing is less distinct,

*) *Herrich-Schäffer*, in *Syst. Bearb. d. Schmetterl. v. Europa* Vol. I, fig. 539—541, figures a specimen agreeing with *Freyer's* figure and gives, Suppl. p. 6, *Syrmia* (= *Slavonia*) as habitat. The form is also recorded from Hungary and the *Bukovina* (*Spuler*), as well as *Bulgaria* (*Rebel*), apparently only in single specimens.

**) The ♀ figured by *Herrich-Schäffer* fig. 164 as *bunea* belongs to the main-form *metis*.

not being ocellus-like, the median band of the hindwing is narrower and its proximal edge curved, the wing-surface without gloss; the ground-colour of the underside greenish, the markings very peculiar, almost recalling those of *Argynnis paphia*. — Only 1 ♂ known, from Chia-ku-ho, July, found at an altitude of about 520 m.

fasciola. **A. fasciola** *Leech* (51a) has the same wing-shape and is also without blue gloss, but has on the dark brown wings but a single common ochreous middle band, which on the forewing is broken in the centre and anteriorly produced into an obtuse tooth projecting towards the outer margin. The underside is brownish, with a darker median line, which corresponds to the proximal edge of the bands of the upperside and is distally shaded with whitish and grey; in the forewing there is a whitish subapical spot and below it a row of small light spots, the anal area of the hindwing being slightly shaded with white and bearing a yellow-ringed eye-spot. The sexes do not appear to differ, the ♀ being only a little larger. — Central China: Chang-yang, in July and August; West China: Omei-shan, Kwei-chow.

fulva. **A. fulva** *Leech* (51a) is a subspecies of *ulupi* *Doherty* from Assam. Ground-colour leather-brown, without lustre, the sparse markings dark brown; the underside dull ochreous, the markings of the upperside reappearing as dark shadows, a spot in the anal area of the forewing developed to an ocellus, the hindwing with a whitish green tint in some places, bearing in the distal area a row of small white spots, at the edge a dark double line, of which the inner one is broadened by dark shading, and in the anal area a small ocellus-like spot. — West China: Omei-shan, Kwei-chow.

nycteis. **A. nycteis** *Mén.* (51c) has less elongate wings than the preceding species, differing very considerably from the same, resembling certain species of the genus *Athyma* on the upperside, especially in the cell of the forewing bearing a white longitudinal streak along the median vein. Underside violet-brown, with the markings of the upperside reappearing, but partly widened and of a white colour which has almost a mother-of-pearl gloss; in the basal area of the hindwing there is anteriorly a long curved white spot, between the middle band and the submarginal row of spots there is a row of bluish white spots in the dark ground-colour. ♀ similar to ♂, larger, rarely with a row of red-brown spots near the outer margin of the hindwing. An apparently rare form of this species is ab. **cassiope** *Mén.* (51c), in which the white spots in the central area of the forewing are so much enlarged as to form an almost continuous, broad, strongly curved band; the middle band of the hindwing, too, is essentially dilated. Larva slug-like, dark green, laterally with light oblique stripes, segments 6—12 each with 2 thorny processes, those on segments 6, 8 and 11 being longer and thicker than the others, at the apex of the body 2 long, pointed processes; on the head 2 long thorny horns, which terminate each in 2 roundish knobs directed forward; head and back with single small short thorns, which are longest on the sides of the head, where they also stand more closely together; the parts of the body ventrally of the spiracles clothed with minute yellowish hairs; ventral surface paler than the back; length of the adult larva 52 mm. In June on Elm. Pupa whitish green like that of *ilia* and *iris*, but bearing a row of obtuse tubercles on the sharply keeled dorsal side of the abdomen (according to GRÄSER). — Amurland, Ussuri, Sutchan, Corea.

leechi. **A. chevana** *Moore*, from North India, is represented in China by the subspecies **leechi** *Moore* (= chevana *Leech*) (51b). The wings are broader than in the preceding species, but the markings are similar. The upperside is darker than in the nymotypical subspecies, the disc being shot with deep blue in certain lights, all the markings narrower and purer white. The underside recalls *A. ambica* by its shining whitish blue ground-colour and resembles in markings the next species. In the ♀ the blue lustre is absent, the markings are broader and pale yellow. — West China: Mupin; Central China: Chang-Yang.

schrenckii. **A. schrenckii** *Mén.* (51b). Upperside black-brown: markings of the forewing white, a spot at the hind-margin bluish, being connected with the white discal markings by a russet-red double spot situated in front of it; on the hindwing a very broad white band which is bordered all round by iridescent-blue scaling, at the distal margin a row of bluish white spots, the posterior ones being indistinct. The dark ground of both wings shot with blue in certain lights. ♀ larger, ground-colour duller, with a greenish sheen, before the hindmargin of the forewing an abbreviated brownish band instead of the bluish spot. The underside of the hindwing of both sexes light blue with silvery gloss, and with an olive-brown, black-edged transverse band and brown border. Larva pale green, in habitus similar to a very large larva of *A. ilia* and almost like that of *nycteis*; on the back of segments 5, 7 and 10 there are two wart-like tubercles which bear a small hook, at the apex of the body a fork formed of 2 thin processes, which are longer than in the European species of *Apatura*. On *Ostrya*. Pupa fastened on the upperside of a leaf, its shape and colour as in the allied species (according to RÜHL and GRÄSER). — Amurland, Ussuri, Corea.

subalba. **A. subalba** *Pouj.* (51c) stands somewhat apart from the series of allied species and recalls very much *Helcyra*. Upperside uniformly black-brown, with some dull white spots; the underside silvery white, slightly bluish, with a brownish spot in the hinder angle of the forewing, the white spots of the upperside slightly

shining through. ♀ like the ♂, the wings somewhat broader and more obtuse. In some specimens of both sexes the spots at the costal margin of the hindwing are absent or very indistinct; in one of the specimens there appears in the anal angle of the hindwing beneath a large spot shaped like a C, which is distally edged with a black line and above which there is a blackish spot in the posterior median interspace (after LEECH). West China, June-August; Central-China, May-July.

2. Genus: **Dilipa** Moore.

The species of this genus resemble in aspect certain forms of *Apatura* (*fulva*), from which *Dilipa* differs mainly in the cell of the fore- and hindwing being closed by a distinct posterior discocellular. Further distinctions: eyes hairy; the 2. subcostal of the forewing originates at a considerable distance beyond the apex of the cell; precostal of the hindwing forked. Palpi and antennae as in *Apatura*. Larva slug-like, with 4 short dorsal projections; head with 2 horns. Pupa suspended, carinate, head with 2 processes.

D. fenestra Leech (♂ = *Apatura chrysus* Oberth.) (51c) is a singular species, red-brown being its prevailing *fenestra*. ground-colour. In the ♂ the forewing dusted with blackish in the basal area, there being further a broad black oblique band from the costal margin to the second median branch, behind the band a round spot as in the ♀, at the hinder angle an elongate spot, anteriorly 2 transparent subapical spots; the distal margin edged with black. Hindwing also margined with black distally, with a median band composed of 6 black spots, the basal and hindmarginal areas grey dusted with black. Underside as in ♀, ground-colour of the forewing more yellow. West China: Omei-shan, Lufang; in July, very rare. — The second, but essentially different, known species of this genus, *D. morgiana* Westw., inhabits the mountains of North India and touches the Palaearctic territory only in the North-West (Kashmir). — Nothing is known of the habits.

3. Genus: **Sephisa** Moore.

In the general habitus likewise similar to certain species of *Apatura* (*laverna*): eyes naked; antennae long, with distinct club; palpi erect, densely covered with scales; thorax robust; abdomen relatively small. Distal margin of forewing obtusely angulate below the apex; costal vein terminating beyond the centre of the costal margin, subcostal 4-branched, 3 branches standing beyond the cell. The cell open in both wings. Precostal of hindwing simple, curved outwards. Larva limaciform, with granulated lobes, the head with horns, the apex of the body with 2 processes.

S. dichroa Koll. (56a). Upperside reddish brown, with black markings, the forewing beneath similar, in *dichroa*. places dusted with whitish or whitish blue, hindwing almost entirely whitish, with some yellow smears, a row of blackish spots in the distal area and a submarginal undulate line. ♀ somewhat larger, the wings broader, on the upper-side not essentially different from ♂, beneath the forewing more abundantly whitish, on the hindwing the blackish spots developed to a lunate band, on the whole duller in tint. — Larva green, slug-like, with 2 pointed anal processes, skin rugate and shagreened, the 8. and 11. segments each with 2 small, granulated, lobiform projections, the anterior segments with 2 yellowish dorsal lines, the posterior segments with oblique stripes, also yellowish, between the dorsal protuberances a red spot; the head with 2 ochre-yellow branched horns. It feeds on a species of oak (*Quercus incana*); rests on a silk-pad on the upperside of a leaf along the centre, the head being directed towards the stalk with the frons downwards, the horns therefore projecting forward. Pupation in May. The butterfly appears early in June; it is fond of ripe fruit, and is met with in open woods resting on the branches of tall shrubs, quickly darting away and returning to the same spot (MOORE, LANG). West Himalaya, in Kashmir extending into Palaearctic territory (Chumba Mts.). — **princeps** Fixsen (= *cauta* Leech) *princeps*. (56b) is a northern representative of the species with the black markings somewhat reduced, the submarginal and subapical spots of the forewing being brown instead of white. Corea; China: Chang-Yang, Omei-shan. Besides ♀♀ coloured like the ♂♂ there occur in China specimens with all the brownish places of the ordinary ♀♀ of a white colour; this form is called ab. **albimacula** Leech (56b); it agrees otherwise in the position and *albimacula*. shape of the spots and in the outline of the wings with the main form of the ♀. — **chandra** Moore (56a) is *chandra*. distinguished by the reddish brown ground-colour of the forewing being reduced to a few spots situated in the basal area; moreover, the oblique macular band in the distal area is pure white; the hindwing, besides a black cell-spot, has no essential differences from *dichroa*. It is doubtful, if *chandra* is specifically distinct, and it is described here for the sake of completeness, apparently not extending into the Palaearctic Region. The ♀ appears in several forms, which will be dealt with in the volume on the Exotics; Nepal and Sikkim are the true home of the form, which is distributed as far eastwards as Upper Siam.

4. Genus: **Thaleropsis** *Stgr.*

In habitus similar to the preceding genus, but smaller. Eyes hairy. Palpi long, densely scaled and hairy, projecting above the head. Antennae long, about half the length of the forewing, somewhat incrassate at the apex. Forewing shaped as in *Apatura*, distal margin obtusely angulate below the apex; subcostal 5-branched, only 1 branch proximally to the apex of the cell closed. Hindwing triangular, costal margin rounded, anal angle produced, precostal forked, cell closed. — Larva smooth, limaciform, with horns on the head and a forked tail. — Only one species in the Palaearctic Region.

ionia. **T. ionia** *Ev.* (= *Apatura ammonia* *H.-Schäff.*) (56a). Upperside reddish ochreous, with black markings and white subapical spots. Underside with yellowish and whitish tints, on the forewing the markings of the upperside partly feebly indicated, partly replaced by black spots; hindwing with a brown transverse band in the centre. ♀ somewhat larger, wings broader, ground-colour paler, otherwise like the ♂. In April, May, and again from the end of July until September, very common, even in the streets of the villages. Larva green, with a very large head, whose horns terminate in two processes curving backwards, and which is black in the young larva. It is found in July and again in the autumn on the Nettle-tree (*Celtis*) between leaves spun together. Pupa similar to that of *Apatura*, but the head-case obtuse. — Northern Asia Minor, Taurus, Kurdistan, Armenia. The butterfly resembles on the wing *Polygonia egea*, which flies at the same time.

5. Genus: **Sasakia** *Moore.*

Strongly built large butterflies, the ♂ of the nymotypical species with magnificent blue gloss on the wings. Eyes large, naked; palpi densely covered with scales and hairs, somewhat projecting above the head; antennae strong, about half the length of the forewing, somewhat thickening at the apex. Forewing a right-angled triangle, with pointed apex; subcostal 5-branched, 2 branches from the cell, or the 2. exactly from the upper angle; anterior discocellular absent, cell open. Hindwing almost ovate, with the costal margin somewhat flattened, the apex rounded, the anal angle distinct, precostal forked, cell open. — Pupa of the nymotypical species thick and clumsy, of the *Apatura*-type, from which it may be justified to conclude that also the larva has a corresponding structure. Lively sun-loving butterflies whose flight and habits as far as known strongly recall the European *Apaturids*.

The species which belong here have hitherto been placed in *Euripus*. But as the forms of that genus are quite different in facies as well as in morphology and life-history (larva with hairy warts), the generic separation proposed by F. Moore is here adopted.

charonda. **S. charonda** *Hew.* (51d). ♂ with vivid blue gloss, only the apical area of the forewing and the distal area of the hindwing being black. Underside of the hindwing greenish, with a red anal spot and indistinct whitish spots. ♀ considerably larger, occurring in two forms: the commoner one dull black-brown, without vestige of gloss, with yellowish spots; the second form slightly shot with blue, the spots being mostly white; this form *splendens.* may be called f. **splendens** *Stich.* The ♂ of this species is a bold warrior, whose habits have been described by PRYER as follows; „It is quite fearless and has a favourite stand, often on the summit of a tall tree, from which it sallies forth and attacks any passing bird or insect, not returning to its perch till it has chased the intruder away. Almost the only way to obtain it is to find an oak or chestnut which has been attacked by boring larvae, the fomenting sap from their burrows being very attractive to it. Each individual generally has its favourite tree to which it descends to suck the flowing sap, fighting the other insects which also crowd such attractive spots. On such a tree it may often be seen in company with 2 or 3 enormous Hornets and a crowd of the Satyrid *Lethe sicelis*, stag and other beetles, which it buffets with its wings until its imperial claims are acknowledged. If capture be missed the first time, patience is needed, as it will in the course of an hour or so surely return“. The pupa is large and clumsy, of a beautiful green colour. Although PRYER often got eggs, and obtained from them young larvae, he never succeeded in discovering the food-plant. Time of appearance: July. Japan: *coreana.* Yokohama, Yamata, Kaga, etc. — **coreana** *Leech* (52a) is a but slightly different form, which has the spots of the upperside, especially on the hindwing, somewhat enlarged and bears on the hindwing beneath prominent brown markings. This form occurs in woods, remains in the crowns of trees as the preceding, and is difficult to catch. Corea; Central China (Chang-Yang); West China (Mupin), July.

funbris. **S. funbris** *Leech* (52a) is of the same size, but differs very much in the black colour of the wings. Forewing with a red spot at the base somewhat dusted with blackish; outer half of both wings between the veins with long whitish streaks, which are connected in pairs in arc-shape on the forewing and are more prominent on the underside. A very rare species, whose ♀ is unknown: from West China: Omei-shan, Tatongkiao, *genestieri.* Tientsuen, in July. — **genestieri** *Oberth.*, from Lutsekiang, differs from the nymotypical form in the internervular streaks of the hindwing above and below being united in pairs so as to form arcs, as on the forewing, and being purer white. The red basal spot of the forewing is brighter and also purer in tint.

6. Genus: **Diagora** Snell.

As regards morphological characters this genus is very similar to *Sasakia*, but the 2. subcostal branches off at a short or moderately long distance beyond the upper angle of the cell. In the shape of the wings the two genera also agree fairly well, but differ very much in colour and pattern. The species of *Diagora* have the ground-colour light, whitish or greenish, and bear blackish streaks along the veins and spots, especially in the outer area of the forewing. The butterflies bear a great resemblance to certain Danaids and *Hestina*, differing, also from the latter, very much in structure as well as in habits and the early stages, the habits being the same as in the Apaturids. By thus separating generically the forms dealt with below we put an end to the uncertainty with which they have been placed on account of the similarity in aspect with the genera *Euripus* and *Hestina*, in a similar way as intended by F. Moore by erecting his genus *Parhestina*. This author, however, incorrectly rejected the earlier name *Diagora*, erroneously supposing it to be already employed in the animal kingdom and also on account of supposed tautonymy.*)

The larva of the genus, as far as known, has the general Apaturid-character: limaciform, naked, with 2 horns on the head. The butterflies fly around the tree-tops and suck at the exuding sap of trees (*D. japonica*).

D. subviridis *Leech* (60b) is presumably a subspecies of *persimilis* *Westw.*, the nymotypical form of which *subviridis*. inhabits the Himalaya; *subviridis* differs from the same only in the whitish green streaks and spots being enlarged, the underside being of a greenish tint. — Still larger are the light markings in ab. **yankowskyi** *Sm.-Krb.*, from *yankowskyi*. Wy-chang, which can only be considered an insignificant aberration. The light colour has especially increased on the hindwing, on which only the veins are shaded with dark, apart from the distal marginal area; especially light is also the underside, the base of the hindwing being slightly yellowish. In the districts inhabited by the main form there occur specimens in which the upperside is more abundantly marked with black: the greenish white spots are better defined, the markings of the upperside of the forewing are more distinctly indicated beneath, the hindwing is greenish white with a large blackish spot at the costal margin and with more distinct dark markings in the marginal area. The name of this form is ab. **intermedia** *Leech*; West-China: Mupin; *intermedia*. Wa-ssu-kow, Ta-tsien-lu, in June, July. Some specimens resemble the form from the Western Himalaya, *zella* *Btlr.*, others again form a transition to **chinensis** *Leech* (56c). In this the ground-colour is white, restricted to *chinensis*. sharply defined spots and stripes in consequence of the extension of the black, the underside of the hindwing bearing a yellow spot at the base and a stripe of the same colour at the costal as well as the abdominal margin; *japonica*. Mupin, Wa-shan. — **japonica** *Fldr.* (= *Diadema diagoras* *Hew.*) (56b, c) is very similar to the preceding form, but usually somewhat larger, the stripes and spots being slightly yellowish and the dark markings of the underside reduced and diffuse. An extreme of this direction of development is reached in ab. **australis** *Leech* (56e), *australis*. which flies together with *japonica*. Here the yellow colour is much extended on the upperside, the prevalent tint of the underside being a yellowish white; occurs in both sexes, but especially often among the ♀♀. Widely distributed in Japan, in 2 broods. One often observes the butterfly flying around the tree-tops, especially *Celtis*, or imbibing the sap flowing from the borings of insects. The larva is green, in shape like that of the Apaturids, with 2 strong horns on the head; it hibernates on branches of trees, assuming the grey colour of the bark.

D. viridis *Leech* (60a) is a larger, lighter coloured form, with a very similar pattern, which also indicates *viridis*. a close affinity of this species with *mena* *Moore*, whose habitat is not known, the insect occurring presumably in the Himalaya. The ground-colour of *viridis* is pale green, the markings consist of blackish streaks, which, on the forewing, are distally dilated to form a broad dark area bearing light spots. On the hindwing beneath the base and a streak each at the costal and abdominal margins are yellow, and the dark markings of the upperside are here feebly indicated and diffuse. The ♀ is similar, the pale stripes are enlarged in consequence of the reduction of the black markings. Central China: Chang-Yang, in June, July. — **nigrivena** *Leech* (60b), *nigrivena*. which is connected with the preceding by intergradations, has more numerous light spots in the dark distal area of the forewing, the hindwing is somewhat incurved at the median veins and bears feeble traces of reddish rings and halfmoons proximally to a row of dark submarginal spots. On the underside of the hindwing the yellow colour is wanting at the base and abdominal margin. West China: Mupin, Wa-shan, Chia-ting-fu. Central China with the preceding. According to WALKER the larva is slug-like, smooth, green, armed on the head with two branched horns.

7. Genus: **Dichorragia** *Btlr.*

Strongly built butterflies. Head large; eyes naked; palpi porrect, not projecting above the head; antennae strong, about $\frac{2}{3}$ the length of the forewing, clubbed at the end. Forewing a right-angled triangle, the

*) Apart from tautonymy (literal identity of the generic and specific names) not being a sufficient reason for rejecting one of the two tautonomic names, the respective name (a synonym) is *diagoras*. Identical with the same is the name of a genus of Orthoptera: *Diagoras* *Stål*. There is therefore no objection to using the generic term *Diagora* *Snellen*.

apex acutely angulate; subcostal 5-branched, 2 branches proximally to the apex of the cell. Cell closed in both wings. Hindwing a triangle with the sides curved, precostal erect, its tip curved outwards; cell long, about half the length of the wing. Upperside of the wings black, tinged with green, bearing white and greenish spots and smears, and at the margin a whitish zigzag line. The butterflies are strong fliers, are fond of settling on roads in the woods, and rest with the wings half erect. Early stages not known.

nesimachus.

D. nesimachus Bdv. (60b). Upperside black-green; the forewing with black dots and narrow black margin, besides bearing white and greenish spots dispersed over the whole surface, and an abbreviated oblique costal band near the apex of the cell composed of grey smears. There are further a row of white submarginal dots and white arcuate bars in the distal area of both wings, the hindwing, moreover, has a row of black spots in the marginal area and a curved row of bluish spots on the disc; in the apical area a larger white spot. Distal margin of hindwing dentate-undulate. ♀ somewhat larger, the spots larger, the ground-colour less dark. The butterflies resemble in habits the other Apaturids; their flight is violent, and they have the habit of returning to their resting-place even if they have been disturbed several times, and of settling with half-spread wings on roads in the woods. The nymotypical subspecies occurs in North India, Assam, Burma, Tenasserim, the Malay Peninsula, Sumatra, Java, Borneo, and the Philippines; it touches in the Himalaya the Palaearctic territory and is here described for the sake of completeness. — In West China there flies a form which is very similar

nesseus.

to the nymotypical race, but is much less strongly spotted; this is **nesseus** Gr.-Smith. The upperside of the wings is dark grey-green; in the cell of the forewing there are 3 black elongate spots, the marginal area has a lighter tint, being bounded by acute arcs, between the veins are long white and whitish acute double arcs, of which the external ones are filled up with black, this colour being continuous with the narrowly black margin. The hindwing is darker, anteriorly slightly violet, the veins bearing blackish, radiating, streaks, at the margin are large black wedge-shaped spots, in the anterior area white double angles. Underside brown; in the cell of the forewing two bluish white transverse spots, in the central area a number of white and whitish spots, in the marginal area long white acute double arcs; hindwing paler in the distal area, which is separated from the basal area by a row of blackish halfmoons, some bluish dots in the basal and discal areas, at the distal margin some blackish sagittate spots edged with bluish white. North and West China: Omei-shan, Ta-tsien-lu. —

nesiotes.

Another local race inhabits Japan; this is **nesiotes** Fruhst. (60b), with the spots and dots of the upperside purer white and broader. The markings are shortened, especially the subapical diffuse spots of the forewing. In the hindwing the black spots of the distal area very distinct, the other greenish spots, however, but dull and diffuse, some of them entirely obsolete. Central Japan: Nikko, Tosa, Niigata, more in the mountains, June and July.

8. Genus: **Helcyra** Fldr.

In habitus similar to *Eriboea*, but the hindwing without tail. Head broad; eyes large, naked; palpi densely scaled, but projecting little above the head; antennae slender, the club flat (elliptical). Forewing a right-angled triangle, apex acute; subcostal 5-branched, 1. branch considerably before the cell-end, 2. branch originating soon beyond the 1., anterior discocellular atrophied, cell open. Hindwing almost ovate, the distal margin strongly undulate; precostal simple, curved distad, cell open.

Only one form in the Palaearctic Region:

superba.

H. superba Leech (52b), which must be considered the northern representative of *hemina* Hew., the nymotypical race inhabiting India. Upperside white, with a silky gloss, apical area black with 2 white spots; hindwing with a sharply defined submarginal zigzag line. The markings of the upperside feebly shining through beneath, the hindwing with a transverse row of black halfmoons and 2 blackish-bordered orange spots, there being sometimes such a spot also in the middle median cellule of the forewing. ♀ not different, only being larger. — Not rare in July at Chia-ku-how (West China), singly in the province Kweichow and at Mupin.

b. Group Charaxidi.

Large, rarely medium-sized, very robust butterflies with hard rigid wings. Head large, broad, with the palpi pointed and porrect. Antennae thick, but slightly and quite gradually incrassate at the apex. Thorax very large and broad, much more voluminous than the proportionately small abdomen, which appears as an appendix to the former, being covered at the base by two lateral tufts of hair of the thorax. The wings very broad, strong-veined, the distal margin of the forewing concave in the ♂; the margin of the hindwing dentate, often with 2 projections. Larva with a rough shagreened skin, the rather large head bearing 4 horns. They often live on plants with very hard leaves and grow rather quickly. The pupa short, resembling a berry. The butterflies imbibe with preference the sap flowing from the wounds of trees, and can be baited with decaying matter, sometimes settling on a perspiring hand or the back of workmen in order to drink. The ♂♂ sit on the ends of certain projecting branches or on the top of bushes, to which place they always return. If one catches a specimen, another will soon

after occupy the same resting place. Here the butterfly rests with the wings entirely or almost closed, rubbing the hindwing against the forewing in a peculiar way. The flight is extremely powerful, but at the same time irregular and fluttering, only occasionally swinging or sailing. The species differ very much from each other as regards abundance. They appear twice a year in the temperate zone, in the early summer and the autumn, while some occur in the tropics all the year round. The sexes meet for mating on the summits of hills and on tree-tops, where the ♂♂ lie in wait, darting at the ♀♀ as they rush by. Copulation is sometimes of longer duration.

9. Genus: **Eriboea** Hbn. *)

Strongly built butterflies. Head broad; eyes large, naked; palpi densely scaled, projecting above the head; antennae strong, short, below half the length of the forewing, terminating in a feeble club. Forewing a right-angled triangle, apex rather acute; subcostal 5-branched, branches 1 and 2 before the cell-end, 3 and 4 soon beyond it, 4 and 5 forming a very long fork, anterior discocellular very short, cell closed. Hindwing distorted-quadrangular, costal margin convex, distal margin strongly undulate, with a projection or tail at the 2. and 3. median vein, abdominal margin with deep fold for the reception of the abdomen; praecostal forked, cell open. Larva slender, slug-like, naked, head with 4 horns, apex of abdomen with 2 processes. Pupa stout, head broad, truncate. The butterflies have a strong impetuous flight and remain generally in the tree-tops. They suck at decaying animal matter, dung, etc., and have, like the Apaturids, the habit of returning to a particular resting-place when disturbed.

E. athamas Dru. (61a). Ground-colour of the wings greenish; forewing with a more or less extended black *athamas*. costal-distal marginal area and one or more subapical spots; hindwing broadly black at the outer and hinder margins, near the former a row of yellowish spots and whitish dots. Underside paler, shaded with silvery white. The species has 2 broods and varies rather considerably according to season. The nymtotypical form *athamas* is on the wing from August to December, the black border is relatively narrow and bears a small subapical spot in addition to the larger one, the light-coloured band-like central area of the forewing about as broad as the dark margin, the whitish submarginal spots of the hindwing often very small, the small yellowish spots more or less distinct and pure. ♀ larger, the wings broader, the light central area of both wings wider, the subapical spots of the forewing larger. — As ab. **hamasta** Moore (52c) a form is known in which the central area *hamasta*. of both wings is widened. Flies in the Himalaya in March; wings somewhat more elongate, the light area of the forewing about twice as broad as the dark margin, the base of both wings and the abdominal margin of the hindwing paler, the inner subapical spot of the forewing large, the exterior one small or absent. Underside paler, the dark discal markings more or less diffuse or absent. — The third named form, **bharata** Fldr., is inter- *bharata*. mediate and flies from April till June. Shape as in *athamas*, the hindwing sometimes rather more triangular. The light area of the forewing $\frac{1}{2}$ to $\frac{1}{3}$ broader than the dark marginal area, the inner subapical spot of the forewing very much enlarged, on the hindwing the outer edge of the light area crosses the anterior median vein about the middle of its curvature. Underside pale, the black markings of the basal area sometimes less strongly developed than in the main form, the 2. spot in the cell of the forewing sometimes absent, the red postdiscal spots less prominent and more regularly curved. However, the form on the whole does not show any essential differences and moreover is not constant. As a further characteristic it has been mentioned that the light area of the underside is yellow with white edge. The reduction of the red spots is said to be the most essential difference (ROTHSCHILD-JORDAN). — The larva of the species is slender, slug-like, dark green, the head with 4 diverging, curved, pointed horns, anal segment cleft into two processes; the sides of the body with yellow oblique stripes, beneath which there is a row of white spots. Pupa thick, ovate-cylindrical, green, shaded with white, back and breast convex, head broad, angulate, truncate; from June till October on Leguminosae: *Poinciana regia* Boj., *Caesalpinia mimosioides* Lam., *Acacia pennata* Willd., *Albizia lebbek* Benth., *Adenanthera pavonica* and *Grewia* (Tiliaceae); feeds at night. Inhabits Kashmir, South China, N.W. India to Burma and Siam, Chin Mts., Shan States, also Malacca and Tonkin. Also some island-forms are known, which will be dealt with in the volume on Exotics.

E. rothschildi Leech (52c) is the Chinese representative of *E. eudamippus* Dbl. from India. Upperside *rothschildi*. yellowish green; forewing with a black-brown area occupying the base and costal and distal margins, with some spots in the costal area and a double row of spots before the distal margin. Hindwing with a dark submarginal band,

*) The generic name *Eulepis* introduced by F. MOORE must be rejected, as it was already employed by BILLBERG (1820) for a division of *Nymphidium* F., a genus of "Zephyriids" (= Lycaenids and Lemoniids), the only representative mentioned, *E. athamas* (nomen nudum!) therefore certainly not being the same as *athamas* Dru. If a word has been once used as a generic term in zoological nomenclature it cannot be employed again as a name for a genus. In its place we have to employ *Eriboea* Hbn. (1816), with *athamas* Dru. as type. The fixation of the type by SCUDDER (1875: *etheocles* Cr.) and by ROTHSCCHILD-JORDAN (1898: *brutus* Cr.) is incorrect, since both species belong to the genus *Charaxes* s. str.

at the outside of which is a row of bluish white spots. Underside silvery white, with narrow yellow bands. Differs from the Indian form mainly in the spots of the forewing being larger, the submarginal spots of the hindwing smaller and the marginal line broader; the bands on the underside are of a dark colour. ♀ similar to the ♂, the dark parts less deep in tint, the light central area of the forewing broader; on the hindwing the base less extended black-brown, the anterior submarginal spots paler, less bluish. — Central and West China, in July, August.

dolon. **E. dolon** Westw. (61a) is a similar species, with the ground-colour yellowish white, slightly greenish; on the forewing the costal margin narrowly, the apex broadly and the distal margin again narrowly black, with a row of whitish spots close to the proximal edge of the dark distal area and a black discocellular bar; hindwing with blackish brown submarginal band, enclosing a row of bluish white spots. Underside glossy white with a slight greenish tint; in the forewing a bar on the discocellulars and an oblique stripe in the distal area from the costa to the hinder angle brown, partly edged with black; hindwing with a transverse band which is feebly edged with black externally, there following further distad an undulate band and at the margin a third band, all three brown; in the middle band and again between it and the marginal one a row of black spots. North-West Himalaya, Kashmir, up to about 2400 m, in April and May. — In the Central Himalayas (Nepal, Sikkim, etc.) there flies a slightly different form, which has been separated as *E. dolon centralis* Rothsch.

posidonius. **E. posidonius** Leech (= *elitiphon* Oberth.) (52d). Likewise yellowish white, with blackish brown costal and distal marginal areas on the forewing, within the distal area a row of light submarginal spots, there being anteriorly a larger subapical spot and a smaller costal one; hindwing with a dark submarginal band which is outwardly dentate, in the anal angle yellow dusting and on the tails blue sealing. Underside greenish, with brown band characteristically arranged, and a greyish violet margin edged with brown and ochreous. As a morphological peculiarity it may be mentioned that the cell of the forewing is long as compared with the allied species (ROTHSCHILD-JORDAN). — West China: Nitu, in May; Wa-ssu-kou, in June; Tse-ku.

narcaea. **E. narcaea** Hew. (52d). Upperside greenish, with a characteristic blackish brown costal and distal border, which includes a large light subcostal patch and in the distal marginal area a broad band of the ground-colour, there being on the median nervure an obtuse projection directed basad. In the hindwing a narrow marginal and a discal band also black, at the anal angle a yellow spot centred with bluish and black, resembling an ocellus. Underside pale green, the paler brown bands edged with silvery white, at the margin of the hindwing a golden yellow stripe, with which a row of black dots is contiguous; a second transverse band, situated in the basal area of the forewing and abdominal area of the hindwing is on the forewing connected with the brown costal margin by means of a transverse bar, and terminates anteriorly in an obtuse process curved outwards. ab. **menedemus** *mandarinus*. Oberth. is a small and more brightly coloured aberration with shorter and obtuse tails. — **mandarinus** Fldr. (52d) is considered to be the wet-season form of *narcaea*. It differs rather conspicuously in the black-brown markings *thibetana*. in the basal and distal areas of both wings being extended. The ab. **thibetana** Oberth. (52d) is a but slightly differing transitional form, in which the enlargement of the dark bands in the marginal area of both wings is not so much advanced as in the preceding, there remaining still an almost continuous light submarginal band, while on the underside the brown bands are less bright and narrower. East, Central and West China, from Ning-po to Mupin. April till August, in 2 broods. The species has also been recorded from Japan (LEWES), but the occurrence in that country has not been confirmed.

10. Genus: **Charaxes** O.

In habitus similar to the preceding genus. Eyes large, naked; palpi densely scaled and hairy, reaching above the head; antennae strong, below half the length of the forewing, slightly clubbed. Body robust, abdomen short. Forewing almost a right-angled triangle, apex rather acute, costal margin arched; subcostal 5-branched, 2 branches before the cell-end, branches 3 and 4 terminating at a short distance from each other soon beyond the upper angle of the cell, branches 4 and 5 forming a very long curved fork; anterior discocellular vestigial, the middle one also short, the posterior one longer, but weak; cell short, narrow, closed. Hindwing almost quadrangular, the costal margin curved, the distal margin usually undulate, with 2 more or less long, often curved tails at the anterior and posterior median vein; praecostal simple, curved outwards, sometimes slightly forked, cell closed (distinction from *Eriboca*).

Egg globular, somewhat broader than high, above ribbed transversely and longitudinally. Larva lima-form, with granulated skin, the head with 4 horns, apex of body with 2 processes, colour usually green; it reposes on a silky pad on the upperside of a leaf of the food-plant. Pupa suspended, clumsy, the back strongly curved, head-piece bifid. The butterflies have a rapid flight, rest on the leaves of projecting twigs of trees and return obstinately to this resting-place when disturbed. They show a preference for ripe fruit, decaying animal

matter, excrements, etc., even the perspiration of man and beast is said to be attractive for them. The coloration is very diversified, the underside bearing especially often a many-coloured and loud pattern. Distributed over the tropics and subtropics of the Old World, Africa being particularly rich in species, in the second place the Indo-Australian Region, while only one species each is found in the temperate zone and on the European Continent.

C. jasius L. (= *jason* L., *rhea* Hbn., *unedonis* Hbn.) (52b, c). Upperside brown, very faintly shot with *jasius*. blue, the distal margin yellow-ochre; forewing with more or less distinct yellowish submarginal spots; hindwing with blue spots instead. Underside with rings and irregular white markings on a blue ground, a silvery white transverse band and in the distal area a blue-shaded yellow macular band. ♀ larger, less dark, the submarginal spots as a rule more distinct. The butterfly varies to some extent, especially in the number and size of the blue spots on the hindwing, which are sometimes quite indistinct. Such specimens may be placed with ab. *hageni* *hageni*. *Fischer*, produced by the application of a low temperature on the pupa. This artificial product has the pattern simplified on the underside, the forewing has no submarginal spots and the blue spots of the hindwing are quite effaced. The opposite development is represented by ab. *bachmetjevi* *Fischer*, likewise an artificial product (cold). In this *bachmetjevi*. the brown row of spots of the forewing is distinct as far as the hind margin, the spots being larger and paler, and proximally to it there is a second, more or less complete row of ochreous spots, while the hindwing has a white median band and strongly enlarged blue spots. Also in nature there occur ♂♂ with the submarginal spots of the forewing enlarged and the row continued to the hind margin (1. brood). The egg of the species is dark yellow, globular, above flattened, reticulate. Larva slug-like, narrowing in front and behind, the anal segment with 2 pointed processes; light green with a yellow side-line; head large, laterally bearing a yellow stripe which is continued along the lower long horn, there being 4 partly red horns covered with granules; skin densely beset with white granules, the yellow lateral line gradually more bright posteriorly, on the body from this line downward short hairs; on the back of the 6. and 8. segments a small pale rounded spot each, the anterior spot being ringed with orange-yellow in the adult larva, the second being bluish with a dark border; length 50–52 mm. The larva feeds on the strawberry-tree (*Arbutus unedo*), on small trees of the same, and has been fed up in captivity on leaves of roses, being said to take also Black Poplar (*Populus nigra*) (RÖSSLER). It reposes on a pad spun on the upperside of a leaf, being very lazy, not moving during the day, feeding at night, not ravenously but by starts, beginning a new leaf only when the old one has been devoured down to the stalk. It has the peculiar habit of alternately contracting and extending the segments in the hot sun, as if it enjoyed the heat. Although living in dry districts, it appears to be fond of humidity and loves to drink the drops of water sprinkled on the food-plant. Pupa light green, suspended, almost egg-shaped, with the wing-cases slightly bordered with red; head wedge-shaped; abdomen curved down close to the cremaster. Duration of pupal stage 10–12 days. The butterfly is a rapid flier, settles on tree-trunks and is occasionally attracted by ripe fruit (figs). Mediterranean countries: Greece, Italy (as far as Firenze), Dalmatia, South France, Portugal and North Africa. In two broods, the specimens of the second brood having the tails narrower and longer; Greek specimens are said to have always a broader orange-yellow marginal band.

C. polyxena Cr. (♀ = *bernardus* F.) (61a, b). ♂ in 2 forms; the nymotypical one with a white band, which *polyxena*. has a bluish tint at its edges and is more or less complete, there being on its outer side some dull yellow half-moons in a black area, which are occasionally absent. The second form, *sinensis* *Rothsch.*, without white band *sinensis*. or only with a trace of the same anteriorly on the forewing, the yellowish spots in the outer half of the wing present, in the hindwing the black submarginal spots more or less united, except the last 3, with or without white dots in them. On the underside the black markings of the hindwing better developed. This form is hardly distinguishable from the Indian subspecies *hierax* *Fldr.* In the ♀, which is larger than the ♂, the colour of the band varies from yellowish white to pale ochre-yellow; the extremes may be placed with the 2 forms of the ♂. The outer yellowish spots of the forewing variable in number and size, the submarginal spots of the hindwing separate except the anterior ones, or all more or less united. — Rare; China, from Hong-kong to Mupin and Omei-shan. In the North-Western Himalayas flies a similar subspecies, *hemana* *Koll.*, which almost reaches the Palaearctic territory.

B. Subfamily: Limenitinae.

This subfamily is very rich in species, playing in the tropical countries almost the most important rôle among all the butterflies. Members of the genera *Neptis* in the Old World and *Adelpha* in the New, can be seen at all seasons of the year, in all weathers, on every road, in every garden and on every hill. The number of individuals which are on the wing is really surprising. In the southern districts of South India one sees sometimes from the railway-carriage the *Neptis* whirling up like coloured bits of paper from the Lantana-bushes covering the embankments, and in certain localities of the interior of Brazil a specimen of *Adelpha* is posted on every twig that projects above the road.

Curiously enough, these insects become rapidly scarcer the more we approach the higher latitudes. They are quite absent from the south coast of Australia, from Patagonia and South Chile and in the North the number

of species is reduced to a minimum. The whole of the Palearctic territory harbours only a small percentage of the partly very closely allied forms, the majority of these Palearctic ones being found in the south-eastern districts adjoining the Oriental Region. In true northern countries there occur but very few though imposing species, appearing usually in a modest number of specimens.

Morphologically the *Limenitinae* are at once distinguished from the preceding subfamily by the palpi, which are not smoothly scaled as in the *Apaturids*, but finely hairy, though not to the same extent in all the forms. The cell of the forewing is always closed, that of the hindwing mostly open. The larvae have not really a covering of thorns but only single projections, which are either paired or are all mesial, their ends being partly enlarged to short clubs (tubuliferous larvae). The pupae sometimes bear tubercles or pointed projections; some have on the incurved, saddle-shaped, middle surface of the back a hatchet-like process in which develops a dorsal brush of hairs of the butterfly.

The *Limenitinae* are adroit fliers; the wings are generally kept spread out, which renders the flight graceful, floating, the butterfly darting forward now and again by short abrupt wing-strokes. Many species, e. g. the *Neptis*, are decided lovers of flowers, whereas the larger *Limenitis* and the *Athyma* do not seem to care much for flowers. But all without exception greedily drink water at the edges of brooks and on damp places on the roads, which on hot mornings are sometimes found actually covered with them. The larvae feed on leaved trees and shrubs. In the northern countries of the Palearctic Region the butterflies have but one brood, which is on the wing early in the summer.

t. Group: **Cyrestidi.**

This group, which is distributed over both hemispheres, but almost entirely restricted to the tropical and subtropical countries, contains the highly remarkable genera *Megalura* in the New World, and *Cyrestis* as well as *Pseudergolis* in the Old. The two last genera, which are represented in the Palearctic territory, are only found in the extreme south of the far East and must be regarded as accessions from the Oriental fauna. These two genera, *Cyrestis* and *Pseudergolis*, have very little in common as butterflies, while the larvae of both, as well as of the American *Megalura*, are distinguished by the long horns on the head and the single row of dorsal mesial projections. The butterflies occur singly on clearings of woods with much undergrowth, where they circle round the bushes, shooting along almost without moving the wings; only when drinking at puddles are they sometimes met with in larger numbers.

1. Genus: **Cyrestis** Bsd. *)

Butterflies of more delicate build. Head small; eyes naked; palpi rather long, porrect, nose-like, end-segment longer in the ♀ than in the ♂; antennae thin, somewhat incrassate at the apex. The wings delicate, but proportionately large. Forewing a right-angled triangle, apex pointed, distal margin undulate, at the anal angle constricted-indented; costal vein short, subcostal 5-branched, 2 branches proximally to the cell-end; cell usually open or closed by the thin posterior discocellular, the latter sometimes but vestigial, anterior discocellular very short. Hindwing a distorted quadrangle, with the sides curved, distal margin apically indented, otherwise undulate, between the middle and posterior median veins as a rule toothed or tailed, the anal angle being lobate, praecostal simple, curved outwards, cell open or closed by a thin vein. Ground-colour whitish or yellowish, with delicate markings, consisting mainly of dark transverse bands and lines. Egg conical, above with a cogwheel-shaped excrescence, which is deeply notched all round. The larva feeds (gregariously?) on *Ficus*-species; it is slender, naked, the head with 2 long curved rather soft horns, on the back a curved process which is directed backwards, being dentate on the hinder side, and a similar process on the anal segment, but directed forward. Pupa suspended, strongly compressed, with a blunt dorsal keel, palpi-eases projecting nose-like (DAVIDSON). Graceful fliers, the flight being sailing without distinct movement of the wings; they like to settle on the banks of rivers, at least the ♂♂, in order to drink, keeping the wings wide-spread and flying low over the ground when alighting. When disturbed they hurry away precipitately, and have the habit of settling with the wings spread out on the underside of a leaf, where they are difficult to perceive (FRUITSORFER). HAGEN says of a certain exotic species: the insect on the wing has exactly the appearance of a piece of paper which, caught by the wind, is suddenly thrown from the ground into the air, where it is whirled about for some time before falling as suddenly and abruptly again to the ground. — Distributed from North India to the South Sea, also in Africa, being represented in the Palearctic Region only by two forms:

thyodamas.

C. thyodamas Bdv. (= *Amathusia ganescha* Koll.) (61e). Flies in 2 broods, the ground-colour being white in the wet-season form, pale yellow-ochre in the dry-season form; the markings the same in both, deeper or duller in tint, also somewhat variable in breadth, altogether stronger in the wet-season form, beneath shining through, the ochre-yellow dusting more restricted on the hindwing, but the anal lobe darker yellow, with a black central dot. The sexes without essential differences, the ♀ somewhat larger and the wings a little broader. Larva on *Ficus indica*, *F. nemoralis*, *F. glomerata*. South-West China (Yunnan), Himalaya, North India to Tenasserim, Hainan. — In West and South China the species attains to quite an unusual size and represents a special race,

*) The genus has been divided into the subgenera *Sykophagus* Mart., *Apsithra* Moore and *Chersonesia* Dist. Only the first name would concern us here, but we prefer to employ the name of the entire genus, as otherwise this name would disappear for the typical group.

which has been introduced as **chinensis** *Martin*. Ground-colour white or yellow, also in transitional shades, *chinensis*. apex of the forewing more broadly black, all markings, especially the transverse stripes, broader and darker, the third stripe connected with the submarginal band of the forewing by an angular soot-coloured spot, the blue submarginal line on the hindwing broadened and very distinct. This form stands in its pattern about midway between the wet-season form of the nymotypical race and the following subspecies. — **mabella** *Fruhst.* *mabella*. (61e), which on an average is somewhat larger than Chinese specimens, is the darkest form of the species, with the broadest transverse stripes and with the apex of the forewing more broadly darkened with brownish black. The most distal stripe is connected with the inner submarginal line before the anterior median branch by a more or less distinct sooty spot. All the colours which are usually yellow are brown, the space between the submarginal lines on the hindwing is filled in with brown, and the blue stripe is usually large. The ground-colour is generally pure white, but yellowish specimens also occur. Southern Japan: Liu-kiu Islands (Okinawa), Jamato, Satsuma. — On the other hand, **afghana** *Martin* is of the usual size and all markings *afghana*. are more reduced than in any other form; in the known specimens the ground-colour is yellowish. The race seems to hibernate as butterfly (HAGEN, from a statement made by HOCKING). Afghanistan, presumably the most northern limit of its occurrence. In the south of the distribution area there appear several other forms which will be dealt with among the Exotics. These are *nobilior* *Martin* from Burma, and *formosana* *Fruhst.*, which latter is perhaps identical with *mabella*. The specimens occurring farther south (Tenasserim) and east (Shan States and Tonkin) are said not to differ from the nymotypical subspecies (MARTIN).

2. Genus: **Pseudergolis** *Fldr.*

Small, inconspicuously brown-coloured butterflies. Head and body delicate, palpi projecting slightly beyond the head, antennae slender, very little thickened at the tip, a little more than half the length of the wing. Forewing almost a right-angled triangle, costal margin curved, apex angular, distal margin also angular below the apex, as in *Vanessa*. Costal vein very short, subcostal with five branches, two being before the apex of the cell, the third terminating far beyond the upper angle of the cell. Cell narrow, closed, less than half the length of the wing, anterior discocellular atrophied, median one strongly, posterior one slightly incurved. Hindwing almost triangular with curved sides, apex and hinder angle angular, distal margin undulating; cell short, closed by a thin vein, precostal forked, the radial veins on a short stalk from the subcostal. Very like *Vanessa* in the shape of the wings and *Ergolis* in appearance, but of course separated from both by the entirely different shape of the larva, which demands the genus to be placed here.

Larva naked, upper surface of the body granulated, with a dorsal projection on the 5th segment and two processes on the 11th ring. Head with two diverging horns. Pupa suspended, with a keel-like hump on the back, anal segments curved upwards, thorax broad, head with two conical processes.

Only one form known in the Palearctic Region.

P. wedah *Koll.* (= *Precis* *hara* *Moore*) (61e). Brown, with blackish transverse lines and a row of sub-marginal dots. Underside slightly dusted with grey, the dark markings as on the upperside, but brown, the median bands broader, the submarginal line separated into lunate spots and edged with a pale violet colour on both sides. The sexes not different. Himalayas, from Kashmir to Sikkim, and Assam to Tenasserim, Western and Central China. Larva found on *Debregeasia* *bicolor* *Wedd.*; dark green with a whitish lateral stripe and rows of white warts running transversely, the processes of the 11th segment black, the base pale greenish blue. Horns of the head greenish yellow with black lines and black tip. Pupa green with brown markings. (MACKINNON.)

2. Group: **Limenitidi**.

All that has been said in the characterization of the subfamily really also holds good for this subdivision. The Poplar Butterfly and allies are elegant insects, generally with white or yellow bands on a dark ground, and with entire wings and without the peculiar projections and zigzag lines of many *Cyrestidi*. The larva always has club-shaped, partly symmetrical processes on the back. The butterflies occur in all warm countries and the north temperate zone, and are found wherever there are woods, sometimes very abundantly. The flight is more fluttering, and not so gracefully floating as in *Cyrestis*, because it is often interrupted by short flappings of the wings. The genus *Neptis*, which has very many forms, has been separated from the true *Limenitidi* on account of the examination of the palpi (REUTER); in this genus a very long palpal end-segment follows a quite short middle one, which seems to indicate a transition to the preceding tribe *Cyrestidi*. But we will not any further break up this group, which is as such not strongly represented in the Palearctic Region, and discuss it as one unit.

3. Genus: **Neptis** *F.*

Medium-sized butterflies of normal structure. Head small, eyes naked, palpi short, directed forward, not projecting beyond the head, antennae half the length of the wing, gradually a little thickened towards the tip. Forewing a right-angled triangle; costal about half the length of the costal margin of the wing, sub-

costal with five branches; the first branch before the apex of the cell, 3. terminating far beyond the same, cell open. Hindwing ovate, costal vein in the ♂ short, reaching about to half the costal margin, in the ♀ longer, ending at the rounded apex of the wing; praecostal straight upright, tip curved outwards or forked; bases of the subcostal and radial veins situated very close together, the radial veins on a short common stalk (this structure somewhat variable), cell open. — Egg higher than broad, top convex. The larva lives especially on Leguminosae, Malvaceae, Urticaceae, etc.; it has a deeply cleft head, vertex with 2 processes. Body stouter in the middle, covered with hairy humps and warts. Pupa suspended, head with two processes, antenna-case projecting like a nose. Upperside of the wing generally black or with white or brownish bands and spots; the butterflies have a slow, floating flight. Distributed from Siberia through China to the South Sea and Africa. In Europe only represented by two forms. F. MOORE has separated the genus *Neptis* without any great necessity into the following genera — from whose introduction as far as they concern us here at all we abstain —: *Paraneptis* (type: *P. lucilla*), *Kalkasia* (type: *K. alvina*), *Hamadryodes* (type: *H. lactaria*), *Acca* (type: *A. venilia*), *Phaedyma* (type: *P. amphion*), *Andrapana* (type: *A. columella*), *Neptis* (type: *N. aceris*), *Philomona* Billb. (type: *P. agatha* Cr. = *melicerta* F.), *Bimbisara* (type: *B. sankara*). *Pandassana* (type: *P. fuliginosa*), *Stabrobates* (type: *S. rhada*), *Tagatsia* (type: *T. dama*), *Rahinda* (type: *R. hordonia*), *Lasippa* (type: *L. heliodore*), *Bacalora* (type: *B. pata*), *Atharia* (type: *A. consimilis*), *Andasenodes* (type: *A. mimetica*), *Rasalia* (type: *R. gracilis*), *Aldania* (type: *A. raddei*).

coenobita.

N. coenobita Stoll (♀ = *fridolini* Fruhst.) (53a) bears in the cell usually a sharply defined basal stripe, the white spots are little variable in size, being in the ♂ of rather smaller dimensions than in the ♀; on the underside there is near the edge a more or less distinct grey band of spots, the submarginal row of spots lying before it sometimes slightly shining through above, the same taking place in the area of the distal margin of the hindwing; ♂♂ of the nymotypical subspecies (see figure of specimen from Saratov) are more brightly marked, the spots rather larger, the band of the hindwing broader. A characteristic of this and the following form is the colour of the fringes of the forewing, which are for the greater part black, interrupted with white once near the anal angle and twice anteriorly, and bear another white spot at the apex. Chiefly in Southern Russia (Volga district), eastwards as far as the Central Asiatic mountain chains, and north-eastward about as far as

lucilla.

Lake Baical. — **lucilla** F. (= *Pap. camilla* Esp., not *L.*, *N. sappho* Kirb. not *Pall.*, = *N. innominatus* Lew.) (53a) only slightly differs from the preceding. In this butterfly the basal streak in the cell of the forewing is mostly indistinct or rudimentary, the band of spots on the underside of the hindwing simple and sometimes indistinct or almost absent, the other markings, as in the preceding, brighter and more plentiful in the ♀ than in the ♂, but otherwise fairly constant; the white spots and band on the dull reddish brown underside edged with black, the streak in the cell of the forewing sharper defined, the wings in the ♀ rather broader. Larva when full grown 4—4.2 cm, brownish or reddish brown, with pale dorsal stripe and 4 pairs of conical humps spotted with yellow; sides with dark oblique stripes bordered with a light colour, and a yellowish longitudinal stripe above the feet; underside inconspicuously pale coloured, dotted with yellow; head blackish brown with yellow spots. In May on *Spiraea salicifolia*, *Sp. ulmifolia*, *Sp. flexuosa*. Butterfly from May to July; flight slow and floating. Southern slopes of the European Central and Eastern Alps, eastwards from about Tessin, southward to the Lago Maggiore, in the Southern Tyrol, Carinthia, Carniola, Styria, Wiener Wald, Upper Austria to Salzburg (see figure ♀) and in Austrian Silesia, Prussian Silesia (Waldenburg), Transsylvania,

ludmilla.

Hungary. In the eastern districts in transitions to the following form. — **ludmilla** Nordm. (53a). In this form all spots are essentially smaller, the basal streak in the cell of the forewing is absent, the spots on the hindwing are obsolescent or wanting, and the band on the hindwing is narrowed and in the ♂ divided up into spots by the strong black scaling of the veins. This name has hitherto been erroneously applied to a mixture of Asiatic and East-European representatives of the species; topotypical specimens of this form appear to be rare (the originals come from the Caucasus), but it occurs again in identical or similar individuals in Bulgaria (see figure ♀), Roumania and the Bukovina, perhaps also in the eastern parts of Hungary (locally together with *lucilla*), has even been found singly in Carinthia and is distributed in Asia as far as the Altai (see figure ♂); it therefore seems to fly locally together with the nymotypical subspecies *coenobita*. — East of the mountain

magnata.

ranges near Lake Baical a form similar to *coenobita* occurs: **magnata** Heyne (53a). It is distinguished by more abundant white markings, by the white submarginal spots on both wings shining through more distinctly on the upper side, by the regular black and white checks on the fringes of the forewing, and by a paler brownish underside with two rows of white submarginal spots or bars (in the forewing). Together with, and in the same district as this principal form another form, similar to *coenobita*, with fewer white spots, is said to occur, to

synetairus.

which the name **synetairus** Fruhst. would have to be applied. Amurland, Mongolia, Western China, Corea. —

insularum.

As the most eastern development there flies in Japan a race again corresponding to *ludmilla*; this is **insularum** Fruhst. (53b, ♀). It is larger than the continental forms, with the spots strongly reduced. Median band of the hindwing very narrow, and in the ♀ still more narrowed towards the hind margin, instead of being broadened as in the other races; the submarginal spots on the darker brown underside almost entirely obsolete in the hindwing and strongly reduced in the forewing. Hondo.

N. pryeri *Btlr.* (= *arboretorum* *Oberth.*) (53b) resembles the preceding species on the upperside. The wings fairly broad; the transverse band on the hindwing nearer the base of the wing, narrower, with a second distinct white band of spots between it and the margin of the wing. Characteristic on the underside are a number of small black basal spots. Fringes white, interrupted with black at the ends of the veins. Varies inconsiderably, ♀♀ generally with more abundant whitish spots in the distal area of the forewing. Differences which might justify the separation of *N. arboretorum* from China as a special race are wanting. — Japan, Corea, Ussuri and Amurland; China (Shanghai, Kiu-kiang, Kiangsi, Moupin).

N. alwina *Brem. and Grey* is larger, apex of the forewing more pointed, dusted with white, otherwise similar to the preceding in markings; forewing bears in the cell a white longitudinal stripe which is several times indented anteriorly and very broad, especially on the underside, and an interrupted discal as well as an oblique subapical row of spots. Underside dull reddish brown, white markings partly with diffuse edges. Eastern China, Corea. — **dejeani** *Oberth.* (53b), from West China (Ta-tsien-lu, Tsekou), is in the markings of the upperside on the whole similar to the preceding, but the spots on the forewing are larger and the median band of the hindwing broader, the spots of the outer band larger and almost continuous. The underside differs more conspicuously, the white markings being so much broadened that it appears as if white were the ground-colour and the brownish places a pattern of bands and spots. — A larger race is known from Mongolia and Japan under the name of **kaempferi** *Orza* (53c). In this form the spots on the forewing are proportionately small, those in the outer row on the hindwing lunate, obsolete anteriorly, and the transverse band narrow.

N. speyeri *Stgr.* (53c) is more simply marked and smaller; the middle row of spots on the forewing is absent; in this characteristic it resembles *lucilla*, but in the cell there is a broad, continuous, white streak, twice constricted; on the hindwing there is a distinct, white submarginal band of spots. Breadth of the band and size of the spots somewhat variable; the ♀ is as a rule more abundantly marked with white than the ♂ figured. The underside is characteristic in that there are more sharply defined reddish brown bands of spots in the dull russet-red ground-colour, these being especially distinct between the white median and marginal bands of the hindwing. — Amurland, Ussuri, Island of Askold.

N. philyra *Mén.* (53c) is again rather larger, otherwise very similar to the preceding on the upperside, but the cellular streak of the forewing exhibits no constrictions and is usually slightly diffuse at the end. The ♂♂ are apparently as a rule a little smaller and more abundantly spotted with white than the ♀♀, especially the subapical spots on the forewing being stronger and the spots at the hind margin larger; the transverse band of the hindwing is placed rather nearer the base, and in the ♂ curves basad anteriorly; the submarginal band of spots is farther away from the margin. Ground-colour of the underside dirty russet-red with a rather indistinct reddish brown shading. Amurland, Ussuri. — **excellens** *Btlr.* is a form from Japan which but slightly differs from the preceding. It has the appearance of being somewhat more abundantly white, especially the smear situated below the larger costal spot of the forewing and but feebly developed in the preceding form is more distinct; at the edge of the forewing there appear some white smears and the band of the hindwing is a little broader. Rare at Nikko, Asamayama, Nügata, in July, a mountain insect.

N. philyroides *Stgr.* (53c) is distinguished from the preceding by there being 2—3 more small white spots at the costal margin of the forewing between the apex of the cell and the white subapical spots; moreover, the forewing bears a row of distinct submarginal spots, the cellular stripe is stronger, the discal spots more broadly ovate, the submarginal band of spots on the hindwing situated nearer the margin and a little more curved. Ground-colour of the underside dull ochre-yellow. In spite of these differences we have perhaps only to do with a variety (seasonal form) of the preceding. Larva in June on *Corylus mandshurica* Maxim. — Amurland, Ussuri, Corea.

N. hylas has a series of more or less constant local and aberrational forms (seasonal and mountain varieties) in a large portion of its area, which are partly very problematical, and whose names have hardly any value except that we can infer from them the habitat. We consider the Chinese form as the nymotypical representative of the species, in opposition to our former views*). Of this three forms may be distinguished: a) **hylas** *L.* (= *leucothoë* *L.* ex parte, *acidalia* *Web.*, *eurynome* *Westw.* and others) (53d, as *acidalia*); it is fairly large, with abundant white markings, the subapical spots on the forewing often isolated, underside ochreous yellow, the white bands edged with black, a distinct double row of spots along the distal margin of the hindwing; b) **sangaica** *Moore*, presumably a spring-form, it is smaller, with fewer white markings, the submarginal band appearing to be rather dulled in the hindwing, the ground-colour on the underside light red-brown, the bands without black edges; c) **acerides** *Fruhst.*, the extreme of the direction of development of the preceding, and scarcely distinguishable from specimens of the species found in Austria-Hungary, China, Formosa. — Only slightly different from the Chinese race is the North Indian one, which, though

*) Cf. STICHEL, in *Int. Entomol. Zeitschr. Guben*, vol. 1 (1907), p. 325. The reason for the change of view will be given in vol. 2 of the same magazine.

- flying especially in the Himalayas outside the limits of our area, yet penetrates as far as Kashmir in the North-West, and therefore is enumerated here. This also occurs in two (seasonal) varieties: a) during the dry-season as *astola* Moore, small as a rule, but rather variable in size, length of forewing 21—27 mm; it has a pale ochre-yellow underside and indistinct black edges to the white bands; b) during the rainy season as *emodes* Moore (53c as *hylas*), larger (up to 30 mm length of forewing), with bright reddish brown to deep yellow-ochre ground-colour on the underside, bands edged with black, the white submarginal spots on the upperside of the forewing rather sharply defined; similar to *sangaica*, and not only appears to be a rainy season form, but on the whole a form from higher altitudes (up to 3000 m), while *astola* is found more in the lower southern parts of the distribution-area of the subspecies. Quite outside the Palaearctic territory there exists southward another transitional form, *adara* Moore, and on the Sunda Islands there are a number of other geographical races, which will be dealt with among the Exotics. — *intermedia* Pryer, from Japan, Corea and Amurland, also appears in 3 forms in Japan: a) a large principal form, apparently a mountain- or summer-form (53d), which is scarcely different from *sangaica* except in the rather smaller extent of the white spots and in the reduction of the submarginal lunules on the underside of the hindwing to thin or obsolescent whitish linear arcs: b) *oda* Fruhst. (53d) has more rounded wings, the white markings are more reduced, being grey on the forewing and slightly darkened, the submarginal band on the hindwing obsolescent, the ground-colour of the underside yellow or reddish brown; Yesso; c) *passerculus* Fruhst. is quite a small form with a dark underside and entirely reduced markings. Tsushima, Island of Iki, September and October. 2 broods have been observed in the Amur district by GRÄSER; the second is a little smaller and has very reduced white markings, therefore belonging to *oda*. — In districts to the west of Amurland no distinguishing characters can be fixed upon with sufficient certainty, and specimens of Siberian origin and from Central Asia are therefore best classified together with *intermedia*. — In Southern Russia (Volga district), on the other hand, appears a subspecies *sappho* Pall. (53e), which is rather well characterized by a conspicuous broadening of the white markings. In this form the wedge-shaped spot at the apex of the cell is broader and larger, occasionally so much that its apex reaches as far as the space between the row of spots lying outside the cell. The latter spots larger, the submarginal spots on the forewing sharply marked in white, occasionally without interruption; transverse band of the hindwing very broad, the outer row of spots almost developed into a band; ground-colour of the underside reddish brown, but very restricted. This form flies with almost unchanged or similar character in the Bukovina, Bulgaria, and neighbouring countries, partly together with and in transitions to the following subspecies, especially to the latter's summer form. — *aceris* F. (not Pap. *aceris* Tatarici Lep.) (= *lucilla* Schrk., *plautilla* Hbn.) (53e), for which special characteristics are difficult to fix. It is perhaps on an average somewhat smaller and bears less highly developed white markings, the small sharply defined spots present in the Asiatic races at the margin of the forewing especially incline towards becoming obsolete, being often only found in the shape of indistinct smears: the spots of the outer row of the hindwing also appear less sharply defined, obsolescent in front. Underside like that of *intermedia*, with which it agrees in facies more closely than the neighbouring form *sappho*; the latter erroneously is usually called *intermedia*. Austria-Hungary as far as Transsylvania, Roumania, in 2 broods (May and August), the second bearing broader bands and larger spots than the first. Egg greenish, thimble-shaped, covered with regular hexagonal cells. Larva on *Orobis vernus*, brownish when young, with inconspicuous warts, the head with two projections; later (after the 2. moult) the body bears 3 pairs of thorny processes, the last pair inclining backwards, on the back a greyish green saddle-patch from the second pair of processes to the anal segment, and two short fleshy conical processes on the 5. segment. The adult larva rests with the upper half of the body erect in a Sphinx-like attitude, the head being so held downwards that the pair of spiky processes on the 3. segment projects conspicuously. It crawls slowly and in jerks, and spins an uninterrupted path, from which it can only be turned away by force; it hibernates when almost full-grown. Pupa suspended, short, with broad, prominent wing-cases: of a yellowish colour, with darker veins and shining metallic spots on the back; head with two projections. Duration of pupal stage 14 days, butterfly in May. Larvae which have emerged very early produce the butterfly already again in August (RÜHL).
- mahendra*. *N. mahendra* Moore is a larger species, very similar to the preceding. Forewing with a broad cellular stripe and a large triangular spot at the apex of the cell, further with a shortened subapical band, which is continued posteriorly by two large spots interrupted by the ground-colour, the second spot placed at the hind margin: near the distal margin there is a row of small white spots. Hindwing with a broad median band and an almost continuous submarginal row of spots, between them and again near the margin another band of spots, which are, however, indistinct. Underside reddish brown, spots and bands broader, in the forewing some white marginal spots, in the hindwing a grey stripe between the median and distal bands and two white lines at the margin, which are sometimes indistinct. Appears in two broods, the dry season form is larger and more abundantly marked with white, the rainy season form has smaller spots, the submarginal spots of the forewing are partly obsolescent, the outer band of the hindwing broken up into spots, and the underside darker. — North-Western Himalayas, Kashmir.
- yerburyi*. *N. yerburyi* Btlr. (53e) is likewise similar. It is distinguished from *hylas* especially by the transverse band on the hindwing being rather more oblique and on the underside almost reaching the outer band of spots

near the apex of the wing; at the margin there are two white undulating lines, the white markings are without black edges in the bright russet-red ground-colour, and on the forewing there appears, beside the discal spots, a sharply defined and undulating white line. The nymotypical form (? wet season) is only distinguished from the one just described by the subcostal spots of the forewing being confluent, forming an abbreviated band, and by the whitish lines present between the bands of the hindwing in that form becoming obsolete; moreover, the ground-colour of the underside is darker and the bands on the hindwing are narrower. The larva has been found on *Celtis australis* (NICÉVILLE). Himalayas as far as Kashmir, ? Afghanistan, up to 2900 m, Tenasserim. — **extensa** *Leech* (53f) is an unimportant local form with a broader and shortened apical spot, and narrower *extensa*. band on the hindwing; the outer band of the hindwing, moreover, is separated into spots, and the intermediate and marginal lines present in the dark ground-colour of the underside are shaded with grey. West China. — **tibetana** *Moore* (= *soma* *Leech* not *Moore*) (54a) seems to be the dry-season form of the preceding. It is a little *tibetana*. smaller, the spots on the upperside are isolated and of a dull colour, the ground-colour of the underside almost brown, the bands on the hindwing narrower. West China, June and July, at heights up to about 2700 m.

Several named forms, which fly in the same district as and are very similar in marking to the preceding, seem to belong to a distinct species with broader wings, of which *N. nandina* *Moore* from Java must be regarded as the nomenclatorial type. These are **adipala** *Moore* (53f) with small spots and narrow bands, the spots being *adipala*. rather dull, and **susruta** *Leech* (53f) with larger spots and broader bands on the hindwing (? rainy season form). *susruta*. Otherwise the markings are as in the preceding species, so that only the form of the wings can be considered as specific difference. In the *mahendra*-forms the apex in the ♂ is angular *), the margin of the wing below it slightly obtusely angled, then almost straight, and the costal margin of the hindwing obtusely angulate in the centre, while in this species the apex of the forewing is rounded also in the ♂, the distal margin slightly convex and the costal margin of the hindwing more regularly curved. Chinese specimens of *susruta* are according to LEECH darker on the underside than Indian ones, and the marginal band of the hindwing is said to be more oblique in position, also *adipala* from China differs from Indian specimen in the position of the bands of the hindwing and on the underside in the basal costal streak of the hindwing being shorter, the white marginal band, moreover, being wanting. West China, Sikkim, Bhutan, southward to Tenasserim.

N. sankara *Koll.* (= *amba* *Moore*) is the first of a series of species of this genus which appear in a white- *sankara*. marked and a yellow-marked form. The nymotypical subspecies is on the whole distinguished from the next one (*antonia*) only by the markings being white; in the dry season it appears as a rather smaller form, **amboides** *Moore*, with enlarged white markings, especially with an almost complete row of elongate spots in the outer *amboides*. area of the forewing. Kashmir, West Himalaya, Nepal, at altitudes from 600 to 1500 m. Usually found at or above rivers (NICÉVILLE), flying low over the ground in the shade of trees and rocks (LANG). — In West China, at Mupin and Tshiakuho, the species appears exclusively with yellow markings: **antonia** *Oberth.* (= *amba* *Leech* *antonia* nec *Moore*) (54a), occurring together with **sinica** *Moore* on the Omei-shan and Wa-shan, again a white-marked *sinica*. race, which differs from the Himalayan race in the ground-colour being deeper black and the stripes and bands narrower, and especially in the underside bearing only one submarginal row of lunules. From the distribution it appears that *sinica* is becoming a separate subspecies towards the east in Central China (Chang-Yang), whence LEECH only received this white-spotted form.

N. narayana *Moore*, which is white-spotted in India, is represented in West China by the yellow-marked **sylvia** *Oberth.* (54a). Upperside of forewing with heavy cell-streak, from which the hastate apical spot is but *sylvia*. incompletely separated, before the latter at the costa a small double spot, beyond which there are 3 oblique subapical spots separated only by the veins, a larger double spot being present in the distal area and at the hindmargin, hindwing with a broad median band and beyond the same a narrow distal band. Siaolou, Tientsin. The spots above are smaller and darker yellow and the ground-colour of the underside is more strongly brownish than in the otherwise similar ab. **nana** *Nicé.*, which occurs in the Himalaya together with nymo- *nana*. typical *narayana* and has also been found at Tsekou in West China.

N. radha *Moore*, from Sikkim, is a large yellow-spotted species, bearing on the forewing above a heavy basal streak which is apically widened and extends a little below the 3. radial. There are also present: 2 small costal spots, an oblique short subapical macular band, a large double spot in the distal area, as continuation of the same some continuous hindmarginal spots shifted more basad, and at the distal margin a narrow indistinct band. Hindwing with 2 bands, the inner one broad and oblique, the outer one anteriorly curved basad and almost touching the former, between them as well as near the margin an obsolescent line; the underside bears on a violet-brown ground 2 light bands, between which there is a reddish brown dentate line, while there are 2 rows of contiguous lunules at the distal margin and brown spots in the costal area. — In West China flies a form of this species, **sinensis** *Oberth.*, which is darker above, the yellow spots being reduced in size, paler and somewhat *sinensis*. shaded with brown. Siaolou, Moupin.

*) These characters are taken from the figures in LEECH, Butterfl. from China, Japan, and Corea.

- ananta*. **N. ananta** Moore (54b) is marked with bright ochreous brown on a black-brown ground; on the underside there is a short violet band between the costal spots and the apex of the forewing, on the hindwing there follows a narrow violet stripe distally to the whitish median band, the submarginal band being broad and reddish and followed near the margin by a second, narrow and undulate, bluish band. The Indian race varies somewhat in the tint and breadth of the bands, especially in the different seasons. Himalaya, Kashmir, Assam, Burma, and southward to the Malay Peninsula. — *chinensis* Leech (54b) is the Chinese representative of the species; very similar to the preceding, somewhat larger, the markings paler yellow, the submarginal band of the hindwing somewhat broader, the cell-streak and the spots of the underside white, on the hindwing the submarginal band broader and bordered at both edges with dark grey. West China: Omei-shan. Specimens with somewhat paler ground-colour, lighter bands and spots, and on the underside more diffuse markings are **areus** Fruhst., Siaolou.
- thestias*. The following Chinese forms must be classified with the Indian *N. zaida* Dbl.: **thestias** Leech (54b), on the whole similar to the preceding, but the cell-streak of the forewing pointed at the tip, the subapical macular band shorter, the markings of the underside more simplified; differing from *zaida* in the markings being narrower and deeper ochreous brown and the underside more brightly coloured. West China: Omei-shan, July and August, mountain-insect; Moupin. — *meloria* Oberth. (54b), above almost like the preceding, beneath the subapical spots of the forewing, which shine through, bluish white instead of yellowish white, the median band of the hindwing whitish, narrower and anteriorly abbreviated, the submarginal band composed of smaller spots, the red-brown space between the bands widened, and two bluish lines at the margin; moreover, the red-brown costal spots present in *thestias* are here absent; Tientsuen, Siaolou, Tchang-hou. — From the same or neighbouring districts of West China four more forms have been described as „species“, which we cannot but consider mere aberrational forms of the preceding (? seasonal or mountain-varieties), namely: *noyala* Oberth. (54c), above darker, the apical spot of the cell separated from the cell-streak; ground-colour of the underside darker red-brown, the spots of the forewing yellowish, the band of the hindwing slightly bluish, the distal margin with only one, somewhat broader, bluish line; Siaolou, Tientsuen. — *annaika* Oberth. (54c), markings above as in *thestias*, the spots sometimes of a lighter, sometimes of a yellow colour; underside paler, with the markings less sharp, the ground-colour greyish yellow, the spots yellowish white, on the hindwing the russet-red sealing between the bands absent and the bluish lines before the distal margin obsolete, the forewing, however, as in *thestia*, only paler; Moupin, Siaolou. — *patricia* Oberth. (54c) closely agrees with the preceding; cell-streak of the forewing continuous, but somewhat shortened, slightly blackish at its apex; the underside brownish, the spots and bands whitish, the space between the bands of the hindwing blackish, but the marginal lines more distinct; only one specimen known, from Siaolou. — In *sylvana* Oberth. (54c) the spots of the upperside are yellow; the ground-colour beneath is pale yellow in the cell, at the costal and distal margins, the distal marginal area without markings, the median area blackish, the spots whitish yellow; hindwing very similar to that of *patricia*, somewhat more extensively shaded with black beyond the median band, a bluish line near the margin, the ground-colour light ochreous yellow; Tse-kou.
- disopa*. The Indian *N. miah* Moore is represented in China by the subspecies **disopa** Swinh. (54c, d, erroneously spelt *disupa*). Differs from the nymotypical form in the spots and bands being narrower and the costal spots of the forewing separated from the discal ones. The underside, moreover, is more brightly coloured. West China.
- armandia*. **N. armandia** Oberth. (54d) is very similar to the preceding in the pattern of the upperside, but the colour is of a more ochreous yellow tint. Easily recognized by the zigzag lines of the hindwing beneath. Central and West China. — *hesione* Leech (54d) appears to be but a variety of it, differing in the broader cell-streak, more continuous subapical spots and the presence of an obsolescent submarginal line on the forewing, the bands of the hindwing, moreover, being broader and continuous, not indented at the veins. Central and West China: Chang-Yang, Wa-shan, Tsia-ku-ho, Moupin.
- antilope*. **N. antilope** Leech (54d, e) is a very similar species. It is distinguished above particularly by the different shape of the double spot situated in the middle of the distal area of the forewing and by the underside bearing a considerably narrower median band and having the costal area of the hindwing almost without markings. — Central and West China with the previous form; South China: Hongkong.
- narcissina*. *N. manasa* Moore from North India is represented in Tibet by the subspecies **narcissina** Oberth. (54e). The upperside bears yellow spots which are similar to those of the preceding forms, but the cell-streak is united apically with the discal spots and thus forms a hooked longitudinal band which ends obtusely. Underside pale yellow, the markings as on upperside but paler, between the bands of the hindwing a bluish line. Lutse-kiang.
- thisbe*. **N. thisbe** Mén. (54e) has a rather pointed forewing; the markings very similar to those of *narcissina*, light ochreous yellow to whitish yellow, the apex of the cell-streak reaching to the bend of the 3. radial and

but slightly touching the discal spots; submarginal spots of the hindwing vestigial only. The underside marked like the upper, the markings pale yellow, on the forewing some violet costal spots in a brown area, hindwing with light-coloured median band, upon which follow a reddish brown area with pale lines and a bluish submarginal band. — With the yellow-spotted main form, which varies in size, flies a variety with pure white markings (Ust-Strielka), which may be named f. *deliquata* form. nov. GRÄSER beat the larva from *Quercus mongolica*, *deliquata*, but it appears to be polyphagous. Amurland (Bureja, Ussuri), Askold, Corea. — In China the species is also represented by two similar forms, *dilutior* Oberth. (54e) with enlarged, bright yellow spots on the upperside and *dilutior*, very light distal marginal area on the underside, at Tse-kou, and *obscurior* Oberth. (54f) with darkened underside, all the brown parts more deeply coloured, the median band of the hindwing somewhat reddish except the whitish anterior portion, Siaolou. According to OBERTHÜR *thisbe* in typical specimens and transitions also flies with those forms. *obscurior*.

N. themis Leech (54f) differs from the preceding species in the median band on the hindwing *themis*, beneath being anteriorly abbreviated and in the 2—3 violet spots standing in the prolongation of the band being absent; on the other hand, there is on the forewing below a large light spot near the distal margin between the radials.*) The distribution-area of this form according to OBERTHÜR extends from West China (Siaolou) to Sikkim, where it is replaced by the nomenclatorially typical form, *N. nycteus* Nicéa, which has white instead of yellow spots. — A closely allied form from Tsekou is *theodora* Oberth. (54f), in which the brown *theodora*, patches on the underside are essentially larger and of a deep reddish brown colour, the violet markings are paler. In the ♀ the markings are rather whitish than yellow, the darkened ground contrasts very strongly with the light spots. — *thetis* Leech (54f) is somewhat smaller than *themis*, but hardly different from it except in the whitish *thetis*, costal streak at the base of the hindwing beneath being partly obsolete, forming an isolated spot in the centre of the costal area. Even this character, however, may be individual. The light submarginal band also is indistinct and the brown patches are less numerous. Siaolou, Tsekou, Lutsekiang. According to LEECH there occur specimens with lighter, almost white, spots on the upperside, which also points to a close affinity with *nycteus*.

N. yunnana Oberth. (55a) is extremely similar to the previous forms, smaller, the position of the markings *yunnana*, as in *thisbe*, their colour bright yellow-ochre, the median band of the hindwing comparatively broad, canary-yellow beneath, as are also the spots of the forewing. Before the band of the hindwing a reddish brown area in which are situated several purplish spots; costal margin ochreous yellow at the base, the distal margin brownish, traversed by reddish brown curved lines. Tsekou. — In *memorum* Oberth. (55a), which is most probably only a variety of the preceding, the median band of the hindwing remains narrower, the bluish spots in the costal area of the forewing beneath are enlarged (confluent), and beyond the yellow median band within the red-brown band contiguous with the same there is a bluish line, which in *yunnana* is indicated only in front and behind; otherwise the distal marginal area remains uniformly ochreous yellow. — With this form occurs a similar one, *sylvarum* Oberth., the ground-colour of which is darker beneath; on the underside there are no bluish *sylvarum*, costal spots before the anterior part of the median band of the hindwing, and the ochreous yellow marginal area is broader, while the russet brown area behind the band is narrower and bears — as in *memorum* — a violet-grey line; the latter, however, has a feeble silvery tint. Tsekou. The upperside is the same in all three forms.

N. antigone Leech (? = *beroë* Leech) (55a) is above recognizable by the prolonged cell-streak, which is *antigone*, broadly joined to the discal spots; the markings otherwise as in the preceding forms, but the submarginal band of the hindwing is pure yellow ochre and consists of a curved row of broad lunules, which are indented on their convex side. Markings of underside somewhat diffuse, on the hindwing the median band anteriorly curved in hook-shape towards the base, in the dull russet-red to ochreous brown marginal area a bluish line and several rows of whitish arcs or lunules. Only one ♀ known; Central China: Ichang. — *beroë* Leech (55b) is extremely *beroë*, similar to the preceding, being apparently specifically identical with it and at the most an accessory form of the same. ♂ somewhat smaller, the markings of the upperside not essentially different; on the underside the median band of the hindwing broader, yellowish, anteriorly less strongly curved, beyond it instead of the bluish line a red brown stripe parallel with the margin, in the dull ochreous yellow marginal area a narrow

*) Contrary to customary treatment *N. themis* and *thisbe* are here dealt with as different species. In this I follow CH. OBERTHÜR's opinion (Études de Lépidoptérol. Comparée II), although the differences do not appear to be quite sufficient for specific separation. There can hardly be any doubt that the classification of the species of *Neptis*, especially of the *thetis*-group, will be modified in many respects as our knowledge of the geographical distribution and seasonal variation increases. At present one has to be content with a grouping which is the more probably correct classification according to one's personal opinion. As not weighty enough I must regard the characters of a number of species described by OBERTHÜR in the place cited; particularly the separation of *thisbe* from *themis* and the specific value attributed to some forms of the *thetis*-series does not seem to be tenable. — STICHEL.

whitish submarginal band. In the ♀, according to LEECH, the cell-streak and the bands narrower, the spots smaller; underside more abundantly chestnut-brown. Central China: Chang-Yang.

cydippe. **N. cydippe** *Leech* (55c) resembles above *antelope*, but is larger, the subapical spots of the forewing are isolated, and there are some yellowish smears at the costal margin above the apex of the cell-streak; hindwing with 2 bands with entire edges. The markings are less sharp beneath, the spots and median band of the hindwing whitish, discal area of the forewing and costal area of the hindwing russet-brown, a stripe of the same colour beyond the median band; the latter ends anteriorly with some violet spots, at the apex of the wing there are indications of several zigzag lines, and in the dull ochreous yellow marginal area there is an obsolescent yellowish submarginal band. — West China: Wa-shan, Pu-tsu-fong; Central China: Chang-Yang.

arachne. **N. arachne** *Leech* (55b) appears to be specifically distinct from the preceding, with which it occurs together. The spots of the forewing are enlarged, the double spot in the central area anteriorly more approaches the apex of the cell-streak, the pattern in this character agreeing more with that of *antigone*; on the underside there are sharply defined red-brown zigzag and undulating lines in the marginal area of both wings, which in the preceding species are only visible at the apex of the wing. The median band of the hindwing is more longitudinal, broader, not inclining anteriorly towards the costa, but ending near the apex. West China: Omei-shan, Wa-giddeneme. shan, Wa-ssu-kow, Moupin, Siaolou, and Central China: Chang-Yang, 900—1800 m. — **giddeneme** *Oberth.* is a smaller race from Tsekou, which is more uniformly yellow above and has all the reddish markings less prominent. *nemorosa*. — **nemorosa** *Oberth.* (55c, erroneously named *nemorum* on the plate) is another but slightly different form, in which the spots of the underside are more whitish, the median band remains anteriorly paler and the markings in the marginal area are more prominent. Moreover the space between the dark zigzag lines, which are partly separated into acute arcs, is filled up with paler yellowish scaling. Siaolou, Lutsekiang.

aspasia. **N. aspasia** *Leech* (55c) belongs to a group which stands apart, the ♂♂ being characterized by a broad, unicolorous, grey, slightly glossy costal area to the hindwing, the group being named *Phaedyra* by FELDER. The forms of this species are chiefly found in the eastern part of the Indo-Australian Archipelago. *aspasia* is above very similar to *arachne*, but the pale ochreous yellow cell-streak is continued at the bent of the 3. radial by a hook directed backwards, the subapical spots are isolated, the hindmarginal spot is small and dull, the median band of the hindwing ends in the ♂ at the grey costal area, the submarginal band is narrow. ♀ with rounder wings, otherwise similar to the ♂, except that the grey costal area of the hindwing is absent. — West China: Omei-shan; Central China: Chang-Yang, July; province of Kweichow.

bieti. **N. bieti** *Oberth.* (55d) is the Palaearctic representative of a small group of species which were united by MOORE under the generic title *Rahinda* and are particularly found in the Indo-Malayan territories. Upperside of the wings brown with ochreous yellow markings as follows: on the forewing a long streak from the base along the median vein beyond the apex of the cell, a subapical double spot and two single spots before the hinder angle; on the hindwing a continuous transverse band from the middle of the hindmargin to near the apex, and a narrow, somewhat duller, submarginal band. Underside pale brown, greenish in places, with the markings as above, but broader and paler. — West China: Ta-tsen-lu.

raddei. **N. raddei** *Brem.* (55d) stands entirely apart in facies; a remarkable species, which must be placed in the present genus as it agrees with the same in its morphological characters. MOORE has erected for its reception a special genus, *Aldania*. Ground-colour white, dusted with grey-brown at the margins, the base and along the veins, the veins themselves blackish, a row of dark lunules along the margin, being especially distinct on the underside. — Amurland: Bureja Mts., Ussuri.

4. Genus: **Limenitis** *F.*

Larger butterflies of stout built. Head large; eyes naked or hairy; palpi rather small, porrect; antennae strong, half the length of the forewing, clubbed. Forewing a right-angled triangle, with rather pointed apex, subcostal with 5 branches, 2 before the apex of the cell or the 2. from the upper angle, the 3. far beyond cell; 1. discocellular absent or very short, the cell usually open or closed by a thin transverse vein; the position of the subcostals and discocellulars is variable, often different even in the sexes of the same species (*L. rivularis*); median vein near the base with a spur directed distad, which however is not always distinct (*L. populi*). Hindwing almost a triangle, with curved sides; precostal simple, originating exactly at the point where the subcostal branches off, curved outward; cell open.

Egg globular, ribbed. Larva either with branched thorns on fleshy warts, and a row of spikes round the head, or with setiferous fleshy processes and cleft (bifid) head. Pupa broad and stout, suspended, or fastened

by the cremaster on the upperside of a leaf. The butterflies are very diverse in colour and pattern, with similar habits as the *Apaturas*. They have a somewhat weaker, though no less elegant flight, love to rest with spread wings on projecting branches of trees, and come down to the ground in order to imbibe moisture; certain species can be attracted by decaying animal matter, others visit flowers.

The genus has likewise been divided by F. MOORE into a number of separate genera (Lep. Ind., vol. 3). We restrict ourselves to mentioning them here as far as they are based on types which we consider to be Palaearctic species: *Hypolinnesthes* Moore (type: *H. albomaculata*), *Patsusia* Moore (type: *P. sinensium*), *Sinimia* Moore (*S. ciocolatina*), *Chalinga* Moore (type: *C. elvesi*), *Litinga* Moore (type: *L. cottoni*), and *Ladoga* Moore (type: *L. camilla* L.). — Some species (forms), like *L. homeyeri*, *pryeri*, a. o., were placed by LEECH in a genus *Parathyma*, which MOORE separated from *Pantoporia* (= *Athyma*).

Distributed over Europe, Asia, the Indo-Australian territories and North-America.

L. sydyi Led. (♀ 57a). Blackish brown, with white spots on the forewing and a strongly elbowed white *sydyi*. band on the hindwing; at the apex of the forewing, especially in the ♀, some reddish brown smears. Underside for the most part brownish, the hindwing bluish at the base and abdominal margin, in the distal area with 2 rows of blackish spots, the spots of the outer row being lunate and forming the borders of a further row of whitish spots. The ♀♀ have a less intense ground-colour, the whitish submarginal spots of the hindwing and the light and reddish patches in the cell of the forewing are more distinct. Altai, Central and West China. — **latefasciata** *latefasciata*. Mén. (57a) is characterized by the spots and bands being considerably enlarged. On the forewing the spots in the outer area are band-like, on the hindwing the median band is strongly widened and the whitish submarginal spots are more distinct. The ground-colour of the ♂ has often a somewhat violet sheen and the white markings, when viewed obliquely, have likewise a bluish tint. In specimens from Corea the band of the ♂ is said to be specially broad and that of the ♀ on the contrary to be narrower and interrupted (FIXSEN). Larva in June on *Spiraea salicifolia*. Amur, Ussuri, Corea, Japan.

L. camilla L. (= *sibilla* L., auct. cet.)* (57a, b). Very similar to the preceding species; however, the *camilla*. position of the spots of the forewing is different and the band of the hindwing is but slightly curved, not elbowed; on the underside the black spots in the marginal area of the hindwing are all rounded, there being no band of light spots outside them as in *sydyi*. In ab. **obliterata** Shipp the white markings are strongly reduced, the spots *obliterata*. of the forewing are but indicated by indistinct scaling, on the hindwing the band is likewise dull, as a rule being more distinct only at the hind angle, the veins somewhat dusted with whitish; the underside darkened. Not very rare in Continental Europe and England (New Forest). ab. **nigrina** Weym., which has very rarely been *nigrina*. met with here and there in nature among ordinary specimens (Elberfeld, Beuron on the Danube) represents the extreme of this direction of development, the upperside having become uniformly black without any markings. Egg globular, somewhat depressed, the surface divided into hexagonal cells, singly on the leaves of the foodplant: *Lonicera xylosteum* L., *L. periclymenum* L. and *L. caprifolium* L. For the deposition of the eggs low twigs of plants growing in shady places of woods are preferred. Larva green, dotted with white, on the back two rows of reddish brown thorny projections, head red, indented, with two white stripes; on the sides of the body above the legs a yellowish white longitudinal stripe, venter brown; adult 42—45 mm long. The larva spins a pad on its resting place and moves slowly and in jerks; it hibernates young in a leaf spun together or in a web on a twig. Pupa suspended from a leaf, whitish green, with metallic spots, angular, with a beak-like tubercle on the back; head with two projections. The butterfly in May, June and July; it loves to suck at the flowers of brambles. Central Europe, inclusive of Italy, Transylvania, Hungary, South Russia, Baltic Provinces of Russia, Denmark. — In Carniola the species has developed into an almost constant local race, which bears the name **angustefasciata** Streckf. (= *stenotaenia* Honr.). In *angustefasciata*. this form the white markings are essentially reduced, the band of the hindwing only being about half as wide as in the nymotypical form; on the underside the ground-colour is darker, the basal area of the hindwing being slate-colour. — A similar subspecies is **japonica** Mén. (= *angustata* Stgr.) (57b), which its author erroneously *japonica*. considered to be a variety of *sydyi*. In the ♂ of this form the subapical spots of the forewing are narrowed, the interspaces between them being broader, the hindmarginal spots are reduced to about half the normal size, and the band of the hindwing is narrower and rather more curved; the differences are less conspicuous in the ♀, both sexes, however, are larger than the European race. Japan, Corea, Amurland, Ussuri.

L. helmanni Led. (57b) has the ground-colour blackish brown, the pattern being similar to that of the *helmanni*. preceding species; the cell of the forewing, however, bears a whitish basal streak followed distally by a white acutely triangular spot; the white spots of the central area are small and isolated, and the band of the hindwing, which is directed towards the centre of the hindmargin, is composed of separated spots. On the hindwing above there are sometimes small, whitish, elongate, submarginal spots. Central Asia: Altai, eastern districts of Amur-

*) For our opinion as to the application of these names we refer the reader to Ent. Zeitschr., Stuttgart, Vol. 21 (1907), p. 29, 35.

pryeri. land; West and Central China; Corea. — *pryeri* Moore is on an average larger, the white markings are widened, both wings have distinct white submarginal spots, the underside is more strongly marked with more prominent white spots on the hindwing. North-East China (Ning-po), Ussuri, Amurland, Corea, Japan. — In *duplicata* Stgr. (♂ 61d, 57b underside of ♀, erroneously named *doerriesi* U. on plate) the increase in the size of the white markings reaches its maximum; the band of the hindwing is continuous and of double or threefold width. Amurland.

doerriesi. **L. doerriesi** Stgr. (57b only ♂*, 61d ♀) is so extremely similar to the preceding that there is justification for doubting the specific distinctness. It has at the apex of the cell of the forewing a feeble reddish brown stripe (not represented in the figure), there being in the ♀ occasionally also a reddish spot anteriorly in the centre of the cell. Near the distal margin of both wings, contiguous to a row of sharply marked small black spots, there are mostly also white elongate spots (absent from the figure of the ♂), which are not present in the anterior area of the forewing, but may be considerably enlarged at the centre of the distal margin. The white spots situated between the median veins of the forewing stand somewhat nearer the middle of the wing than in *duplicata*. The inner edge of the white band on the underside of the hindwing is said to afford an essential difference from *duplicata*. This edge in *doerriesi* projects below the subcostal somewhat towards the distal margin, and is here as well as between the radials quite straight or feebly undulate (concave towards the base), while in *duplicata* the brownish portion of the basal area projects twice in arc-shape into the respective white spots of the band. In the ♂ the rest of the underside is almost as in *duplicata*, the white band, however, is somewhat narrower and there are distinct black dots in the grey spots of the marginal area. In the rather larger ♀ the outer area of the underside is more evenly ochreous, with white marginal lunules and a row of small elongate white spots in a narrow grey band; before each of these spots there is a black dot, the anal angle as in the ♂ bearing a double dot. Amurland: Sutshan (Ussuri).

homeyeri. **L. homeyeri** Tancré (57c) is somewhat more narrow-winged than the previous forms, but very similar to them, being more delicately marked. The middle spots of the discal row of the forewing as in *doerriesi* project less distally, the band of the hindwing however is anteriorly narrower and there is a row of distinct small white spots in the marginal area of the hindwing. Amur, Ussuri. — *venata* Leech (57c) is a larger form of a darker tint, with the white markings enlarged, which is especially evident with the cell-streak of the forewing and the band of the hindwing. On the underside too the ground has a deeper colour, the markings are silky white, the band of the hindwing being sharply traversed by the black veins. South-East and West China.

amphyssa. **L. amphyssa** Mén. agrees in size with *doerriesi*, differing from the latter chiefly in the cell-streak of the forewing being absent. The cell bears instead a smaller and a larger white spot, beyond the cell there is an oblique macular band which is continued near the margin of the wing by two isolated spots; before the hind margin a larger double spot, near the apex 3 smaller linear spot and at the margin a row of such spots, all white. Hindwing with a broad white band and a row of white spots between the band and the margin, the fringes being black and white. Underside brownish, the markings as above, but larger; the hindwing bluish at the base and before the hindmargin. — Amurland: Bureja, Ussuri; Corea; Central China.

cleophas. **L. cleophas** Oberth. (61e) is a larger species with a spot in the cell of the forewing; the macular band situated outside the cell stands nearer the cell, otherwise the markings similar to those of *helmanni*, but the spots larger, except those before the hindmargin, which are comparatively small, the anterior one being indistinct, at the margin an obsolescent whitish stripe. Band of hindwing curved in S-shape, in the outer area of the wing a row of obsolescent lunules and close to them a white submarginal stripe. Underside brown, markings as above, but broader, the cell of the forewing bluish white at the base with two black transverse stripes. The basal and hindmarginal areas of the hindwing likewise bluish, interrupted anteriorly by reddish brown spots; the margin dark brown from the white band to a band of light lunules, which bear each a blackish dot; then follows a pale brownish yellow stripe and at the edge a brownish undulate line. Recalls *Athyia recurva*. — West China: Ta-tsien-lu, Mupin.

rivularis. **L. rivularis** Scop. (= *camilla* W. V., *Rühl*, Stgr., *Spul.* a. o., *nec* L.; *lucilla* Esp., *drusilla* Bergstr.) (57c). Ground-colour blue-black, markings similar to those of *camilla*, the spots of the forewing somewhat differently placed and less numerous, the band of the hindwing intersected by broad vein-streaks and placed nearer the base. At the margin of the wings, especially of the hindwing, bluish white dots. Underside pale greyish brown with reddish patches, the white markings enlarged, the hindwing with bluish grey basal area and beyond it an abbreviated reddish brown band. ♀ larger, the blue marginal spots of the upperside more distinct, the white markings somewhat larger. ab. **pythonissa** Mill. is a form rarely found in nature, but lately produced in experi-

*) The figure on Pl. 57 row b named *doerriesi* U. represents *duplicata*.

ments with cold; the white markings of the upperside are absent, the prevalent colour of the underside being russet red. Transitions are known. — Larva green, on the back 2 rows of red thorns, on the side a white longitudinal stripe, venter, prolegs and head red-brown, the last dotted with white; adult 42—45 mm long; on *Lonicera periclymenum*, *xylosteum*, *caprifolium*, *tartaricum*, and *Symphoricarpos racemosus*, hibernates young in a web between the branches of a forked twig, being full grown early in May if the season is favourable. Pupa suspended, brown or yellowish brown, with some small metallic spots (Röhl). Central and South Europe (about from the 51° southward), Asia Minor. — In Dalmatia (Gravosa), South France (Digne), presumably also in the interjaacent southern districts, an enlarged form is found in which the white markings are conspicuously widened; we introduce it as **herculeana** *subsp. nov.* (♀ 57e). The costal spots of the forewing *herculeana*, are so broadened as to form a band, both spots before the hindmargin and the band of the hindwing have twice the ordinary width. — On the other hand **reducta** *Stgr.*, from Armenia and Persia, is a race with the *reducta*, spots reduced and the band narrowed.

L. cottini *Oberth.* (57d) bears on the black ground of the upperside some obsolescent spots in the basal *cottini*, area, a dull macular band in the middle and a row of dull submarginal dots on both wings, as well as some small subcostal spots on the forewing. On the underside all the markings are larger, the ground-colour is reddish brown. The ♀ does not much differ from the ♂, only being somewhat larger and the spots of the upperside purer white. — Common and widely distributed in West China.

L. elwesi *Oberth.* (57d). The ground-colour black-brown, with white spots, the submarginal spots of both *elwesi*, wings obsolete. Beneath the apical area of the forewing and the whole hindwing red-brown, the spots larger, those of the central row of the hindwing united to a narrow continuous band. ♀ not known. — Tibet: Tse-kou, Chow-pin-sa, May—June, at an altitude of about 1000 m.

L. trivena *Moore**) is of a black-brown ground-colour, with a white band in the middle of both wings. *trivena*. On the forewing the band starts at the costal margin beyond the cell, runs obliquely to the 1. median branch, then turns backwards, where it is separated into 3 spots; on the hindwing the band is moderately broad and remains continuous, only being transected by the blackish veins. On the forewing, moreover, there are an elongate cell-spot and 2 subapical spots, all white. The margin of both wings is somewhat paler, with a blackish submarginal line and a row of whitish dots on the hindwing. Underside like upper, but the ground-colour much lighter. ♀ somewhat larger, the white markings wider, especially the spots in the marginal area of the hindwing, which are accompanied by black lunules. Size as in *L. elwesi*. North-West Himalaya, Kashmir, at 2000—2400 m, in oak-woods (*Quercus ineana* und *semicaprifolia*). Has a quick, but sometimes slower, flight, floating in and out of the sunshine. — In the same district occurs **ligyes** *Hew.*, presumably a seasonal form, which differs *ligyes*, from the preceding only in the somewhat lighter ground-colour, in all the markings being distinctly enlarged and the single spots in the posterior area of the forewing united with the anterior band to one continuous median band. In the marginal area of both wings appears a row of dark spots, and the cell of the forewing bears in the ♂ a reddish brown patch beyond the white spot. Underside light ochreous brown, the band strongly broadened on both wings. Of this forms there occur transitions towards — **hydaspes** *Moore*, which has the discal *hydaspes*, spots isolated and reduced, the upperside, especially in the marginal area, being variegated with reddish brown; this tint is less distinct on the forewing, being present along each side of a submarginal row of blackish spots, while on the hindwing it forms almost as in *lepechini* long wedge-shaped spots, in which is placed a continuous row of black halfmoons. Plentiful in Kashmir. — In **lepechini** *Ersch.* (♀ 57d, ♂ 57d erroneously named *trivena*) *lepechini*, the brownish colour in the marginal area and in the cell of the forewing (there obsolescent) is most strongly developed. The white markings resemble those of *trivena*. The sexes are similar, the ♀ differing only in the spots being larger and paler. Turkestan: Sarafshan, north-western Pamir.

L. sinensium *Oberth.* (56e) is similar to *elwesi* in the position of the spots; the wings are more rounded, *sinensium*, the spots are light reddish brown, there is, moreover, a larger brownish patch in the cell of the hindwing and the outer row of spots is more evenly curved. Underside yellowish brown and grey, with black veins, the markings of the forewing being similar as above; on the hindwing there is only an angulate dark brown discal band, a submarginal band shaded with brown, and a brown margin. ♀ larger, the spots of the upperside paler. — North and West China: Peking, Moupin, Ta-tsien-lu, Wa-shan, Wa-ssu-kou, Pu-tsu-fong; June, July, up to about 3000 m.

L. pratti *Leech* (56d) has the ground-colour grey with a slight greenish tint, the markings being similar *pratti*, to those of *lepechini*, differing however from the latter in the middle spots of the distal row standing nearer the cell. The submarginal spots of both wings are white, this colour being prevalent on the underside in consequence of the increase in size of the markings. — Central China: Chang-Yang.

*) Pl. 57 row 3 named *trivena* *Moore* is *lepechini* ♂.

mimica. **L. mimica** Pouj. (= *Hestina oberthueri* Leech) (60a als oberthueri) somewhat recalls *L. misippus* F. from North America, but the ground-colour is whitish, partly dusted with blackish, especially on the forewing, the veins and distal margin black. In the marginal area of the forewing there is a row of white spots, which becomes double anteriorly, the hindwing bearing a double row of such spots. The underside is paler, the spots nearest the margin are almost square, otherwise the markings as above. The facies is quite that of a species of *Hestina* oder *Diagora*, the upperside also somewhat recalling certain characteristics of *L. cottini*. The ♀ resembles the ♂, but the wings are rather more rounded. In some ♂♂ the white markings are almost entirely dusted with blackish. — West and Central China.

ciocolatina. **L. ciocolatina** Pouj. (= *livida* Leech) (56e). Closely allied to the following species. The upperside black, the forewing with an elongate bluish spot in the cell, a curved row of grey bluish discal spots (too blue on the plate) and two rows of greyish blue submarginal spots; hindwing with 5 band-like rows of grey spots, of which the 2 proximal rows (on the disc) appear washed out, while the third consists of more or less distinctly marked halfmoons; at the anal angle a reddish brown ocellus with black centre. Underside for the greater part red-brown, with white-edged dark bands, and bluish white spots on the forewing, which correspond to those of the upperside. The ♀ not known. — West China: Omei-shan, Wa-ssu-kou, Pu-tsu-fong: June, July, at altitudes of from 900 to 3000 m.

populi. **L. populi** L. (56d). ♂: upperside black-brown, forewing with indistinct cell-spot, a curved row of discal spots and a straight row in the marginal area, all white or whitish; besides with a feeble brownish spot at the cell-end and a double row of submarginal spots, of which the anterior ones are reddish, while the others are bluish or grey. Hindwing with a narrow whitish median band, a row of red-brown lunules in the marginal area and a double row of bluish spots at the margin. Underside for the most part light red-brown, with the markings of the upperside repeated in a grey-greenish tint, the margin of both wings greenish grey with a black undulate line, and near it two rows of black spots, which are less developed on the forewing; basal and abdominal areas of the hindwing more or less grey-green, there being some black transverse bars in the anterior half of the basal area. The ♀ larger, the spots of the forewing considerably wider, purer white, the median band of the hindwing much broader, transected by the dark veins, the markings near the margin more prominent, glossy metallic green; the median band varies from greenish white to yellowish, being in some cases even deep yellow (SPULER). Central Europe (exclusive of England and the Netherlands), South Scandinavia, Finland, Denmark, Livonia, Russia. ♂♂ in which the upperside is black with the subapical spots developed and the markings near the margin vestigial are ab. **tremulae** Esp.*). Everywhere among the ordinary form, locally even prevalent (Baden). The ♀♀ which belong here are devoid of a distinct band on the hindwing and have the white spots of the forewing dusted with black. In both sexes there occur transitional specimens, ab. **diluta** Spuler (56 c as *tremulae*), which have, besides the spots of the discoidal area, only darkened smears in the marginal cellules above and beneath.

tremulae. ab. **defasciata** Schultz is like *tremulae*, but the median band of the hindwing is indistinct or obsolete; rare in nature.

diluta. ab. **radiata** Schultz bears also but 2 white subapical spots on the forewing, and 2 russet-red spots in the anal angle of the hindwing, the upperside being otherwise black. Beneath the light spots at the apex and the light median band of the forewing are replaced by the russet-red ground-colour, the light costal spot and the basal one being filled in with black. On the hindwing the median band is absent, the wing being russet-red from the base to the greenish marginal band, and the veins being bordered with blackish brown radiating streaks; rare in nature.

defasciata. more often artificially produced, transitions also being known. ab. **monochroma** Mitis is a form of the same direction of development: the upperside is quite black, only at the margin there is an uncertain greenish tint, the underside for the greater part is red-brown with same black spots and stripes and at the distal margin a greenish band; found singly in Galicia. In the otherwise normally marked ab. **suberrima** Schultz the russet-red markings in the apex of the forewing and along the distal margin of the hindwing are intensified; found singly in nature.

radiata. — The egg is oval, ribbed, and is usually deposited singly at the tip of leaves of *Populus tremula* L., as a rule at a moderate height above the ground. The young larva is brown, resting on a silky pad on the upperside of a leaf along the midrib and eats both sides of the leaf from the tip; later it selects the stalk of a leaf as resting place. It hibernates in a leaf drawn together to form a cylinder, according to other observations in a boat-shaped web at the tip of twigs. In the spring it is found on the upper- and underside of leaves and also on leaved twigs. Adult 48—50 mm long, green with dark shades, the head anteriorly red-brown, laterally black, with two projections; on the back two rows of hairy tubercles or rounded warts, of which the first pair is longer than the others; segments 5 and 7, moreover, bear each a pair of bright green patches with white dots. When the head is stretched forward two yellow intersegmental rings become visible. The pupa is suspended from the upperside of a leaf; yellowish, shaded with brown, head and thorax tuberculate, the anterior abdominal segments with hatchet-like brownish excrescences. The butterfly appears the end of June and in July, usually comes down to drink at damp places on the ground only in the morning, remaining later more in the crowns of the trees, sitting with spread wings on the leaves. It loves malodorous animal matter, being for instance attracted

*) Pl. 56 row e named *tremulae* represents a transitional specimen, which belongs to ab. *diluta*.

by the foam of horses. — In the Bukovina and Roumania the species has developed into a larger conspicuous local race, which has been named **bucovinensis** *Horn.* (♀ 55e). In the ♂ the white markings are nearly as broad as in the ♀ of the nymotypical form, the ground-colour is deep black with a vivid bluish green tint, the distal area of the wings little or not at all different from the rest of the upper surface, the band of the hindwing and the spots are sometimes shaded with blue, the orange-red halfmoons are frequently reduced to small smears or streaks and partly obsolete; on the underside the ground-colour is dark orange-yellow, the basal area silvery blue, more restricted, the abdominal area also silvery blue instead of greenish. In the ♀ the band of the hindwing and the spots are purer white, also essentially broader, and the ground-colour has a remarkably strong greenish tint. Similar ♂♂ occur singly also among the ordinary form of the species. — A single ♀ from the South Tyrol, an extreme development in the same direction has lately been described as a subspecies by FRUHSTORFER, **goliath**, which form may best be placed here, if it is at all tenable as a unit in systematics. — The species is modified in a similar way as **ussuriensis** *Stgr.* (= *enapius Fruhst.*) (56e) in Central Asia (Altai, Kentei, Mongolia), on the Amur and in the Ussuri-district. In this form the band of the hindwing (♂) is as a rule still somewhat broader than in *bucovinensis*, not narrowing at the hindmargin; the ground-colour is more brownish, and the distal marginal area of the hindwing greenish as in the nymotypical European form, while the underside is marked as in *bucovinensis*, but is orange on a greenish ground. Within the area of this subspecies there occur two aberrations: ab. **eumenius** *Fruhst.* with the white markings reduced, from the Kentei district, and ab. **liliputana** *Stgr.*, half the ordinary size, but otherwise agreeing with *ussuriensis*, in Amurland (Radeffka). — In Europe south of the Balears there flies yet another subspecies, which agrees with *bucovinensis* in size and in the intensity of the black colour with a strong green gloss, but differs in being like ab. *tremulae* but sparsely marked with white. This form may be introduced as **rilocola** subsp. nov. On the forewing of the ♂ the spots are reduced in size and entirely or partly dusted with black except the subapical ones, sometimes even quite obsolete, and the hindwing has no trace of a band, the red halfmoons on the other hand are often strongly developed, and on the underside the red-brown colour has visibly increased, the greenish median band being sometimes reduced and separated into spots, the basal area also being almost entirely red-brown before the median vein. Bulgaria: Rilodagh, at Samokaw at an altitude of 1000 m (K. DRENOWSKY).

L. albomaculata *Leech* (57e) is a very interesting species whose ♂ bears a remarkable resemblance to *Hypolimnas misippus* in the colour of the upperside. On each wing there is on the deep black ground a larger white patch with bluish grey diffuse margins and before the apex of the forewing, besides, a smaller white spot. The underside is red-brown, the white spots are band-like, having preserved the character of the allied species, the basal half of the hindwing is greyish blue, and there are in the distal area of both wings rows of small light spots which are contiguous with black lunate spots. The ♀ has quite a different facies: the upperside bears a whitish yellow cell-streak and bands and spots of the same colour similar to those of *L. populi* ♀, there being a double row of obsolescent whitish lunules at the distal margin. East Tibet, West China. — ab. **nigricans** *Oberth.* agrees above with the ♂ of the main form; beneath the white band of the forewing is slightly dusted with black, the whole hindwing is darker, the band very indistinct as such and only represented by a whitish ill-defined discal spot, and the bluish basal area too is irrorated with blackish atoms. Siao-lou in East Tibet.

5. Genus: **Pantoporia** *Hbn.*

In facies resembling species of the genus *Limenitis*, sometimes so closely that one might mistake them for each other. Butterflies with rather strong wings, normally developed head and body, the upperside of the wings black or blackish brown with white, sometimes bluish, bands and spots, the markings of the ♀ not rarely essentially different and brownish as in certain *Neptis*. — Eyes naked or hairy, antennae above half the length of the forewing, clubbed. Forewing a rectangular triangle with slightly rounded apex; subcostal with 5 branches, 2 of them from the cell; the latter rather narrow, closed or open, the upper discocellular very short. Hindwing broadly ovate, the costal margin slightly curved, the apical and anal angles slightly marked, the distal margin undulate. The neuration not quite constant; even the discocellulars not furnishing reliable characters on which to base groups and still less subgenera or another genus, because individually variable; within the same group of forms there occur specimens with the cell closed, imperfectly closed and open. Nearly all these characters in neuration recur in *Limenitis*, so that in the artificial linear arrangement of the butterflies these two genera must be placed close together. For the sake of completeness we enumerate the genera separated by F. MOORE (Lep. Ind. III.): *Parathyma* (type: *P. sulphitia*), *Tacoraea* (type: *T. asura*), *Tatisia* (type: *T. kanwa*), *Tharasia* (type: *T. jina*), *Chendrana* (type: *C. pravara*), *Athyma* (type: *A. perius*), *Condochates* (type: *C. opalina*), *Tacola* (type: *T. larymna*), *Pantoporia* (type: *P. nefte*), *Zabana* (type: *Z. urvasi*), *Pseudohypolimnas* (type: *P. punctata*), *Sabania* (type: *S. speciosa*), *Bolanga* (type: *B. kasa*), *Zamboanga* (type: *Z. gutama*) and *Kironga* (type: *K. ranga*). — Larva cylindrical, with 4 or 6 rows of thorny processes, similar to the larva of *Limenitis camilla*,

laterally above the legs short bristles, the head with a belt of spikes; they feed on Rubiaceae, Euphorbiaceae and Oleaceae. Pupa suspended, the thorax laterally dilated, on the back two flat lobes curved towards each other, the head with 2 long processes or broad diverging horns. The butterflies fly mostly in the woods, only *P. perius* is found everywhere in the neighbourhood of human dwellings; however, all are fond of sunshine and fly usually on clearings and at the edge of woods where there are plenty of flowers. Most species occur at altitudes of from 600 to 1500-m, some ascending into the alpine region. They are powerful fliers which move in rapid jerks, but do not like to be on the wing for longer distances, settling frequently with spread wings on the leaves of trees and bushes (FRUHSTORFER). The genus is distributed from China through India to the Malay Archipelago (with interruptions) and the Philippines, also being represented on the Solomon Islands.

elwesi. **P. elwesi** *Leech* (59a) is the representative of *P. asura* *Moore* from the Himalayas and the adjacent districts of India. The species is characterized by the chain of black spots situated in the white macular band of the hindwing, which is also well marked on the forewing beneath. The ♂ of the form here dealt with differs from that of the nymotypical subspecies in the white markings being reduced, the ♀ having the markings about as large as in the ♂ of the Indian race. Central China: Chang-Yang; West China: Moupin, Omei-shan, Wa-shan, Chow-pin-sa; in June and July at an altitude of 1000 m, appears to be rare everywhere. — This and the following forms have the cell of the forewing usually open.

jinoidea. **P. jinoidea** *Moore* is a form of the species *jina* *Moore* and resembles *fortuna* *Leech* (comp. 59d). Ground-colour deep black, the markings white, in the cell of the forewing a long narrow streak, beyond the cell from the costa backwards 3 spots which form a short oblique band, behind these but somewhat shifted towards the distal margin a single ovate spot continued obliquely towards the middle of the hindmargin by a band-like row of spots, of which the first is isolated, while the other 3 are only separated from each other by the veins; moreover, there is near the margin a row of smaller spots which is interrupted in the middle by the discal spot being shifted distad and is anteriorly farther away from the margin. Hindwing with a broad complete median band and a row of lunules near the margin, the latter bearing also a deeper black line. Underside red-brown, the markings as above, there being also a row of distinct marginal lunules on both wings. The pattern as in the nymotypical subspecies (*jina*), but the markings narrower and reduced. Not rare in West and Central China, in June and July, up to 1800 m.

fortuna. **P. fortuna** *Leech* (59d) is a similar species, with a radiating cell-stripe, an angulate and interrupted band on the forewing, a complete and a macular band on the hindwing, without submarginal spots on the forewing. *diffusa.* In ab. **diffusa** *Leech* (59d) all these markings, especially the macular band of the forewing, are much widened, being partly shaded with bluish. — Central China: Chang-Yang, Ichang, in June and July.

perius. **P. perius** *L.* (59a). Also similar to *jina*, but the cell-stripe separated into spots and the position of the spots of the band on the forewing, moreover, somewhat different. On the underside, which has a pale ochreous ground-colour, there is again a row of black spots in the external band of the hindwing as in *elwesi*. Larva on Glochidion-species (Euphorbiaceae) in March, cylindrical, green, the head black with red thorns, on the back 2 rows, on the side one row of red branching thorns, the anterior ones shorter but the pairs unequal, so that the thorns of the 5., 7., 9., 11. and 13. segments are shorter than on the others; venter and legs reddish. Pupa brown, the wing-cases projecting, on the back a beak-like process curved downward and below the same another curved upward, the head with 2 pointed horns. The butterfly deposits the eggs particularly on young shoots from the roots of the food-plant. The nymotypical subspecies in India, Burma to the Malay Peninsula, northward to South China (Hongkong) and extending in the Himalaya to Kashmir.

serica. **P. serica** *Leech* (59a) is to be regarded a subspecies of *P. ranga* *Moore*, being the first of the series of forms in which the cell of forewing is usually closed. *serica* deviates a little from the type of the allied species; there appear light spots in the basal area of the forewing, the discal band is obsolescent anteriorly, being only posteriorly represented by some larger well-developed spots, which are partly somewhat shaded with bluish. *serica* differs from the nymotypical race, which has two seasonal forms, in being darker throughout and in the white markings being reduced. Sparsely in West China in June and July, up to about 1600 m.

cama. **P. cama** *Moore* (♂ 59b, ♀ 55e) touches in the Northwest the Palaearctic territory (Kashmir) and is here mentioned for the sake of completeness. In Sikkim the nymotypical subspecies is seasonally dimorphic, the dry-season form, which is paler beneath, being named *camida*. There is remarkable sexual dimorphism. The species will more fully be dealt among the Exotics. Distributed in the Himalayas as far as Upper Burma.

P. selenophora Koll. (♂ 55e). A strongly dimorphic species. The ♂ with an ill-defined brownish basal streak and a white double spot at the apex of the forewing, and across both wings a white median band, which is abbreviated anteriorly on the forewing. ♀ with the pattern usually found in the species of the first group of the genus; the submarginal spots of the forewing are parallel with the margin, the exterior white band of the hindwing is slightly S-shaped and reaches to the costal margin, where it also joins the discal band. The ground-colour of the underside is reddish brown. The nymtypical subspecies has two broods, of which the dry-season form (♀ 59b, named *selenophora* ♂) is somewhat smaller, of a paler ground-colour and more richly marked, in the ♂ particularly the submarginal and marginal bands are more distinctly brownish grey, the cell-streak is better developed and there is sometimes a white spot at the cell-end. The wet-season form is larger and darker, the ♀ (59b, third figure as *selenophora* ♀) moreover having narrower bands, and approaches the subspecies *bahula* Moore from Silhet (Assam). Larva on *Adina cordifolia* Hook. (Rubiaceae), very similar to that of *P. inara* from India, i. e. cylindrical, with 6 rows of thorny processes, green with a small brown spot on the 9. segment and some white lateral spots. Pupa as in the other species of which it is known with two grotesque flaps each on the back and head (DAVIDSON and AIRKEN). Himalaya, northwestwards to Kashmir; Assam: Cachar, Silhet; Upper Burma; South India; South China.

P. opalina, which has the sexes alike, occurs in two subspecies on Palaearctic territory. There is first **constricta** Alph. (59b): A small form with reduced markings; forewing almost without submarginal spots, the exterior band of the hindwing composed of separated spots. There occur also specimens with more abundant markings, which approach *orientalis* Elwes (cf. Exoties) from Sikkim, etc., the latter being considered by MOORE the wet-season form of the nymtypical subspecies, the differences between the various forms therefore being very uncertain. West China: Pu-tsu-fong, Moupin, Wa-ssu-kou, Wa-shan, Omei-shan; Central China: Chang-Yang. Flies in June and July at altitudes from 1200 to 3000 m. — The other Palaearctic form is the nymtypical **opalina** Koll., which is larger and more abundantly white, especially the ♀. This bears a striking resemblance to *selenophora*, but the markings are all broader, the most distal cell-spot is broadly triangular and almost touches the long streak-like posterior subapical spot, near the margin there is a row of more or less distinct small white spots, both bands of the hindwing are straight, which character is less marked in the ♂. Egg globular, flattened beneath, brown with silvery dots. Larva on *Berberis aristata* Hook., cylindrical, brown when young, later green with a bluish side-stripe and brownish line. Head reddish, spiky, body with 4 rows of thorny projections, those on the 3. and 4. segments being longer than the others, only 2 thorns on the 12. segment, the 13. with 4 simple points and 2 small branched thorns. All the processes and thorns dark brown with white tips. Pupa suspended, the shoulders projecting sideways, on the back two appendages which curve towards each other, the posterior one compressed boot-shaped, the anterior one beak-like. Head with 2 strongly diverging lobate pointed appendages (ROBSON). The butterfly has a fast flight, sailing from tree to tree, but rests frequently. Himalaya as far as Kashmir; Khasia and Naga Hills; Burma.

P. sulphitia Cr., whose nymtypical subspecies (61c) is restricted to South-East China and Tonkin, is represented in the Palaearctic Region by a separate form, **ningpoana** Leech (59b). In facies so remarkably like some species of *Limenitis* (*homeyeri*, *pryeri*, etc.) that these insects were united by F. MOORE in one genus *Parathyma* (Lep. Ind. III.). As long as the early stages are not known it must remain an open question, whether MOORE was right. *ningpoana* is recognised by the cell-streak of the forewing being only once interrupted; the subapical spots are shifted towards the centre of the wing and between them and the submarginal row of spots there is a further row of diversely shaped spots obliquely across the wing, the largest, ovate, spot of this row being placed between the two median veins. Hindwing with the usual two bands. Ground-colour of the underside red-brown, the hindwing with some black dots at the base and a slight bluish shade on the discal band. China: Ning-po to Moupin.

P. disjuncta Leech (59c). On the upperside similar to the preceding species, the forewing apparently somewhat more elongate, the cell-spots of the forewing rather different, especially on the underside. The hindwing below with a white streak before the costal vein, the basal spots less prominent, the discal band more erect, i. e. being posteriorly nearer the anal angle, and composed of broader ovate spots. Also the present species bears a certain resemblance to *L. helmanni*. — Not rare in Central China (Chang-Yang), also in West China: Omei-shan, Moupin, etc.

P. recurva Leech (59c). Similar to the preceding, but the cell-spots of the forewing different and the exterior macular band of the hindwing is nearer the margin. Underside red-brown, the spots as above, but better developed, on the hindwing there runs a white curved stripe along the costal vein from the base to the first spot of the discal band, which it sometimes joins. The edges of the band rather straight, but the exterior edge may also be dentate, otherwise only transected by the dark veins. The ♀ is larger and bears enlarged white spots. Appears to be very rare. — West China: Moupin, Wa-shan, in June.

punctata.

P. punctata Leech (59c) differs in facies entirely from the other species of the genus, bearing above on a black ground whitish violet spots, which recall *Hypolimnys misippus* as in the case of *Limenitis albomaculata*. The underside is brownish, markings similar as above, but broader, and the discal spot of the hindwing is enlarged to a broad band. The ♀ (61c) is essentially different, the brownish markings on a dark ground more bearing the general character of the genus. — Central China: Chang-Yang; West China: Ta-tsien-lu, Moupin.

6. Genus: **Stibochiona** Bllr.

Similar to the preceding genus in the structure of the body and wings, but the upperside black-brown with few white spots; hindwing with blue rings at the margin or blue marginal band. Head broad, eyes naked, palpi short, antennae above half the length of the forewing, with feeble club. Forewing a rectangular triangle, the apex rather pointed in the ♂, somewhat rounded in the ♀; the subcostal 5-branched, one branch before the cell-end, the second branch close to the upper angle or from the same. Cell of both wings closed. Hindwing almost triangular, apex rounded, anal angle in the ♂ rather pointed, in the ♀ more rounded, precostal erect, simple, its apex curved outward. The butterflies are lively fliers, being found in and near shrubby woods. Nothing is known of the early stages. Only one species in our Region.

nicea.

S. nicea Gray (= *Adolias dolope* Fldr.) (52a). ♂: Upperside black, on the forewing two bluish cell-dots, beyond the cell 2—3 white ones, upon which follows a curved incomplete row of white dots and finally a complete row of white submarginal spots, on the proximal side of which there are, moreover, more or less distinctly visible blue lunules. Hindwing at the margin with a row of ring-spots, which are proximally blue and distally white. Fringes of forewing black and white, of hindwing entirely white. Underside blackish brown, with a feeble violet tint, the white spots and dots more distinct and numerous. ♀ larger, upperside with greenish sheen, all the markings more complete, the hindwing with a greenish band of lunules near the row of rings. Flies fast and lively, keeping along the edges of the shrubs and appears sometimes here sometimes there in the open, settling often on trees and bushes with wide-spread wings, occasionally also on the underside of leaves, being easy to catch (NICÉVILLE). Distributed in North-India: Himalaya as far as Kashmir, Assam and West China.

C. Subfamily: **Euthaliinae**.

The *Euthaliinae* throughout are large butterflies, of a dark ground-colour. Head large, with broad frons and large eyes. Antennae very long, quite gradually incrassate to a club; palpi of medium length, pointed, porrect, smooth-hairy; tongue in live specimens transparent grass-green as in *Apatura*. Thorax broad and strong, abdomen short, hardly above half the length of the abdominal margin of the hindwing. The wing hard and strong; forewing with strongly curved costal margin, long hindmargin and often an incurved distal margin. The hindwing in many ♀♀ uncommonly large, in the ♂♂ the anal angle often produced. Cell of both wings usually open as in many very strong fliers. — The larvae are green, very soft, without thorns on the back, often with bright-coloured dorsal markings; each segment has (in the known species) on each side a long feathery appendage, these processes surround the resting larva like rays, so that the larva lying on the midrib covers the whole surface of the leaf, to which the feathers are closely applied. These processes of the larvae of many species cause a painful burning if one touches the larva with a tender part of the skin. The larvae live on trees, especially *Mangifera indica* and *gabonensis*, where one finds it at the tips of twigs of the lower branches. The pupae are dull green, fastened close to the midrib of a leaf, with very strong thorax and quite short obtuse abdomen; the latter carinate above, produced into a pointed process behind the thorax, which gives the pupa a very peculiar facies, the more as the surface is ornamented with red and golden dots and stripes. — The butterflies are found in all localities where there are orchards, in gardens, plantations, but also in the forest on clearings and the edges of thickets. The flight is that of *Apatura*, being fast and powerful, darting, with short abrupt movements of the wings. They never visit flowers, but suck ravenously at fallen off fruit and kitchen-refuse, rarer on moist spots on the roads. During the day they keep to the shade of the trees; in the afternoon they are mostly found in the tree-tops, where the ♂♂ rest on the highest twigs, sitting so close that one can easily take them off with a net on a long pole. The ♂♂ of the large species of *Euthalia*, when in the net, make violet endeavours with their strong wing-muscles to get out, so that one can hardly keep them between the fingers. If a ♂ has been caught, at once another occupies the place which has become vacant, so that I thus once in China caught 34 *Euthalia*-♂♂ one after the other from the same leaf of a tree. — The *Euthaliinae* are distributed over the forest-region of South Asia and Africa; many species are very abundant and belong in the tropics of the Old World to the butterflies characteristic for the respective districts (A. SEITZ).

1. Genus: **Auzakia** Moore.

Apart from facies, this genus differs from *Limenitis* especially in the cell of both wings being closed by transverse veins. The species have hairy eyes and are strongly built and dull coloured butterflies, the sexes being somewhat dimorphic. Forewing a rectangular triangle, with strongly marked costal markings and pointed,

somewhat produced apex, 2 subcostals before the apex of the cell, the 1. and 2. discocellular directed obliquely outward, the radials therefore appearing to form a long fork on a common stalk, the 3. discocellular but slightly developed. Hindwing almost triangular, apex rounded, the anal angle acutely produced. The morphological characters on the whole as in the preceding genus. Nothing has hitherto been published about the life-history and habits.

A. danava Moore (57e) is brown, slightly shaded with olive-green, particularly at the anal angle of the hindwing, with black-brown band-like shade and whitish diffuse spots in the costal area of the forewing. Underside light brown, partly grey-brown, with darker bands and blackish figures in the basal area. ♀ olive-green, brown distally, with the dark markings of the ♂ more distinct; both wings with 2 whitish bands, one in the centre, the other in the distal area, the former being proximally dentate, the latter more distinct and broader on the hindwing and followed on both wings by a row of dark spots. Underside as in the ♂, but paler, partly shaded with greenish. The true home of the species is the Himalaya, being known from Assam (the Khasia and Naga Hills) and Burma, but extends in the North-West to Kashmir. — In China flies a slightly modified race, **leechi** Moore. It is somewhat smaller, evenly darker, the external edge of the dark basal area of the forewing more sharply dentate, the two band-like shades in the distal area of *danava* united in *leechi* to one continuous dark area, in the marginal area a row of glossy bluish grey smears at the dark brown marginal line, the light spots of the cell and the anterior portion of the light discal band being also shaded with grey. Hindwing with two dark bands which are united behind and a submarginal band dusted with grey. Underside uniformly darker than in *danava*, the exterior edge of the basal area and the median band more strongly dentate, especially on the forewing. Only the ♂ is known. Central China: Chang-Yang; West China: Moupin, Pu-tsu-fong.

2. Genus: **Abrota** Moore.

A peculiar form, which somewhat recalls the species of *Enispe*.

Strongly built butterflies with robust body; head large, eyes naked, antennae strong, above half the length of the forewing, clubbed. Forewing a rectangular triangle, with curved costal margin and pointed apex; subcostal 5-branched, 2 branches before the apex of the cell, the 1. discocellular very short, the cell closed. Hindwing triangular, with rounded apex, the anal angle acute and projecting in ♂. Nothing is recorded about the early stages. The butterflies rest with spread wings on the leaves in the dense forest and resemble certain species of *Euthalia* (NICÉVILLE).

A. pratti Leech (61a, b) is the Palaearctic representative of the only species of the genus, which is known from Sikkim as *ganga* Moore (= *mirus* F., ♀ = *confinis* Fldr., *jumna* Moore). The upperside of the ♂ is ochreous brown with blackish markings, which do not essentially differ from those of the nymotypical form; the discal band of the hindwing is continuous, while in *ganga* it consists of isolated spots; the anal angle apparently projects less and the general colour is paler. The ♀ particularly differs, being above black-brown with ochre-yellow bands, the connection between the sexes being more obvious on the underside. — Rare on the Omei-shan and at Kweichow in West China.

3. Genus: **Euthalia** Hbn.

Butterflies of very diverse aspect, represented by but one group in the Palaearctic Region. The prevalent colour of the wings is greenish, mostly with light bands and spots; the sexes as a rule different. Head and body normal, eyes naked, antennae above half the length of the forewing, clubbed. Outline of wings simple; forewing a rectangular triangle, with the apex more or less pointed, the distal margin straight or somewhat concave; the subcostal 5-branched, 2 branches emitted before the apex of the cell, the first branches in certain groups anastomosing with each other and with the costal vein for same distance; 1. discocellular very short or aborted; cell as a rule open. Hindwing broadly ovate or triangular, with rounded apex, the distal margin undulate, the anal angle feebly marked, more rarely somewhat more acute; precostal ascending beyond the point of origin of the subcostal, simple oder indistinctly forked; cell open. — Larva on Ebenaceae, Myrtaceae, Melastomaceae, Loranthaceae; cylindrical, with long lateral branched appendages which are featherlike and of about the same length. It rests on the midrib of a leaf and is therefore difficult to perceive. Pupa suspended, short, angular, the abdominal segments strongly focussed into each other, the body strongly incrassate in the middle, with glossy metallic spots and stripes, the head with 2 short points; in aspect similar to two pyramids

which lie together with their basal surfaces. The flight of the butterflies is fast and graceful. They rest in the sunshine with the wings spread out, closing them when disturbed (NICÉVILLE).

This genus also has been split up by F. MOORE (Lep. Ind. III) without there being any great necessity for it into the following genera: *Saparona* (type: *S. cibaritis*), *Haramba* (type: *H. appiades*), *Cynitia* (type: *C. phlegethon*), *Kirontisa* (type: *H. telchinia*), *Tasinga* (type: *T. anosia*), *Dophla* (type: *D. evelina*), *Nora* (type: *N. kesava*), *Sonepisa* (type: *S. kanda*), *Euthalia* (type: *E. lubentina*), *Limbusa* (type: *L. nara*), *Mahaldia* (type: *M. sahadeva*), *Zalupia* (type: *Z. patala*), *Chueapa* (type: *C. franciae*), and *Labranga* (type: *L. durga*). For the Palaearctic species it is sufficient to employ the general designation *Euthalia*.

omeia. **E. omeia** *Leech* (♀ = *consobina* *Leech*) (58c, d) is presumably the Chinese representative of *E. nara* *Moore* (♂ = *anyte* *Hew.*) from North India. The yellowish colour of the costal margin of the hindwing is characteristic for the ♂, being more extended than in *nara*; the colour of the other parts of the wings is more brownish instead of greenish as in *nara*, and the pale abbreviated discal band of the latter is obsolete in *omeia*. In the ♀ of both forms the differences are less marked. This sex has a very different facies, being grey-green, with a white oblique band on the forewing, the markings of the underside proving that the sexes belong together. The ♂ agrees very well in shape and colour with the species of the preceding genus. — West China: Omei-shan, Moupin.

strephon. **E. strephon** *Gr.-Smith* is olive-green above. Forewing with 2 black-edged spots in the cell and a black transverse stripe near the base, the interspace being shaded with yellow; beyond the cell across the whole wing a rather broad, dull yellowish band with somewhat undulate edges, being accompanied anteriorly on both sides by some ill-defined lighter spots. Hindwing of a greener tint, in the cell a black-edged spot, in the outer area parallel to the distal margin a broad, pale ochre-yellow transverse band, which is posteriorly diffuse; near the edge a row of dark hastate or lunate spots. Underside paler; the forewing ochreous, the cell-spots distinct, the transverse band indicated by a black shading along its sides, the distal marginal area greenish yellow, the abdominal area grey; hindwing greenish, in the cell and above the same black ring-shaped markings, the band broader than above, the margin yellowish. In size like *hebe*, but the forewing more pointed. The ♀ recalling *khama*; the white spots of the forewing smaller, the apex more pointed, the hindwing beneath with a row of 5 white spots, otherwise on the whole agreeing with the ♂. — North-West China: Siao-lu, Tientsuen, etc.

khama. **E. khama** *Alph.* (= *sinica* *Moore*). ♂ in shape and colour similar to *E. omeia* *Leech*, also similar to *thibetana*, but the bands of both wings abbreviated. Ground-colour dull greyish green, in the cell of the forewing 2 black-bordered spots placed as in *omeia*, the interspace olivaceous yellow; beyond the cell an oblique band of 4 spots and 2 subapical spots, also yellow, between the two median veins a pale yellowish discal spot, which is ill-defined and gradually fades away in the ground-colour, which is brownish there. On the hindwing a narrow basal area uniformly dark grey-green; on the disc a sharply defined, curved, olive-yellow band, which is broad costally, behind becoming narrower and being here separated into spots. Underside ochreous olive, the markings as above. China: province of Sze-chuen in the Taïsiangualin Pass and along the Tibetan frontier; Ta-tong-kiao. — **dubernardi** *Oberth.* is a local form of smaller size and with all the spots on both wings of the ♂ above and below reduced. The ♀ not yet known: Tse-kou, Tibet.

irrubescens. **E. irrubescens** *Gr.-Smith* belongs to the group of *E. lubentina* *Cr.* from India, etc. ♂: collar and palpi red; upperside of forewing dark green in the basal half, almost black, the outer half paler, light metallic green, the veins and long internervular streaks black; in the cell 2 red, black-edged, narrow, elongate spots, one in the centre, the other at the apex. Basal area of hindwing of the same tint as on forewing, the discal area paler and traversed by the black veins and the long tear-like internervular streaks, in a similar way as the outer half of the forewing; in the cell 2 dark stripes, and at the distal margin, beginning at the anal angle, some elongate red submarginal spots, costal margin paler, with a bluish tint. Underside similar to upper, paler, the red spots in the cell of the forewing broader and more distinct, below the median vein at the base of the lower branch a small black spot; across the cell of the hindwing two red bars, above the cell 3 small red spots and a red costal basal streak; in the distal area there are at the tips of the black internervular streaks a row of red spots, of which the posterior ones are the more distinct ones; the abdominal margin edged with red from the base to the anal angle. — Apparently so far only one specimen known. West China: Omei-shan.

pyrrha. **E. pyrrha** *Leech* (58d) is a smaller Chinese race of *sahadeva* *Moore*, of which the nymotypical race flies in North India. The ♂ is similar to the ♀ in colour and pattern, but the band of the forewing continued to the hindmargin. The ♂ of *pyrrha* differs from the nymotypical form in the yellowish band of the forewing being broader, and the ♀ in the band being purer white, while in *sahadeva* ♀ it is yellowish (OBERTHÜR). — West China: Moupin, Siao-lu, Mosymia.

E. leechi Oberth. (58d) is a name which has recently been proposed for the form recorded by LEECH *leechi*. (Butterfl. China, Jap., Cor.) as *sahadeva*, but now considered to be a distinct species. This *Euthalia* is very similar to the preceding, but the ground is more bronze-colour, the band of the forewing is entirely absent, and the macular band of the hindwing is more like a chain. The ♀ resembles that sex of *pratti* according to OBERTHÜR. — West China: province of Kwei-chow, Moupin, Omei-shan, Siao-lu.

E. kardama Moore (= *armandiana* Pouj.) (58a). Somewhat resembling the ♀ of the preceding form, *kardama*, but the white band of the forewing composed of smaller spots, angulate in the middle, and the posterior spots shifted basad. Both sexes with a broad, pale, greyish green curved band on the hindwing bearing white spots at its inner side and black ones at the outer. Underside much lighter, otherwise as above. ♀ larger, the apex of the forewing somewhat more obtuse than in the ♂. — Widely distributed and not rare in West and Central China.

E. confucius Westw. (58b) bears a rather close similarity to the following species. Forewing with a broad yellowish oblique band whose edges, especially the outer one, are strongly broken, and with an abbreviated yellowish subapical band; hindwing with a curved complete posteriorly tapering band which is likewise yellowish. Underside pale green, with grey and black shadows; markings as above, the bands broader, whitish green. ♀ larger, the subapical spots of the forewing whitish; on the hindwing in place of the band a large costal patch and an elongate curved spot behind the same. Somewhat variable in the extent of the bands of both wings. The facts that the sexes of *confucius* are practically alike and the species was placed by MOORE in his genus *Mahaldia* render it probable that this insect is specifically distinct from the following species, placed by MOORE in *Zalapia*. — Plentiful in West and Central China.

E. patala Koll. (= *doubledayi* Gray, *epiona* Moore) is in facies very similar to the preceding, but has *patala*. only a small subapical double spot and a narrower oblique band on the forewing. In the nymotypical subspecies the hindwing bears only an abbreviated, spot-like, band, which also on the light greenish grey underside is continuous only as far as the 1. radial, ending between the radials with an isolated spot. The ♀ only a little larger, the band and the spots are white instead of yellowish, with a slight green sheen. The nymotypical form occurs from Sikkim and Nepal to the north-western districts of the Himalaya and extends to the Chumba Mts., for which reason it is described here. Plentiful in forests during the rainy season, in July and August, from 600 to 2400 m. The butterfly circles very swiftly round the tree-tops with a graceful skimming flight like a swallow. If two or three meet they chase each other in and out of the shade and sunshine among the branches of the trees. They pitch abruptly on the leaves, often with expanded wings, basking in the sunshine until a ♀ or some passing insect, another *Adolias* or a *Neptis* floating near the quarrelsome species provokes it to dash off, buffet the passer-by and, after a rapid skim, pitch suddenly once more near its former resting place (LANG). — **pratti** *pratti*. Leech (58c) is the Chinese form of this species, differing but slightly in the band of the forewing being narrower and that of the hindwing longer. The light markings, moreover, are yellowish in the ♂, white in the ♀. Rare in Central China: Iehang, Chang-Yang; West China: Chiao-ku-ho. June, July.

E. hebe Leech (58c) is a remarkable species with yellowish bands and spots on a greyish green ground. *hebe*. The position of the band on the forewing is a characteristic of this and the following forms, this band not running obliquely from the costa to the hind angle but being almost parallel to the distal margin. In *hebe* the band is composed of spots and twice elbowed, the middle portion being oblique and the other two portions erect. The band of the hindwing is continuous, being broad anteriorly and narrowed behind. Ground-colour of the underside of both wings pale greyish green. ♀ not known. — China: Chang-Yang and Omei-shan.

E. thibetana Pouj. (= *staudingeri* Leech) (58b). Likewise on the forewing with a macular band which is nearly *thibetana*. parallel with the outer margin, being slightly zigzag, beginning anteriorly with some isolated small spots and widening posteriorly. Hindwing with a continuous band, which narrows behind and is exteriorly accompanied by a sinuous black line, upon which follow light lunules; in the marginal area large black shadowy patches. Underside pale yellowish brown, with the markings of the upper, in the hind angle of the forewing a deep black shadow. ♀ larger, the ground-colour of the upperside somewhat paler, the bands whitish. Somewhat variable, the bands sometimes quite white in the ♀, the width of the same very inconstant in both sexes. In some ♂♂ the spots of the band on the forewing very small, the proximal edge of the posterior spots diffuse, sometimes the green colour with a yellowish tint. Common, up to 2100 m, in West and Central China, in June and July. This form is very closely related to *E. duda* Stgr. from North India, and must apparently be united with *E. durga* Moore to one species. — At Tse-kou there flies another slightly modified race, **yunnana** Oberth., which is on *yunnana*. the whole lighter coloured and in which the bluish grey scaling at the outer side of the band on the hindwing is more extended.

undosa. **E. undosa** *Fruhst.* differs as follows from the main form of the preceding species: ground-colour lighter, more yellowish green, all the pale markings dark straw-yellow, the spots of the band of the forewing more irregularly placed, the anterior ones more strongly isolated; the band on the hindwing strongly constricted and bordered at both sides by a black undulate line. Ground-colour of the underside light yellow, the black markings intensified, the submarginal band of both wings broader and sharper; the middle band of the forewing more broadly edged with black on its proximal side, the edges of the band on the hindwing strongly undulate, the anal area of this wing with light green hairs and scaling. — West China: Moupin.

duda. **E. duda** *Stgr.* differs from *thibetana* in the ground-colour being more green, especially beneath; the bands of both wings are white, that of the forewing being anteriorly more sharply defined and broader, that of the hindwing outwardly conspicuously violet-blue and gradually fading away in the ground-colour. On the hindwing beneath the dark submarginal shadowy band narrower, strigiform, the middle band broader and posteriorly somewhat abbreviated. — The true home is North India, but the species occurs northward in Tibet and North Yunnan (Tse-kou, Lu-tse-kiang), where it is not rare (according to CHAS. OBERTHÜR).

Here follow three lately described forms which their author considers to be specifically distinct. They are:

alpherakyi. **E. alpherakyi** *Oberth.* Larger than *thibetana*, the apex of the forewing more produced, the distal margin strongly dentate. The ground-colour light bronze, powdered with ochreous, especially on the forewing; the bands as in *thibetana*, but that of the hindwing very strongly curved, composed of spots which are proximally convex between the veins and outwardly concave, there being no bluish dusting along the outside of the band. Underside bright greenish yellow, particularly on the hindwing. China: Siao-lu, Tientsuen, Moupin. — In Tibet (Tse-kou)

monbeigi. flies a similar form, named **monbeigi** *Oberth.*, with the spots larger and lighter, particularly on the hindwing, on which the band is almost whitish, being outwardly edged with bluish grey dusting.

aristides. **E. aristides** *Oberth.* Shape and size as in *thibetana*, which it most resembles of the last three species. Ground-colour somewhat darker bronze than in the previous forms, the spots in the cell of the forewing on a paler ground; the band of the forewing anteriorly separated into isolated spots. The band of the hindwing outwardly very strongly curved, each spot of the same bordered between the veins by a black concave lunule. Underside dull ochreous yellow. Otherwise like *thibetana*. — China, with the preceding forms.

themistocles. **E. themistocles** *Oberth.* In facies like the preceding. The ground-colour ochreous yellow, dusted with golden scales, the shadows and markings blackish aeneous. The yellowish spots purer and lighter. The macular band of the hindwing as regards the degree of curvature halfway between the bands of the 2 preceding forms. The black markings of the underside more prominent on the light ochreous yellow, slightly greenish ground, especially on the hindwing. — China, with the previous forms.

Subfamily: **Vanessinae.**

Imposing butterflies, mostly with showy colours, the palpi being long and porrect, the club of the antennae pear-shaped, and the wings strong, hard and in northern species in places hairy like the body. The larvae with long thorns bearing short lateral points, the head being usually indented above. The pupa with a pointed thoracical tubercle and distinct conical caputal processes, sometimes ornamented with metallic tubercles.

Antennae of medium length, straight, the club dark with pale tip. Palpi curved at the base, pointed, porrect, the 1. segment being short and the last long and thin. Tongue strong, nearly always pigmented. Wings hard, often hairy at the base, densely scaled, in many forms with the distal margin angulate and irregularly sinuous, very diverse in shape, markings and colour as well as in venation; cell of both wings either closed or open. The butterflies are difficult for the human eye to perceive on their resting places on trees, fences, etc., on account of the coloration of their undersides; many are striking instances of protective resemblance, the distorted shape of the wings, which may even affect the venation, rendering them similar to the dry leaves of trees.

The *Vanessinae* inhabit nearly all the countries of the globe, even extending to the higher latitudes, and one genus — *Pyrameis* — occurs from Polar Sea to Polar Sea and may occasionally be met with on remote islands.

Tribe **Calinagidi.**

Very peculiar butterflies, which deviate from their relatives, the wings being broad and entire. They mimic Danaids, from which they cannot be distinguished on the wing, their flight being clumsy, exactly as in the Danaids, which is quite unusual among the Nymphalids. They do not visit flowers, but imbibe the sap exuding from wounds in the bark of trees. For mating they visit the summits of high mountains, where they circle round the tops, being here easy to catch. Nothing is known of the early stages, but their larvae are presumably similar to those of *Hypolimnas*. (A. SEITZ.)

1. Genus: **Hestina** *Westw.*

Rather strongly built butterflies, with whitish or greenish ground-colour to the wings and black longitudinal stripes and transverse bands, the pattern therefore partly resembling lattice-work. Head broad, eyes naked, palpi pointed and long, inclined forward, antennae about half the length of the forewing, slightly

clubbed at the apex. The forewing a rectangular triangle, with the apex slightly rounded and the distal margin rather deeply concave; subcostal 5-branched, the 1. branch before the cell-end, the 2. variable in the position, emitted either somewhat before or beyond or exactly opposite the upper angle of the cell; 1. discocellular very short, the 2. strongly curved, extending into the cell; the latter open in both wings. Hindwing ovate, the costal margin curved in the ♂, almost straight in the ♀, the apex rounded, the distal margin undulate, angulate at the 3. radial in *assimilis* and allies. The genus shows close affinities with *Euripus* Dbl., but in the latter the 2. subcostal of the forewing originates far beyond the cell; the habits of the *Euripus*-♂♂ also being different, the separation appears justified. Some of the species put in *Hestina* by earlier authors have been removed and placed with the Apaturid genus *Diagora* for biological and bionomical reasons. The species of *Hestina* have a slow sailing flight and on the wing are easily mistaken for Danaids even by an experienced collector. Nothing is known about the life-history; however, the close relationship with *Euripus* renders it probable that the early stages of both genera are the same. In *Euripus* only the larva of *consimilis* is known, being similar to that of *Ergolis*: cylindrical, with branched horns on the head and hairy warts on the body.

H. assimilis L. (60a). Ground-colour white, with a slight greenish sheen, the markings black, the bright red spots in the black anal area of the hindwing being especially conspicuous. Underside like upper, the black places less deeply coloured and more restricted. ♀ somewhat larger, the wings somewhat broader, otherwise like the ♂. — East Tibet, China (southward to Hongkong), Corea. *assimilis*.

H. nama Dbl. (60a). Ground-colour bluish white, the markings of the forewing black, those on the hindwing reddish brown, in the ♂ darker than in the ♀; the latter also being larger, with the ground-colour purer whitish and as a rule more extended. Underside like upper, but paler. ab. **melanina** Oberth. is a variety of this species with the forewing much shaded with blackish, the spots being very indistinctly marked only in the distal area, and the hindwing entirely dull red-brown with a paler marginal band and darker veins. — The species has a slow and undulating flight and occurs in clearings or at the edge of woods and perfectly resembles *Danaüs* (*Caduga*) *tytia*. — Himalaya as far as Kashmir, Assam, Burma, Shan States, Siam, West China. Abundant all through the year up to 1800 m. *nama*, *melanina*.

H. namoides Nicé. is similar to the preceding species. Ground-colour bluish white, with black vein-streaks, the base of both wings grey, the marginal area of the forewing black with 2 rows of small white spots. The outer area of the hindwing broadly reddish brown, with 3 black spots and a row of 6 small white marginal spots, the edge of the wing more strongly undulate than in *nama*. Underside similar to upper, paler, the light colour more extended, spots larger. — East Tibet: Tse-kou. *namoides*.

2. Genus: **Calinaga** Moore.

In *Iacis* a very peculiar genus, whose position in the classification has not yet been ascertained with certainty. Some authors have attempted to interpret these insects as a connecting link between the Pierids and Parnassiids (KIRBY, OBERTHÜR), and others are inclined to place them with the Satyrids (LEECH); however the structure of the atrophied forelegs of the ♂♂ only justifies, according to our present knowledge, a classification with the Nymphalids. We place them near that genus to whose species they bear a certain resemblance. — Head and body of normal proportions; eyes densely hairy; palpi porrect, not projecting above the head; antennae short, about one-third the length of the forewing, somewhat incrassate at the apex. Forewing an obtuse triangle, apex rounded; subcostal 5-branched, 2 branches emitted before the apex of the cell, the 3. originating near the fork of 4 and 5; cell long, moderately broad, closed; 1. discocellular atrophied, the 2. very short. Hindwing ovate, with the apex rounded, and the distal margin slightly angulate at the 3. radial; precostal simple, curved towards the base of the wing; cell closed by an oblique vein, the posterior discocellular joining the 3. radial in an acute angle immediately after the origin of the 1. median. Nothing is known of the early stages. The butterflies are found in forests on the banks of rivers at altitudes of 1000—1800 m from March till July; they settle often on the wet sand or gravel and when disturbed fly off with a *Papilio*-like flight, being very strong on the wing (MOORE).

C. davidis Oberth. (59e) is a subspecies of *buddha* Moore, the nymotype of which came from Sikkim. The upperside is rather dark, the whitish parts being reduced to narrow streaks and spots. ♀ with the wing somewhat more rounded, but marked as in ♂. West China: Moupin, also Wa-ssu-kou, Chow-pin-sa, East Tibet. — **saka** Moore (59e) differs from the preceding in the whitish markings being broader, being sometimes so enlarged that only the distal margin and the vein-streaks are grey. Central China: Chang-Yang, more rarely in West China. *davidis*, *saka*.

C. cercyon Nicé. (59e) has the markings quite similar, but the ground is yellowish; moreover, the position of the distal spots of the forewing is somewhat different, so that we apparently have to do with a distinct species. — West China: Ta-tsien-hu. *cercyon*.

lhatso.

C. lhatso Oberth. (59d) is likewise yellowish; the longitudinal and transverse stripes dark brown, before the distal margin there appear diffuse lunules on the forewing and distinctly pale yellow ones on the hindwing, the latter bearing an orange-yellow spot at the anal angle. — East Tibet: Tse-kou.

Tribe Hypolimnidi.

Almost exclusively tropical and subtropical species, mostly of imposing size, with magnificent, partly iridescent colours. Some species bear a mimetic resemblance to certain Danaids in the ♀♀ only, while this phenomenon is observed in both sexes of some other species. Others again show a most striking similarity in shape and colour to dry leaves, the most often quoted cases of protective resemblance (*Kallima paralecta*) and mimicry (*Hypolimnas misippus*) belong to this group. Although the ♂♂ of some species of *Hypolimnas* fly also in the hot sunshine, the Hypolimnids are nevertheless shade-loving insects, which, during the hot season, are flushed from the undergrowth of the forests or beaten from the thickets of bushes overhanging the mountain-paths. The ♀♀ of some *Hypolimnas* select as resting-places the bows in the interior of the rotang-bushes, which are impenetrable on account of their thorns. (A. SEITZ.)

3. Genus: **Isodema** Fldr.

This also is a genus deviating in facies from the general Nymphalid character, its systematic position being still uncertain; however, it is advisable to place it here on account of its morphological characteristics. Head and body slender; eyes large, naked; palpi inclined forward, not projecting above the head; antennae slender, about half the length of the forewing, the apical incrasation hardly visible. Forewing nearly a right-angled triangle, with rounded apex; subcostal 5-branched, 2 branches originating before the apex of the cell, the 3. emitted considerably beyond the angle of the cell near the fork of 4 and 5; cell broad, closed; 1. discocellular atrophied, 2. very short, the 1. and 2. radials almost from a point, the 3. discocellular slightly S-shape. Hindwing ovate, with hardly indicated apex and undulated distal margin; costal vein ending at the apex of the wing, precostal emitted beyond the subcostal, simple, its apex somewhat curved basad; cell broad, obliquely closed, the posterior discocellular joining the 3. radial in an acute angle near the fork formed by the 3. radial and the 1. median vein. Nothing is known of the early stages and habits. Only one species is known:

adelma.

L. adelma Fldr. (61b). Upperside brown. Forewing with a yellowish white oblique macular band, of which the 1. spot lies across the distal portion of the cell, and with a patch of spots of the same colour beyond the cell, there being also 2 rows of white dots in the marginal area, of which the outer one is indistinct. Hindwing with yellowish white fringes and a row of submarginal spots of the same colour, of which the anterior ones are larger than the next. Underside as above, but paler, the spots larger and purer white. ♀ somewhat larger, the brown colour paler, the macular band broader. East China: Ningpo Mts. to Ichang; not rare.

latifasciata.

— **latifasciata** Lathy is the western race of the species, with the transverse band broadened and continuous and the costal spots of the forewing enlarged, forming likewise a short band. On the other hand, the submarginal spots are restricted to the apex and anterior portion of the margin. Central and West China, and East Tibet.

4. Genus: **Kallima** Dbl.

Large butterflies with the apex of the forewing produced into a point and the anal angle of the hindwing prolonged to a long lobe. The upperside blue and black, on the forewing a broad golden yellow or whitish band (exotic form); the underside grey or brown, with a narrow band similar to a midrib, which on the spread wings runs from the apex of the forewing to the anal lobe of the hindwing, the surface besides bearing dispersed dark lines joining the band, and diffuse shadows, spots and dots. The total aspect of this pattern in connection with the shape of the wings is so similar to a dry leaf that the butterfly is one of the most striking examples for the theory of mimicry (imitation). Body rather small; eyes naked; palpi long, projecting like a kind of beak; antennae about half the length of the forewing. Subcostal of the forewing 5-branched, 2 branches emitted before the apex of the cell, fork of 4 and 5 very short; cell broad, closed; 1. discocellular very short, the 2. half the length of the 3., which latter joins the 3. radial at the point of origin of the 1. median. Precostal of the hindwing forked, the outer branch longer than the inner one; cell closed by a thin false vein, which sometimes is but vestigial. Egg not particularly large, globular, ribbed vertically. Larva cylindrical, head with 2 long branched processes, body long-hairy, armed with branched thorns; on Acanthaceae. Pupa suspended, simple, the thorax somewhat carinate, the abdomen with small conical tubercles.

The species of this genus are distributed over India, the Andamans, Ceylon, the Malay Peninsula, Sumatra, Java, Borneo, South and West China and the Liu-Kiu Islands. They show conspicuous seasonal dimorphism in the shape of the wings and the colour of the underside, the dry-season form being characterized by a long apical lobe to the forewing and a pale, prominently marked underside. The butterflies are mostly found in the valleys and forests, they are powerful fliers, impetuous in their movements, but keep the wings closed when

at rest and thus resemble a dry leaf so closely that the human eye does not easily detect them in this position. They only arrest the attention, when startled by some movement, they open the wings and dart away, showing to the surprised observer the magnificent coloration of their upperside. As a rule they do not fly far, but the butterfly is difficult to catch on account of the suddenness of its appearance and the rapidity with which it vanishes in a new hiding-place. The insect also likes to drink at the edges of rivers and to imbibe the sap of trees. Stale beer (old beer-barrels) are particularly attractive to it (NICÉVILLE, ELWES a. o.).

In the Palaearctic Region the genus is only represented by one species, *K. inachis* Bsd., of which the nymotypical subspecies flies in North India, the following forms differing but unessentially in a general way.

K. huegelii Koll. (? = *buckleyi* Moore). Shape as in the following. Ground-colour at the base of the forewing and on the hindwing glossy light blue, on the hindwing anteriorly shading off into yellowish white and distally as well as posteriorly into grey; costal and distal marginal areas irrorated with black atoms; the band of the forewing orange-yellow, between the 2 median veins in the blue ground-colour a vitreous black-edged spot. Both wings with distinct submarginal zigzag line. Underside grey or grey-brown, with leaf-like markings and shadows as in *chinensis*, but very variable in colour as well as in the intensity of the markings. ♀ similar to the ♂, the apex of the forewing more produced. Appears like the following subspecies in two broods. As nymotypical (= first described) form we must regard the dry-season form. The apex of the forewing is produced into a pointed lobe, the tails are longer, somewhat curved inward, and the underside bears prominent markings. ab. **boisduvali** Moore is the name for the rainy-season form, which is smaller on an average, has somewhat broader wings with a deeper tint of the ground-colour, the apex not being much produced, the tails shorter, and the markings of the underside more indistinct, darker and more diffuse. West Himalaya, Kashmir. — **chinensis** Swinh. (60d) differs but unessentially from *inachis* and *huegelii*. Smaller, the blue colour of the wings not violet but steel-blue, almost as in *huegelii* but darker, the deep orange, almost yellow ochre band proportionately somewhat narrower, proximally more strongly bordered with black. Only one form is known, which nearly corresponds in shape with the Indian dry-season form, but has a more uniformly coloured underside with diffuse markings. Also in this form has the ♀ the apex of the forewing more produced and pointed. West China: Omei-shan; Central China: Ichang (coll. SEITZ, JANKOWSKY leg.). — **eucerca** Fruhst. (60d) is similar to the preceding, the wings however are broader, bearing the characteristics of a rainy-season form, the band of the forewing darker golden yellow, the blue ground-colour of the basal half of the forewing and of the hindwing darker blue, strongly glossy; on the hindwing there is close to the submarginal zigzag line an incomplete row of black lunules, which are placed in a black shadow. This band-like pattern is but slightly indicated in the other forms. Known from Okinawa (Liu-Kiu Islands) and here described on account of its being so closely related to the Chinese race. Specimens from Hongkong probably belong here. — The species flies in the forest, and FRUNSTORFER says that he attracted (baited) the race from Okinawa by squirting rice- or potatoe-alcohol (Sake) into the air or saturating with it a pocket-handkerchief.

5. Genus: **Hypolimnas** Hbn.

Broad-winged butterflies of simple build, with the neurulation but moderately prominent. Head and body normal; palpi porrect forming a beak, moderately long; antennae less than half the length of the forewing, with almost knob-like club. Forewing a right-angled triangle, with the apex somewhat truncate obliquely; subcostal 5-branched, 2 branches originating close together proximally to and near the apex of cell; cell closed; 1. discocellular aborted, the 3. about twice the length of the 2., both curved inward. Hindwing almost triangular, with curved sides, the apex somewhat rounded, the anal angle less distinct in the ♀ than in the ♂; precostal simple, its apex curved distad in hook-shape; cell open; the posterior discocellular indicated only by a fold as a minute line. — Larva cylindrical, with branched thorns, on Portulacaceae and Urticaceae. Pupa suspended, short and stout, with short lateral tubercles. — Distributed over the whole of the Indo-Australian Region as far as the South Sea Islands, occurring also in Africa, and being recorded from North and South America.

The species of this genus are remarkable for their sexual polymorphism (see description of *misippus*) and the similarity of the ♀♀ to certain Danaids. They fly in the warmer valleys of the submontane region, the ♂♂ having brisk movements; they rest in the sun on leaves or flowers, alternately opening and closing the wings, the ♀♀ having the more sluggish flight of the Danaids.

H. misippus L. (60e). ♂ above velvety black-brown, bearing on both wings a large white patch with diffuse glossy violet-blue edges; moreover, on the forewing a similarly coloured small subapical spot. Underside of the forewing reddish brown at the base, blackish distally, the apex being yellowish, in the cell several

black-edged white spots and before the distal margin a double row of small white lunules, the large white median patch more sharply defined and without blue gloss. Hindwing beneath ochreous yellow, the median patch enlarged to a broad white band, in the centre of the costal margin a black angle-shaped spot, before the distal margin a double row of white spots and near them white dots. ♀ in the ordinary form above reddish brown with black apex to the forewing, a white oblique band and white subapical spot, the margin of both wings being black with small white double spots. This form is a striking copy of *Danaus chrysippus*, which it also resembles in its habits, being an often quoted illustration of mimicry. There occur specimens with the disc of the hindwing white above and beneath, thus resembling the homonymous form of the Danaid mentioned above: ♀-ab. *alcippoides* Btlr. The white subapical band of the forewing is not rarely absent, the apical area having assumed the colour of the rest of the wing: ♀-ab. *inaria* Cr. (60c). Transitional specimens are also known, in which the subapical band is yellowish red and the black apical area reduced, the extreme individuals bearing more or less extended white scaling on the disc of the hindwing. Also these forms have Danaid models, which are known as *dorippus* and ab. *albinus* Lanz (from Africa). — Larva black, with paler dorsal line and grey intersegmental belts, the head and legs reddish, the former with 2 long branched horns; on the body several longitudinal rows of dirty white branched thorns, the anal ring with only 2 such thorns. Lives gregariously on *Portulaca oleracea* and *quadrifida* L. and is very voracious; when disturbed it emits a green liquid from the mouth. Pupa suspended, light brown, without metallic spots, abdomen with one dorsal and two lateral rows of short pointed tubercles, thorax bent, head somewhat bifid (DE LA CHAUMETTE, according to MOORE). The ♂ is described as an active quarrelsome butterfly which, perching on the top of a bush, darts forward to attack and chase every butterfly that may fly past. On the other hand it is said to be exposed to the attacks of birds, so that one cannot wonder at the frequency of the occurrence of specimens with the wings battered and torn. However, these results of its passions and the danger to which it is exposed do not appear to greatly diminish the activity of the insect (SWINHOE). A widely distributed species: Indo-Malayan Subregion, Australia, Africa; also recorded from North America (New York, Carolina), the West Indies and the northern parts of South America. In the Palaearctic Region known from Syria and Palestine. In China only recorded from Hongkong.

The second species of the genus, *H. bolina* L., touches the Palaearctic territory in western China, but will more opportunely be dealt with among the Exotics.

Tribe Vanessidi.

This tribe comprises the true "angle-wings". Eyes and the whole head very strongly hairy, the antennae usually ringed, the distal margin of the forewing usually angulate below the apex, the angle sometimes forming a pointed tooth; the hindwing is produced at the anal angle and sometimes angulate in the centre of the distal margin. — The larvae bear long strong thorns, the head being indented above and somewhat heart-shaped, its two semiglobular halves being occasionally more strongly tuberculiform. Many feed gregariously, some till they pupate, on non-poisonous plants. The pupa is usually ornamented with metallic spots and is suspended exposed on fences, walls and the projections of the bark of branches or stems. — The butterflies are plentiful as a rule and occur all the year round, sometimes in several broods which differ from one another; many pass the winter in a lethargic state. On warm days of the early spring such hibernating specimens awake and become active, which has given the name of "heralds of the spring" to these butterflies. Most species belong to the very commonest and most conspicuous of all known Lepidoptera, and some species congregate in swarms which wander wide distances. Whereas the genera *Vanessa*, *Polygonia* and *Araschnia* occur in the northern temperate zone, *Precis* and *Junonia* are distributed over the tropical and southern temperate territories. *Pyrameis* being cosmopolitan, its most beautiful and largest forms flying on remote islands, such as the Sandwich Islands and New Zealand.

6. Genus: **Junonia** Hbn.

Broad-winged butterflies with a relatively small body, the ground-colour being a dull grey-brown, red-brown or black, bearing in the last case large bright ochreous patches. Head broad; eyes naked; palpi long, projecting beak-like; antennae about half the length of the forewing. The latter, taken as a whole, a right-angled triangle, the costal margin strongly curved, the apex more or less obliquely truncate, distal margin more or less concave, sometimes bearing a lobe at the upper radial; the outline of the wing different in seasonal forms, the wing being more strongly angulate in the dry-season form than in the wet-season form; subcostal 5-branched, 2 branches before the apex of the cell, the 3. at a considerable distance beyond the same; upper discocellular atrophied, the middle one deeply concave, joining the 2. radial without forming an angle with it, 3. discocellular absent, the cell being open. Hindwing about triangular, with strongly curved sides, rounded apex, and the anal angle often produced into a lobe; precostal creet, then almost rectangularly bent outward, bearing sometimes a short spur on the basal side.

Larva cylindrical, with branched thorns, the head with short bristles; on Acanthaceae. Pupa suspended, with small wartlike tubercles on the back. The butterflies are fast fliers, and are fond of sitting with spread wings on the ground; they visit flowers and therefore are frequently met with in the gardens of planters.

J. iphita Cr. (61e). Greyish brown with darker shades; a row of small ocelli in the hindwing. Two broods, *iphita*. the wet-season form being nymotypical. This form is the larger one, with the wings less angulate and more brightly coloured, especially on the underside, than in the dry-season form, the latter being named *siccata* *siccata*. *Fruhst.* (62a). — The larva feeds on *Strobilanthus callosus* Nees (Acanthaceae), and is cylindrical, dark brown with russet-red head, the segments bearing short branched thorns. Pupa short, grey or sooty, with small tubercles on the back. The butterfly is abundant where it occurs: it has a somewhat bold flight, but only for short distances, and sometimes settles on the ground or on bushes (NICÉVILLE). It is active throughout the day, apparently not being influenced by the weather, flying also while it rains (FRUHSTORFER). Chiefly inhabits Continental India as far as the Malay Peninsula, Ceylon and Sumatra, but extends into the Palaearctic Region in the North West in Kashmir as well as in Western and Central China.

J. almana L. (62a). Reddish brown with black costal spots on the forewing and a large ocellus on each *almana*. wing. Likewise in two broods. The dry-season form (nymotypical) resembles the preceding species in the shape of the wings, but the hindwing is somewhat angulate at the 3. radial. The rainy-season form, *asterie* L. *asterie*. (62a), has less angular wings, the eye-spots and the other markings are more strongly developed, the colour is on the whole deeper, the paler underside bearing sharply marked transverse bands and undulate lines as well as bright eye-spots, which are almost entirely wanting in the nymotypical form. The larva feeds like that of the preceding species on Acanthaceae (*Hygrophila spinosa* And.) Very widely distributed. Occurs in South and North India, extending to the Malay Peninsula and the neighbouring and Malayan islands: Andamans, Nicobars, Sumatra, Java, Borneo (partly in named varieties, which will be dealt with among the Exotics), being also found on Formosa, the Philippines, in China (Ning-po) and Japan (Ishigaki).

J. hierta F. (= *oenone* Cr.) (62b).¹ Ground-colour black, both wings however bearing a light golden *hierta*. yellow, irregular patch, which occupies the greater part of the wings; the hindwing; moreover, bears anteriorly a blue spot. In the ♀ there appear on the forewing some dark brown costal spots and posteriorly a blue-centred ocellus, which is also present in the ♂ but blind; the hindwing with 2 smaller ocelli in the yellow area. The underside of the forewing is for the greater part light ochreous, that of the hindwing being grey with brown shadows and brown transverse lines. — The larva feeds on *Hygrophila spinosa* And. (Acanthaceae); it is cylindrical, with short hairs and branched black thorns; ground-colour sooty grey, beneath dull reddish, with a pale yellow dorsal line and whitish lateral spots. Pupa dull reddish, the head obtuse, on the back and sides small black tubercles (MOORE). Distributed from Ceylon, the Andamans, Nicobars, the Mergui Archipelago and Tenasserim throughout India to the Himalayas and South and West China. — *crebrene* Trim. (62b) is the *crebrene*. representative of the species in Africa and Anterior Asia. This form is smaller, the yellow patches are paler, with an orange tint at their edges, being also somewhat differently shaped, especially in the ♀. Syria, Arabia, Africa.

J. orithya L. (♂ 62b) varies according to season. The rainy-season form is nymotypical; it has the wings *orithya*. less angulate; in the ♂ the ocelli of the forewing are small, the bluish violet area of the hindwing on the contrary occupies nearly the whole wing. In the ♀ (62e) the blue sometimes disappears entirely or is restricted to the distal part of the wing; the ground-colour is brown, the cell of the forewing bears reddish markings, the ocelli of the forewing are surrounded by reddish brown and those of the hindwing are for the greater part reddish. Underside of a light ochreous yellow tint, the hindwing with brownish undulate lines, the forewing marked as above. — *isocratia* Hbn. is the dry-season form with the distal margin of the forewing produced into a pointed *isocratia*. lobe; the ♂ abundantly marked with blue, which has a greenish tint, the ocelli ringed with red, the underside of the hindwing ashy grey. ♀ variable, either with rather abundant blue colour on the hindwing (62b), or the ground unicolorous, the blue area only being indicated by a grey distal zone; on the forewing usually some blue scaling behind the well developed posterior ocellus. — This species, whose larva has the same food-plant as that of the preceding one, is widely distributed (as far as Australia and the South Sea Islands, as well as Africa) and has been separated into a number of subspecies, which will be dealt with among the Exotics. In South-West China the nymotypical subspecies touches the Palaearctic territory, and has also been recorded from South Japan, Hainan and the Liu-Kiu Islands. — *here* Lang is a smaller local form. The blue of the *here*. forewing is more extended, being continued in the shape of a band along the white costal oblique band and including the posterior ocellus (which has no reddish ring); in the cell there are some blue subcostal spots, but no reddish ones. The basal half of the hindwing is black, the outer area blue, the ocelli are more or less

reduced, the anterior one being usually blind, the distal margin is bluish, more rarely whitish, being traversed by two dark lines as in the nymotypical form. The hindwing of the ♀ is bluish black-brown and the ocelli are fully developed. Asiatic Turkey, Arabia. — In the Indo-Australian countries occur further subspecies, which will be described among the Exotics.

7. Genus: **Pyrameis** Hbn.

Medium-sized butterflies with bright colours and simple outline of the wings. Eyes hairy; palpi with short hairs only, without long bristles, the end-segment pointed, porrect; antennae above half the length of the forewing, with flat club, which is almost knob-like. The forewing a right-angled triangle, the apex narrowly rounded (*cardui*) or slightly angulate (*atalanta*), the hindmargin straight; subcostal 5-branched, 2 branches close together before the apex of the cell, the 3. at a considerable distance beyond the same; upper discocellular very short, the 2. joining the middle radial in a shallow curve; cell of both wings closed by a thin oblique crossvein (3. discocellular). Hindwing nearly triangular, the costal margin straight, slightly lobate at the base (*cardui*) or here strongly convex and then shallowly concave (*atalanta*); apex obtuse, anal angle acute, distal margin undulate, without tooth at the 3. radial; precostal forked. — Larva cylindrical, with branched thorns. Pupa suspended, with beak-like projection on the back, with metallic spots, the head being bifid. The butterflies have an active flight, suck at flowers, some also at the sap exuding from trees. They are distributed over Europe, North Africa, and Asia, some species occur in North and South America, others are found in the Indo-Australian Region as far as New Zealand, one species (*P. cardui*) flying in all countries with the exception of South America.

- atalanta*. **P. atalanta** L. (62c). The forewing of this butterfly bears on a black ground an oblique vermilion band and a group of white subapical spots. On the hindwing the larger portion of the distal margin is red, with a row of small black spots and at the anal angle an elongate blue spot. The underside is partly variegated with blue; the forewing is on the whole similar in markings to the upper, while the hindwing is brightly variegated and clouded, bearing black markings, of which those in the cell resemble a figure (on the left wing 18 or 98, on the right 81 or 89); in the middle of the costal area there is a pale patch and in the distal marginal area a row of ocellus-like spots. Sometimes, especially in the ♀, the red band of the forewing bears a small white spot in the middle. A dwarfed form, recorded from Biskra (Algeria) and the Riviera, but probably occurring everywhere in the distribution-area of the species (*e. g.* Italy, Albano) is named ab. **nana** *fracta*. *Schultz*. Specimens in which the red band of the forewing is interrupted at the median vein are ab. **fracta** *Tutt*; occur likewise here and there among the main form, especially in southern districts (Italy), also obtained in temperature-experiments (treatment with heat). In ab. **klemensiewiczzi** *Schille**) the white costal spot situated beyond the band of the forewing is dulled with blackish scaling, the red band is widened and shortened, the subapical row contains 7 spots instead of 4 or 5, the spots being partly diffuse, the middle ones shaded with blue, the last placed in the red band. Beneath the red band particularly broad, the outer portion of the costa and the apex of the wing bluish; the hindwing also bluish, slightly marmorated, with the black ground shining through. Occasionally in nature: Galicia, Silesia, Tyrol, England, etc., also in transitions to the main form and as artificial product of the treatment with low temperature. The extreme of this direction of development is represented by ab. **klymene** *Fisch.* (62c, as *klemensiewiczzi*), which so far appears to be only known as a product of experiments with low degrees of temperature. In this form the white costal spot of the forewing is entirely obsolete, the band and the distal spots are as in the preceding form, but the marginal band of the hindwing is reduced and the black dots in the same are absent or hardly indicated; underside dark grey, similar to that of the previous aberration. By exposure of the pupae to heat a further form is produced which recalls *cyclops*. *vulcania* and which I name ab. **cyclops** *ab. nov.*; the red band of the forewing is strongly widened throughout and has on its proximal side in the cell a projection which encloses a black double spot that is only slightly indicated in the other forms: at the base and apex reddish or even bright red scaling on the slightly brownish ground, and the white submarginal spots of the forewing somewhat reduced (type: Plate VII. fig. 7 in Standfuss, Handb. Pal. Gross-Schmett., 2. edit. 1896). ab. **merrifieldi** *Stdjss.* is characterized by the reduction of the red band and the enlargement of the white costal spot, which basally shades off into grey; the ground-colour of the upperside is deep blue-black, the ornamental band is twice interrupted, the sinuate middle portion being sometimes altogether obsolete, the posterior tip of the band is usually separated by the black vein and sometimes also quite absent; between the enlarged white costal spot and the blue band there is blue scaling. On the hindwing the dots of the marginal band are enlarged and dusted with blue, the blue spot at the anal angle being particularly strongly developed, and at the proximal edge of the marginal band appear several blue spots. Beneath the blue in the apical area of the forewing is better developed; the markings of the hind-

*) The form named *klemensiewiczzi* on Pl. 62c is = *klymene*.

wing are diffuse, the costal and distal marginal areas being yellowish with a blue tint. This magnificent form, like the others, is connected with the normal form by several transitional aberrations and is the product of the treatment with cold. — The species has hardly at all developed into geographical races. All the specimens from South and Central Italy may be united under the name *italica* Stich. This form is characterized throughout *italica* by the red band of the forewing being reduced in width, which frequently leads to the development of ab. *fracta*; the posterior spots in the red marginal band of the hindwing show blue scaling, on the underside the apex of the forewing and the centre of the distal marginal area are yellowish. South and Central Italy as far north as the Albanian Mts. and the Abruzzi, further north in transitions towards to the nymotypical subspecies. — The egg of *atalanta* is oval, greenish, with longitudinal ribs. Larva cylindrical, stout, variable in colour, being obscurely yellowish, reddish, greenish or black, dotted with yellow, with a longitudinal yellow stripe on each side and yellow branched thorns. Two broods: May and June, and again July until September. They live singly in leaves of nettles spun together (*Urtica dioica* L., *urens* L.). Pupa brown or greyish brown, with metallic spots on the back, the head produced into 2 short points. The butterfly, which hibernates, is fond of the sap exuding from trees (borings of *Cossus*, etc.), but also visits flowers. Europe, North Africa, Canaries, Asia Minor, Palestine, eastward to Central Asia (Altai).

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P. indica Hbst. (= *caliroë* Hbn.). Closely allied to the previous species. Ground-colour less deep, the *indica*. band of the forewing paler red, distally once and proximally twice sinuate, anteriorly bearing a black cell-spot. The band of the hindwing with larger spots, there being at its proximal side another row of spots which distinctly contrast with the brown ground-colour. Underside of the hindwing very different from that of *atalanta*; instead of the cipher-like markings the cell bears sharply white-edged dark spots, the wing, moreover, is crossed by a dentate transverse band dusted with whitish, being a continuation of one of the cell-spots. The sexes differ but slightly, the ♀ being only a little larger and less bright-coloured. The larva feeds on Urticaceae like *atalanta*; head black, minutely tuberculated, the body clothed with thin hairs and provided with black branched thorns; colour blackish, dotted with yellow (MOORE). Very common wherever the food-plant grows, ascending to a considerable altitude in the mountains and flying all the year round. NICÉVILLE (Butt. Ind. II.) mentions a peculiar aberration found at Dehra Dun in July which corresponds to the ab. *klemensiewiczii* of *atalanta*. Widely distributed: Himalayas, Assam, Burma, Ceylon, China, Japan, Korea, eastern Amurland. — **vulcania** Godt. (= *callirhoë* Mill.) (62e) is darker coloured, with the band of the forewing brighter *vulcania*. red and strongly sinuate, and particularly large spots in the narrow marginal band of the hindwing, the apex of the forewing, moreover, being more angulate than in *atalanta*. Larva on *Urtica dioica* L. Canary Islands. — **occidentalis** Fldr. is a smaller and darker form from Madeira, of which single specimens are also recorded *occidentalis*. from Portugal.

P. limenitoides Oberth. (61d). The shape of the wings on the whole as in the preceding species, but the *limenitoides*. apex of the forewing rather more angulate; in the markings, however, the species deviates so markedly from the allied forms that a special genus, *Lelex* Nicé., has been proposed for its reception. Ground-colour black, markings white. The pattern recalls certain *Limenitis* (*ricularis*, *homeyeri*), but the position of the spots on the forewing is somewhat different and the band of the hindwing which runs from the costal margin to near the anal angle bears on its proximal side a broad tooth. The forewing beneath is paler, with larger, less sharply defined spots, the underside of the hindwing being whitish with brown pencilling and short brown transverse lines in the basal area, the distal margin being grey, bearing posteriorly some dark triangular spots. — Tse-kou, Tibet.

P. cardui L. (62d) shows close affinities to the preceding forms. The ground-colour is pale red (pink), *cardui*. more or less variegated with pale shades; the apex of the forewing black with white spots, a macular black band obliquely across the middle of the wing, the base blackish dusted with ochreous yellow. Hindwing dull-coloured at the base, with 3 rows of black spots in the distal area. Underside of the forewing on the whole similarly marked as upper, the white colour more extended; hindwing very similar to that of the previous species, but of a lighter tint, near the distal margin a row of ocelli with distinct blue centres. A dwarfed form of this is named ab. *minor* Cann., its expanse being 28—30 (♂) and 30—33 (♀) mm; the white subapical spots *minor*. are said to stand in a straight line not in an arc, and the underside to be yellowish for the greater part. Recorded from Calabria (Italy), doubtless everywhere among the normal specimens. ab. **pallens** Noel is described as *pallens*. having the ground-colour quite white, the markings being normal, but the thorax blue-hairy. This is an extreme case of albinism. Specimens in which the black markings are remarkably pale, the apical area especially having assumed a whitish grey colour, are ab. **carduelis** Schultz. In ab. **priameis** Schultz the anterior submarginal *carduelis*. spots of the hindwing, which are normally rounded, are prolonged to black streaks. ab. **inornata** Brams. is *priameis*. distinguished by the reduction of the black transverse band; of this band only a subcostal spot is left, and the *inornata*. black area beyond the cell is absent except a narrow black line bordering the white costal spot, the 4 white

subapical spots are nearly prolonged to streaks, there being below them an additional, smaller, white spot; on the other hand the posterior portion of the marginal band is widened and produced along the veins, there being no line of pale dots at the margin. Ground-colour of the upperside pale rosy red. On the underside the markings are also visibly reduced, on the hindwing only the middle ocelli are distinct, the marginal line and the bluish lunules near it are absent. South Russia (Ekaterinoslaw). In specimens from South Russia, as well as from the Balkan Peninsula, there is apparently a general inclination of the black median band of the forewing towards reduction in width. ab. *wiskotti* *Stdss.* has been artificially produced by treatment with cold; sooty all over, the red ground-colour remaining distinct only around the middle cell-spot; the white costal spot is occasionally dusted with grey. On the hindwing a small spot at the apex of the cell and the margin remain reddish. Beneath the markings are diffuse and dull. ab. *elymi* *Ramb.* about correspond to *atalanta* ab. *klemensiewiczii*. The median band, except the first spot in the cell, is absent, the costal spot has entirely disappeared in the black apical area, the dark marginal band is widened, the white submarginal spots are elongate and more numerous behind; ground-colour dull pink. On the hindwing the rounded spots are absent, the other distal spots are indicated only by a widening of the black vein-streaks, the costal area is darkened, and the distal area bears a row of whitish smears. The markings of the underside are similarly simplified and diffuse. Occasionally in nature (Strassburg, South France, Catalonia), also artificially produced in extreme specimens as well as transitions towards the main form. — This species, too, does not vary much geographically. A northern form, which is on the whole lighter in colour, the ground-colour being yellowish red, has been named *pallida*. *pallida* *Schoyen.* Arctic Scandinavia. — The specimens from Eastern Asia are larger on an average, with the ground-colour reddish ochreous yellow. They are further characterized by the strong reduction in size of the rounded submarginal spots of the hindwing, of which the anterior ones are either absent or are at least quite isolated in the ground-colour. These differences justify the separation as a subspecies, which we call *japonica* *subsp. nov.* (62d). Japan; Eastern China (Tsintau). — The egg of *cardui* is green, elongate, reticulate. The larva is grey or blackish, with yellow stripes, spots and dots, and short paler thorns; in leaves of the food-plant spun together, especially on thistles and nettles: *Carduus crispus* *L.*, *Cirsium arvense* *L.*, *Urtica dioica* *L.*, but has also been found on *Anchusa officinalis* *L.* (Alkanet), *Lappa officinalis* *All.* (Burdock), *Echium vulgare* *L.* (Viper-grass), *Artemisia vulgaris* *L.* (Mugwort), *Filago arvensis* *W.* (Cudweed). Apart from the two local races which bear special names, the species is cosmopolitan, being absent only in South America. It is particularly abundant in the subtropical countries of the Eastern Hemisphere, but occurs also in the New World, where it extends southward to the West Indian Islands. In Europe there are 2 broods. In the tropics the broods are not sharply separated, the larvae being found all through the year when and wherever there is food, according as they emerge from the eggs. In the warm countries the species is more an inhabitant of higher altitudes, the larva being found in India on *Gnaphalium indicum*, *Zornia diphylla*, and a species of *Blumea* (MOORE, DAVIDSON). It has an irregular fast flight, loves to bask on the bare ground and stones, and shows a decided propensity for migrating. Frequently enormous swarms have been observed, especially in warm districts, the specimens all flying in one direction. This phenomenon is said to stand in connection with the instinct of self-preservation. In some years, namely, the enormous numbers of caterpillars of the February brood devour all food in large districts, and the butterflies emerging in May emigrate together.

virginiensis. ***P. virginiensis*** *Drury* (= *huntera* *F.*) (62d). Similar to the preceding species, but the wings proportionally shorter, the apex of the forewing being broader and slightly angulate. Ground-colour light red, sometimes with a pale yellowish tint, the irregular black markings being quite similar to those of *cardui*, and the forewing bearing a white costal spot and several subapical ones; moreover there appears a white spot in the red colour within the cell and another in the centre of the distal marginal area. Hindwing with an elbowed blackish median band and in the distal area 4 spots, of which the first and last resemble an ocellus, bearing a blue centre. Underside of the forewing rosy-red, the markings on the whole as above; hindwing with a white median band and in the dark basal area white transverse lines, which partly form ovate markings, in the distal area 2 pale ocelli on a dark ground. — The true home of this butterfly is North America, but the insect has repeatedly been found on the Canaries, where it appears to be indigenous.

8. Genus: **Vanessa** *F.*

This genus is closely related to the preceding one, and contains the species commonly known as "Tortoiseshells" and others which differ much in colour and markings. Head broad; eyes hairy; palpi rather long, porrect, the hairs sparsely intermixed with longer bristles; antennae about half the length of the forewing, clubbed. Forewing a right-angled triangle, the costal margin strongly arched basally, the apex obliquely truncate, the distal margin more strongly angulate at the 1. radial and more feebly at the lower median; subcostal 5-branched, 2 branches before the apex of the cell; upper discocellular very short, the 2. joining the

2. radial in a flat curve, cell open or closed, in the latter case the 3. discocellular oblique and joining the 3. radial at its bent. Hindwing almost triangular, the apical and anal angles distinctly marked, the former less angulate than the latter, the distal margin angulate or dentate at the 3. radial, otherwise like that of the forewing more or less undulate or even dentate; precostal not the same, being simple or forked or curved in hook-shape either outside or inside; cell open. — Larva cylindrical, with more or less branched thorns; on Urticaceae, Leguminosae, Compositae, etc. Pupa suspended, angular, with beak-like dorsal projection with metallic spots. The butterflies are fond of sunshine and have a swinging and not specially fast and vigorous flight, being met with in meadows, on pastures and in gardens. They visit flowers, some species also imbibe the sap of certain trees.

F. MOORE (Lep. Ind. IV, 1899) divides the genus up as follows: *Euvanessa* Scudd. (type: *E. antiopa*); *Eugonia* Hbn. (type: *E. polychloros*); *Aglais* Dalm. (type: *A. urticae*); *Kaniska* (type: *K. canace*). *Vanessa* F. is employed for *Pyrameis* Hbn. (type: *V. atalanta*).

V. io L. (62d) is a magnificent species, characterized by the peacock spots which are present on both *io*. wings on a bright red-brown ground, the underside being blackish and bearing deep black transverse bands and lines. There occur specimens which are only half the normal size; these are ab. **ioides** O.*), and are said *ioides*. to be the result of the larvae eating the flowers of nettles instead of the leaves; however, they are also generally obtained from starved larvae. ab. **pavo** Stich. is the name for a form with a steel-blue gloss on the black costal *pavo*. spots of the forewing and all over the inner portion of the ocelli of the hindwing, the distal margin having a peculiar coppery tint; from Bohemia. In ab. **pallida** Tutt the pale margin of the ocellus and the space between *pallida*. the black costal spots of the forewing are white instead of golden yellow; rare in England, are these perhaps faded hibernated specimens? ab. **dyophtalmica** Garb. (= *cyanosticta* Raynor) is a variety in which there appears *dyophtalmica*. below the ocellus of the hindwing another, simple, blue spot of variable size. In the type-specimen this additional spot is edged with black and the black margin of the large ocellus projects backwards in apostrophe shape; from Italy (Verona) and England (Maldon). ab. **fulva** Oud. is of a dull grey-brown ground-colour (as *fulva*. if faded); the ocellus of the forewing does not contain any black and the outer part of its yellow edge is absent, these latter differences, however, being apparently of secondary importance; at Amsterdam, bred from larvae in October. In ab. **calorefacta** Urech, which has been obtained by exposing the pupa to the influence *calorefacta*. of heat, the brown ground of the forewing bears four blackish spots, one each being placed at the bases of the two median veins and in the submedian interspace. The nymotypical subspecies, moreover, varies frequently in the more or less imperfect development of the ocelli. Such aberrations are like the previous one generally obtained by artificially exposing the pupae to heat or cold at a certain stage, but also occur or may occur in nature, namely: ab. **exoculata** Weym. with the ocellus of the hindwing dulled or blind, black-grey (ob- *exoculata*. solescent). ab. **fischeri** Stdfss., the blue centre is absent from the eye-spot of the forewing, and in the ocellus *fischeri*. of the hindwing there is hardly any blue; low temperature form, also at Luzern (bred from larvae). In ab. **antigone** Fisch. the yellow and red of the ocellus of the forewing is almost entirely replaced by black, *antigone*. this colour merging into the black costal spot, which is enlarged; hindwing normal or with an indication of the ocellus becoming obsolescent; low temperature form. ab. **jocaste** Urech (= *narses* Schultz) is a further step *jocaste*. in the same direction, the black costal patch is continued to the next spot as a broad streak; low temperature form. In ab. **belisaria** Oberth. (62e) this development reaches its highest point as regards the confluence of the *belisaria*. costal spots and the dulling of the ocellus of the hindwing; and in ab. **extrema** Fisch. the whole upperside of *extrema*. the wings is black, the red places of other forms being visible only by their duller tint when viewed obliquely, the latter is known only as artificially produced (rapidly sinking temperature), and the former has been sporadically found in nature, otherwise also low temperature form. All these aberrations are connected by transitions and intermediates, a strict separation being impossible. The larva of the species is black, the body bearing black thorns, the abdominal legs reddish; it occurs gregariously in May, June and August on nettles (*Urtica dioica* L.) and hops (*Humulus lupulus* L.). Pupa brownish or (if suspended beneath green leaves) greenish, with metallic spots on the ventral surface. The butterfly hibernates, the ♀ depositing the eggs in May in small clusters on the leaves of the food-plant. Distributed all over the European Continent, occurring eastwards to the adjacent districts of Asia (also in Amurland), westwards to South Spain and England. — The species varies but little geographically. We have to mention **sardoa** Stgr., larger, the ground-colour more fiery, from *sardoa*. Sardinia and Sicily; similar species also occur in Hungary. — The form from Japan may be named **geisha** subsp. *geisha*. *nov.* (62d). Recognizable by the blue scaling in the ocellus of the forewing being very much reduced (direction of development of ab. *fischeri*), and by the yellow costal patches of the forewing being very bright orange. The

*) Besides this dwarf-form a transition in size between *io* and *ioides* has been provided with the designation var. *veronensis*. This is said to be 1/4 smaller than *io* and to occur frequently at Verona; GARBINI, Bullett. Società Veneto-Trentina di Scienze Natur., Padua 1883, Vol. I. p. 19. Giving a name in such cases is quite useless, and we therefore abstain from doing more than mentioning the name here.

ocellus of the hindwing, moreover, appears less completely rounded, being somewhat elliptical, and the edge of the wing is less undulate and dentate.

- urticae*. **V. urticae** L. (62e) of a bright foxy red ground-colour; the forewing with 3 black costal spots, whose interspaces are yellow, there being a larger black spot in the middle of the hindmarginal area and two smaller ones in the disc between the 3. radial and 2. median; hindwing with the basal half black; both wings with black submarginal band bearing blue spots. Underside of the forewing ochreous, with the costal spots as above, the apex and distal margin blackish; hindwing brown, basal half black with dentate edge, the whole surface with darker pencilling; at the distal margin of both wings contiguous dull blue lunules. ab. **violescens** Slev. has in certain lights a violet sheen on the blue marginal lunules of the upperside; with ordinary specimens in Russia, Kurland and Sweden. ab. **urticoides** F. d. Waldh. (= *pygmaea* Heyne) (62e) is a dwarf-form, corresponding to ab. *ioides* of *io*. The following aberrations are mostly artificially obtained, as in the preceding species, but some appear also in nature in an identical or similar garb: ab. **discolor** Hein (= *herrmanni* Herrm.) has the ground-colour ochreous yellow, and has been produced by placing the food-plant in water mixed with a metallic ink (!), particularly pale specimens, however, having also been bred by more natural treatment (*herrmanni*). ab. **embryonalis** Solowjew is characterized by a greyish yellow ground-colour and the reduction of the spots of the forewing; the central spots are altogether absent, and of the costal spots only the median one is fully developed; low temperature form. ab. **consentanea** Jachontow is a similar aberration, with lighter ground-colour than the main form, the spots of the forewing reduced, but the blue marginal spots enlarged; corresponds to the *dixeyi-gruetzneri* type of *V. polychloros* resp. *xanthomelas* (according to the author); low temperature form. The greatest development of the blue marginal spots is found in ab. **bolandii** Lamb.; these spots are prolonged to streaks and reach from the edge of the wing into the red-brown area; on the forewing the white submarginal spot is well developed, being traversed by a continuation of the first blue spot; the two outer costal spots are atrophied; on the hindwing the reddish yellow distal area is reduced in width and shaded with blackish in front and behind. This form is closely allied to the previous one as regards the direction of development. Caught at Spa (Belgium). ab. **selysi** Donck. is the first of a series of melanotic aberrations; on the forewing the 2 black discal spots are absent above and below the 1. median vein, the dark margin is reduced in width, and the blue spots are replaced by grey-blue smears, which extend at the apex to the nearest black costal spot, the ground-colour of the forewing is pale red without a yellow tint between the black costal spots; the hindwing, with the exception of an indefinite reddish area, is shaded with blackish, the blue marginal spots being entirely absent; the markings of the underside are similarly reduced and dulled; found in Belgium. ab. **atrebatensis** Boisd. (62e) is recognized by the enlarged costal spots of the forewing, of which the two external ones are almost or partly united, by the absence of the discal spots and of the blue marginal spots of the forewing, and by the almost black hindwing, of whose ground-colour only some spots remain in the outer half; sporadically among the ordinary form, also product of low temperature. ab. **nigricaria** Hav. is quite similar, also here are the discal spots of the forewing entirely absent as are the blue marginal spots of both wings, the 2 outer costal spots of the forewing are completely united, distally produced along the veins, and the hindwing is black except for some small reddish spots in the outer area; found several times in Belgium. More advanced in the same direction is ab. **ichnusoides** Selys (= ab. *nigrita* Fick.) (62e), in which the two outer costal spots of the forewing form a broad continuous patch, which is connected by a costal streak with proximal costal spot; the discal spots are nearly always absent and the hindwing is entirely shaded with black; rare among ordinary specimens, also known as product of cold. In ab. **dannenbergi** Neuburg., which is otherwise similar, the marginal spots are straw-colour (instead of blue), those of the hindwing cuneiform, extended to the edge of the wing, forming a continuous yellow marginal band on the underside. ab. **conjuncta** Neuburg. is a stage in the same direction of development in which all three costal spots of the forewing are united to a broad black area; product of low temperature. A similar form is ab. **osborni** Donck.; the spots of the ochreous costal margin are united to a broad black streak, the distal marginal area of the forewing is likewise ochreous yellow, traversed by black streaks, the discal spots are wanting; hindwing brown, with the abdominal area ochreous yellow, the distal margin the colour of the ground, the marginal spots very pale; found in Ireland. The most extreme melanotic form is ab. **gruetii** Corcelle; the base of the forewing is yellowish brown, a discoidal (cell-) spot reddish yellow, the rest of the wing blackish in consequence of the spots being confluent, the normally white subapical spot being grey; hindwing entirely black-brown; the blue marginal spots absent from both wings; underside black, the disc of the forewing somewhat paler; found near Renan in the Swiss Jura. — The egg of the species is dark green, with pale ribs. Larva black or greyish brown, with indistinct yellowish or greenish longitudinal lines, the body bearing short yellowish hairs; head black, minutely hairy; in summer, from June onward, gregariously on nettles (*Urtica dioica*, *U. urens*), very rarely on hops (*Humulus lupulus*). Pupa brown, with golden spots as a rule, the body with small tubercles, the head angular; duration of pupal stage 14 days. The butterfly in 2—3 broods, the last (hibernating) brood usually with the black markings more strongly developed, sometimes nearly as in *polaris*. Widely distributed and very common in Central Europe, throughout northern Asia to *polaris*. the mouth of the Amur. — We have to mention the following named subspecies: **polaris**¹ Stgr. (62e),² darker,

with enlarged black spots, the hindmarginal spot of the forewing often being united with the middle costal spot. Northern polar zone and the adjacent southern districts, only in 2 broods. Transitions occur on the Amur, and similar specimens occur as occasional aberrations among the nymotypical subspecies. — **ichnusa** *ichnusa*. *Bon.* (62f) is distinguished particularly by the less angulate wings, the deeper red ground-colour, and usually by the absence of the discal and hindmarginal spots of the forewing. Closely allied to the following race, transitions from the nymotypical subspecies to *ichnusa* occur in the southern districts of the latter. Sardinia, Corsica. — **turcica** *Stgr.* (62f) is brighter red, the discal and hind marginal spots being reduced in size (? also absent). *turcica*. South-Eastern Europe: Balkan Peninsula, Bukovina, Bulgaria etc. (together with the nymotypical form), Asia Minor and (?) Central Asia. ab. **turcicoides** *Stgr.* stands in the same relation to *turcica* as *urticoides* to *turcicoides*. *urticae*; Northern Persia, at the highest altitudes. — **nixa** *Gr.-Grsh.* is characterized by the reduced or obsolescent *nixa*. blue marginal spots, broader distal marginal band and the quite dark underside. Central Asia: Pamir, Darvaz, 2700 m*). — **rizana** *Moore* (63a, rainy-season form) has more or less angulate wings, with moderately broad *rizana*. black spots; the form with less angular wings (dry-season form, cf. MOORE, *Lep. Ind. IV.*, t. 317, fig. 1, 1a) has the yellow colour between and at the costal spots of the forewing more conspicuous, the hindwing bearing a yellowish tint at the dentate edge of the black basal area. The blue marginal spots are absent from both forms; the underside is entirely dark. The Himalayas are its true home, but the insect touches in the North-West (Kashmir) the Palaearctic territory and therefore is mentioned here. North-West Himalayas to Sikkim and Bhutan, up to 5000 m. — **ladakensis** *Moore* is an alpine form of the previous, differing in the less angular wings *ladakensis*. and in the black markings being enlarged in a similar way as in *polaris*, the hindmarginal spot being sometimes united with the central spot or with this and also the first costal one. As in the dry-season form of *rizana* the blue marginal spots of the forewing are absent and the ground-colour is yellowish in places. North-West Himalayas as far as Ladak, Yarkand, Karakorum and Western Tibet. Is a connecting link between *nixa* and *rizana*, ascending in the mountains up to 5000 m. — **chinensis** *Leech* (= *thibetana* *Aust.*) (62f) is larger *chinensis*. on an average; the ground-colour bright red-brown, the spots normal in size, hardly any yellow scaling between them, very large blue spots in the black marginal band of both wings. West China, Eastern Tibet. — **connexa** *connexa*. *Btlr.* (= *jessoensis* *Weism.*, *japonica* *Fisch.*) (62 f) approaches the nymotypical subspecies in colour and facies, but the black spots are large and deep in tint, and the middle costal spot is connected with the strongly widened hindmarginal spot, forming a broad band which is twice elbowed; there are no blue spots at the margin of the forewing. Japan: Hakodate, Yesso. Specimens identical or similar to this form have been obtained by experimenting with low temperature, such artificially produced varieties often resembling natural geographical races. The limits of the area inhabited by *connexa* is not known; it has likewise not been ascertained with certainty, if or to what extent there is variability in colour and shape according to season or altitude.

V. caschmirensis *Koll.* (62f, dry-season form) is similar to the preceding species; the ground-colour is *caschmirensis*. dull grey with ill-defined large spots placed as in the previous species, the underside being completely dark with black pencilling. Also in this species differ the seasonal forms rather conspicuously from each other. The rainy-season form has the ground-colour of a purer pale red-brown (less dusted with blackish), closely resembling *rizana* (cf. figure in MOORE, *Lep. Ind. IV.*, t. 316), while specimens occur in the dry-season which are almost completely black (according to FRUUSTORFER). The specific distinctness of *caschmirensis* appears doubtful, but the insect flies in the Himalayas together with various races of *urticae* and is said to have a different caterpillar, described as follows: head black, almost square, slightly hairy, bearing on both sides some short sharp spines, each ending in a fine hair; face and cheeks minutely tuberculated, the segments of the body slightly hairy, armed with a dorsal and 3 lateral rows of long branched blackish spines; body dark purpurulent-black, almost black, paler beneath, with two dorsal and two sublateral slender yellow maculated lines, the spaces between them being covered with numerous minute yellow dots (MOORE). The larva feeds on nettles (*Urticaceae*). The butterfly occurs in several broods and is found in the mountains up to about 5500 m, far above the snow-line. In the Himalayas from Kashmir to Sikkim, Bhutan and further east; Chinese Tibet.

V. polychloros *L.* (63a). Similar to the preceding species, mostly larger, the ground-colour more yellowish, *polychloros*. the arrangement of the spots as in those species, but the forewing bears an additional black spot before the hind angle. Both wings with yellowish submarginal lunules, upon which follows a black band which is likewise

*) Specimens with the upperside quite similar and with but slight vestiges of blue marginal spots on the forewing are before me from the Rilodagh (South Bulgaria, 1000 m), from the collection of A. K. DRENOWSKY, Sofia. Their underside, however, is coloured as in the nymotypical form.

composed of lunules and bears on the hindwing small blue spots. Underside for the most part smoky brown with darker shades and black transverse pencilling. Small, brighter coloured specimens, which occur sporadically among the ordinary form, are ab. **pyromelas** *Frr.* (= *pigmaea* *Slec.*) A rare form in which all the pale places of the wing-upperside are white is ab. **pallida** *Tutt.* Further individual aberrations are: ab. **testudo** *Esp.* (= *osborni* *Donck.**) (63b, transitional specimen) is characterized by costal spots of the forewing being united. In the type-specimen the two outer costal spots are merged together to a continuous black patch, which is connected with the enlarged cell-spot by a heavy black streak each along the costal margin and the median vein, the two spots before the hindmargin also being united; the 2 discal spots, however, are absent and the black marginal band except its posterior portion is obsolete, forming posteriorly a black double are; the hindwing blackish except the posterior (inner) area, only at the margin a row of pale brown lunules. Various steps in this direction of development and different combinations of characters are met with. In accordance with the custom of giving names to such intergradations the name ab. **pyrrhomelaena** *Hbn.* may be retained for a similar aberration. Only the two outer costal spots are united on the forewing of this form, the hindmarginal spot being connected with the anal one by dark shading or remaining quite isolated, the whole margin is yellowish and the submarginal band is represented by a slight dusting; hindwing more or less shaded with black, in extreme specimens quite black-brown, with light marginal lunules and a row of pale brown submarginal spots. Both aberrations rare among the ordinary form, also obtained artificially in temperature-experiments. — The egg of the species is reddish brown, barrel-shaped, longitudinally and transversely ribbed, deposited in batches on the twigs of the food-plants: willow-, elm-, poplar-, cherry-, apple- and pear-trees (species of *Salix*, *Ulmus*, *Populus*, *Cerasus*, *Pyrus*), also *Celtis australis* (in southern districts). The larvae live gregariously until the last moult, at first in a loose web (May). They are blackish or grey-brown bearing yellow thorns and thin white hairs, on the back and at the sides an indistinct reddish line; adult 75—76 mm long (in June, July). Pupa suspended, angular, the head with two short points, on the back a beak-like projection and some metallic spots. Only one brood. The butterfly hibernates; it frequently settles with the wings closed above the back, on the trunks of trees and sucks the sap exuding from birches, oaks and fruit-trees. Widely distributed in Europe, exclusive of the most northern districts. — **erythromelas** *Aust.* (63a) is larger, especially the ♀, the ground-colour being more fiery and uniformly red brown, the spots on the contrary relatively smaller and the underside darker. Algeria. — **fervida** *Stdflss.* (*Stgr.* i. l.) is an intermediate form which somewhat recalls *xanthomelas***) It is found in Asia Minor (Taurus), Kurdistan, Armenia and Southern Siberia, also specimens from the south-western Himalayas (Simla) probably belong here (cf. *STAUDINGER-REB.*, *Cat. Pal. Lep.*). — The race from South Russia (Saratow) is described as **lucida** *Fruhst.*; the ground-colour is to a great extent lighter, being abundantly variegated with ochreous yellow; the black spots are usually reduced in size, and the dark marginal band bears yellowish scaling at the edge of the wing.

V. xanthomelas *Esp.* (63b). Very similar to the preceding species, but the margin of the forewing more strongly angulate, the ground-colour usually brighter red-brown, although there occur also specimens with an ochreous brown tint, the spots generally larger and deeper black, the marginal lines of the forewing diffuse, the black submarginal band of both wings widened, with heavier border, the forewing bearing a white patch between this band and the outer costal spot. Mid- and hindlegs pale ochreous yellow (in *polychloros* dark brown like the body). The size of the spots and the width of the marginal band are variable, as are also the blue spots in the marginal band, these spots being sometimes quite absent, sometimes of double the normal size. ab. **testudo** *Dahlstr.* (= *chelys* *Mit.*) corresponds to the homonymous aberration of *polychloros*; the two large costal spots of the forewing are merged together, the black margin of both wings, moreover, is diffuse and variegated with yellow scaling, the discal spots and the anal one of the forewing are wanting, the black spot of the hindwing on the contrary is much enlarged, almost the whole surface of the wing being blackish; underside uniformly grey, without any markings; Hungary. ab. **grützneri** *Fisch.* is of a bright yellowish red colour, the forewing anteriorly pale yellow, the middle costal spot reduced, the hindmarginal patch enlarged, with diffuse edges, the discal spots obsolete, a row of large blue spots before the margin; the black costal patch of the hindwing reduced, the blue marginal spots enlarged; artificially obtained by low temperature. ab. **repetita** *Jachontow* is a melanic atavistic form obtained by low temperature and corresponding to *urticae polaris*,

*) *DONCKIER DE DONCEEL* described this form as *Vanessa urticae* ab. *osborni*. The size of the specimen alone (length of forewing 30 mm) would be sufficient to prove that the figure can only be that of an aberration of *polychloros*, being identical with *testudo* in the main points. The 3 costal spots of the forewing are completely united to a large black patch, the discal spots are absent, the spots at the hindmargin and in the hinder angle are only represented by a continuous black shading, the dark marginal band is reduced, being traversed by ochreous streak-like smears; the hindwing is for the greater part blackish and bears small bluish white spots before the margin above and beneath, the underside being more strongly darkened. Found in Ireland.

**) Compare *V. xanthomelas fervescens*, p. 205.

the hindmarginal spot of the forewing especially being enlarged and showing a tendency of uniting with the middle or the inner costal spot or with both. — The strongly spiny larva of the species is black with whitish yellow longitudinal stripes and numerous small dots of the same colour, a brown spot on each segment from the 4. to the anal one; head and thorns black, prolegs yellowish; lives gregariously on *Salix caprea*, *vitellina* and *glauca*, with preference on the twigs of the tree which overhang the water, being full grown in July. Pupa grey or brownish, with a strong blue bloom, smaller, stouter, with smaller metallic spots and shorter spines than in *polychloros*. The butterfly has 2 broods, and is restricted in Europe to the central and southern countries (Germany, Switzerland, Austria-Hungary, South Russia), but distributed through Asia to the Amur and Ussuri districts and China, extending southward to the Himalayas.*) — Sparse development into geographical races. A subspecies corresponding to *polychloros fervida* has been separated as *fervida* Stgr. (nec Stdfss.); for reasons of priority a new name must be introduced: **fervescens** *nom. nov.* General characters: paler, more yellowish red *fervescens*. ground-colour, smaller spots in the basal, discal and hindmarginal areas, narrow submarginal bands and pale blue spots at the margin of the hindwing; distribution-area: Asia Minor to the Himalayas. — **japonica** Stich. *japonica*. (63b) is in every respect a more highly developed race: size increased, margin more strongly angular, ground-colour more fiery red-brown, all the spots enlarged, especially the anal one of the forewing, the outer costal spot sometimes prolonged to a short band, the blue marginal spots of the hindwing larger. Japan.

V. antiopa L. (63b). Upperside velvety brown, darker distally, with pale yellow margin, which is *antiopa*. more or less dusted with black, near the margin a row of blue spots, the forewing bearing 2 white costal spots, which are very rarely connected with each other by pale scaling. Underside dull black with darker markings. An aberration produced by the application of low temperature is ab. **heppei** Stdfss. in which *heppei*. the upper- and undersides, especially the dark parts, have a peculiar strong gloss. The species varies otherwise in two main direction: reduction and enlargement of the yellow margin. The named aberrations are mostly artificially produced, some however being also found in nature. We mention: ab. **daubi** Stdfss., *daubi*. ground-colour of the upperside darkened, especially on the hindwing, which is occasionally quite black, the blue spots reduced to half the normal size, their colour somewhat violet, the yellow margin shaded with black and produced discal at the veins; a high temperature form. ab. **dorfmeisteri** Fisch., ground- *dorfmeisteri*. colour normal, the marginal band of ordinary width, but strongly irrorated with black, all the blue spots completely obsolete, the exterior black line near the marginal band contrasting particularly strongly with the ground; a high temperature form. ab. **artemis** Fisch. (= *roederi* Stdfss.), the yellow margin is strongly reduced *artemis*. in width and abundantly dusted with black, the blue colour on the contrary increased, the blue spots of the hindwing enlarged and hastate, with a tendency of projecting into the yellow margin; ground-colour of both wings darkened, or at least the black outer area widened, the hindwing sometimes entirely velvety black; low temperature form, rare in nature (Hungary). ab. **epione** Fisch., ground-colour normal or paler, the yellow *epione*. margin wider, extending in the shape of pointed arcs between the blue spots into the black band, the blue spots reduced to dots; low temperature form, but also obtained by normal breeding. ab. **hygiaea** Heydr. (63c), *hygiaea*. an extreme of the previous form: the yellow margin strongly widened, usually somewhat deeper yellow, projecting in narrow arcs far into the ground-colour, the blue spots completely absent; low temperature form; also found sporadically in nature. — Egg of the species elliptic, green, with longitudinal ribs. Larva black, slightly clothed with pale brown hairs and armed with strong black spines, the body dotted with yellow, on the back with russet spots which are divided by a middle line; head black, prolegs russet; it lives in June and July on willow, poplar, elm and birch (species of *Salix*, *Populus*, *Ulmus*, and *Betula*), gregariously until the last moult in a common wide-spread web. Pupa suspended, compact, brown or grey, the head produced into two short points, the back with a row of small tubercles. The butterfly occurs in one brood; it hibernates and reappears in spring with the marginal band faded into white; its particular haunts are gardens and woods, where it sucks at the exuding sap of leaved trees and generally reposes with closed wings on tree-trunks. Apart from the darker tint of the yellow marginal band (which happens also in the products of high temperature) and the sometimes increased black dusting of this border, *antiopa* varies but little in nature, there being also no constant local races, so that the species occurs as a single unit in the whole Palaearctic Region. It is distributed from western Europe and North Africa through Asia to Japan, extending in Asia southward to the Himalayas (Sikkim, Bhutan) and northward to Amurland. Represented also in North America, where several named forms occur.

V. canace L.***) is a species distinguished by the strongly dentate wings, the ground-colour being blackish *canace*. blue and both wings bearing a blue submarginal band. On the forewing the band usually joins a small white

*) These characters are on the whole well marked in MOORE's figure 2a on plate 316 of Lep. Ind. IV, so that it will hardly be necessary to further subdivide the species by separating the Indian specimens. However, MOORE's fig. 2 is I think a *polychloros*-form, which might be united with *fervida* Stdfss.

**) The 2. and 3. figures on plate 63c belong to *charonides*.

costal spot, and there is beyond the apex of the cell a larger elongate blue spot placed obliquely to the band; the hindwing bears black dots in the band and a more or less distinct blue line near the margin. Underside more or less clouded, pencilled and marmorated with brown and whitish, bearing a rather distinct median band with irregularly dentate edges and a small whitish hastate mark in the centre, at least on the hindwing. The larva bears alternate orange and white belts, and is ornamented with black spots and dots, and also bears whitish, branched spines with blackish tips. Pupa suspended, reddish brown, with metallic spots, the back with a row of small tubercles, the thorax with beak-like projection and the head with 2 curved horns. The butterfly has a swift flight, is very lively, often reposes with open wings in the bed of a stream on a stone, frequents paths in the forests, sucks at the exuding sap of trees (*Ilex*), and occasionally settles on the ground with open wings. If disturbed it pitches on the trunk of trees, closing the wings and then being difficult to perceive (HAMPTON, NICÉVILLE). Himalayas: Burma to Kashmir, and in the adjacent Chinese mountains (province of Sze-chuen). — In Eastern and Southern China (and Tonkin?) the species is represented by a slightly different form, **charonia** *Don.**), in which the bands are narrowed and shortened. On the forewing the submarginal band is usually obsolete anteriorly, the small white subapical spot is isolated; but as the species is variable, these differences do not strictly hold good. In this and the preceding race the ♀♀ have more abundant markings and somewhat broader wings. — In the northern districts of the distribution-area, on the continent, there occurs another subspecies, which may be named **charonides** *subsp. nov.* (63c, as *canace*). Similar to the Himalayan form: the submarginal band, though narrowed, reaches the white subapical spot; on both wings, particularly on the forewing, there is a distinct marginal double line, which is somewhat diffuse anteriorly and loosely merged together with the submarginal band. Lower Amur and Ussuri. — **no-japonica** *Sieb.* (63c, d, as *charonica*) as the older name has to be retained instead of *glauconia* *Motsch.* for a further subspecies, which is characterized by the oblique spot being white or whitish at the costal margin. In the bands this form agrees with *charonia*, but there occur also here exceptional specimens in which the band of the forewing reaches the subapical spot. The ♀ in two forms (? seasonal), the one being very conspicuously marmorated beneath and having the bands of the upperside slightly violet, while the other is beneath almost uniformly russet-brown and pencilled with black, the bands of the upperside being as pure blue as in the ♂. The marginal markings (lines) are very slightly developed in all specimens, being sometimes altogether absent. Japan, also on the southern islands as far as Oshima and Okinawa; Corea. — **ishima** *Fruhst.*, which we mention here for the sake of completeness, has the apex of the forewing more produced (? seasonal form) and the teeth of the hindwing more pointed. The oblique costal spot is pure white, sharply defined, the subapical band of both wings narrower, straighter and at both ends shortened, neither reaching the apex nor the anal angle on the hindwing. Ishigaki-sima (Liukiu Islands). — In the Indo-Malayan territories the species is represented by several more local races, which will be dealt with among the Exotics.

9. Genus: **Polygonia** *Hbn.*

Morphologically closely connected with *Vanessa*, there being no difference in neuration. The palpi slightly different, densely scaled beneath, less densely laterally and above, with single long hairs, end-segment short, hardly $\frac{1}{4}$ the length of the 2. segment, which is slightly curved and not at all thickened; antennae with obtuse club. More essentially differing in facies, on account of the deeply excised distal margin of the forewing and the strongly dentate margin of both wings. The prevalent colour of the butterflies is brown, the underside of the hindwing always with a white hook- or angle-mark. They are very lively, sailing with a swinging flight among the bushes at the edges of the woods and on clearings, settle with spread wings on leaves or the ground, and imbibe moisture and the sap exuding from wounded trees.

P. l-album *Esp.* (= *vau-album* *Schiff.*, nom. nud.) (63d). The largest species of the genus, very similar to *Van. xanthomelas*, but the wings more elongate and more strongly dentate, the hindwing beneath bearing the characteristic V or L. ab. **chelone** *Schultz* is an aberration which differs in a similar way as ab. *testudo*; the costal spots are united, the hindmarginal ones enlarged, the ground-colour pale brown; on the hindwing the black costal spot is partly joined to the dark outer margin, the contiguous white patch being consequently partly reduced, the underside is darker, the white L being reduced to a small spot. In ab. **contexta** *Schultz* the second costal spot of the forewing is connected with the hindmarginal spots in the shape of a band. — Larva black or blue-grey, the spines being black in the young larva, yellow in adult ones; head dotted with yellowish, bearing 2 yellow spines; on the back a yellow stripe, which is longitudinally divided by a brown line, both being interrupted between the segments, another yellow line on each side, stigmata reddish yellow, venter russet-red;

*) The figures 63 c, d belong to *no-japonica* (= *glauconia*).

in May and June gregariously on birch, elm, willow, saw-tooth and gooseberry (*Betula*, *Ulmus*, *Salix*, *Hippophae rhamnoides*, and *Ribes grossularia*). Pupa yellowish or brown, with silvery spots on the back. Particularly in South-Eastern Europe, from Silesia and Bohemia eastward, in Italy, South Russia, and Asia (Amur, Siberia, Chitral, Kashmir), singly in the Rhine-valley and Switzerland. — **samurai** *Fruhst.* (63d) is *sanurai*, a more elongate subspecies; the distal margin of both wings more strongly and acutely angulate and dentate, the ground-colour brighter russet-brown, with the spots larger and better defined and the underside darker. Japan.

P. c-aureum *L.* (64b). A smaller species with similar markings, the ground-colour ochreous brown, *c-aureum*, without white spots; the hindwing with blue-centred black spot anteriorly in the distal area, this spot being continued in front and behind by a blackish band which bears some more blue spots. Underside light brown, with darker shadows and an indistinct median band, in the basal area blackish transverse lines and figures; on the hindwing a slightly golden C or L at the apex of the cell. ♀ larger, with the wings somewhat broader, the small black spots at the apex of the forewing bear blue centres, while they are almost blind in the ♂. Some specimens of this form are more or less dusted with blackish. ab. **pryeri** *Jans.* (64c) is the autumn-form, which *pryeri* hibernates; it is lighter, being more sparsely spotted, and the underside is darker and more uniform in colour; in the same districts as the main form. — China, Lower Amur, Japan. Larva on hemp (*Cannabis sativa* *L.*) and wild hops (*Humulus japonicus* *S. a. Z.*).

P. c-album *L.* (63e). On an average somewhat smaller than the preceding species, the wings more *c-album*, strongly but obtusely angulate, the markings very similar, but there are no blue dots in the black spots. Underside of the hindwing with a white c-like mark, which may be modified into G, i, f or o. The species is somewhat variable, but there are no constant races in truly European countries. The seasonal forms, however, of which 2 are known in Germany, are rather well defined, although also in this case intergradations are not rare, occasioned by abnormal weather, retardation of development, etc. On the whole the wings are more strongly dentate in the spring-form, the hindwing bears distally a broad dark red-brown area in which is situated a row of light brown hastate spots, the underside is dark, being either unicolorous or prominently marmorated. In the summer-form the wings are less dentate, the ground-colour is less bright, and the hindwing has a narrow dark submarginal band, near which stands a row of light lunules proximally bordered by a band of brown arcs; the underside is of a paler colour, being less distinctly — sometimes, however, very prominently — marmorated and shaded. From the southern districts 3 broods are recorded, May—June, July, August—September (*Dahlström*, *Jns.-Börse* vol. 15. p. 135), of which the first is said to be of a lighter tint and the other two, the summer- and autumn-forms, of a darker. The size varies considerably, there occurring specimens which are only about half the normal size. The dwarfed form, in accordance with common usage in similar cases, may be named ab. **pusilla** *ab. nov.* As nymtypical we have to regard, according to *Tutt* (*Brit. Butterfl.*), the form *pusilla*, with a uniformly dark brown underside (belonging essentially to the 1. brood). Specimens with brightly marmorated underside variegated with green are ab. **variegata** *Tutt**, and individuals with lighter underside marmorated with ochreous (2. brood) bear the name ab. **pallidior** (*Petiver*) *Tutt*. In ab. **iota-album** *Newnh.* the c-mark *pallidior*, of the underside is reduced to a small line, while the name ab. **c-extinctum** *Schultz* may be used if the mark *iota-album*, is quite obsolete. A form which is lighter in colour and less prominently spotted and marked on both sides, *c-extinctum*, with more obtusely angulate wings, is named ab. **hutchinsonii** *Robson***) (= *lutescens* *Bath*, ? *pallida* *Tutt*), occurring *hutchinsonii*, particularly (or exclusively ?) in the ♀; it appears to recur remarkably often in southern countries, being found in Germany only among the summer-form, while some British collectors believe it to be the spring- (or first) brood and others consider it the summer-brood (cf. *Entomologist* vol. 29. p. 358). Two melanotic aberrations have received names: ab. **reichenstettensis** *Rühl*, characterised by the forewing being broadly edged with dark, *reichenstettensis*, especially at the hindmargin, from which the border extends to the disc in the shape of a triangular spot, hindwing shaded with black except a narrow basal stripe and along the distal margin; Strassburg i. Alsatia, Harz, Silesia. Further, ab. **f-album** *Esp.****) (= *j-album* *Spuler*) (63e); in this the spots of the upperside, especially the *f-album*, costal ones of the forewing, are merged together, the distal margin is broadly darkened and the hindwing black-brown. These melanotic varieties are not rarely accompanied by the C-mark being modified into an F or a simple hook. Found here and there in nature, otherwise known as product of experiments with low temperatures.

*) Our figure Pl. 63 e, *c-album* *U*, approaches more this form than the nymtypical one (according to *Tutt*).

**) This form has been named after a lady, Mrs. HUTCHINSON, therefore the name should be spelt "*hutchinsoniae*" or "*hutchinsonae*" in accordance with the accepted rules of nomenclature.

**) The figure in *ESPER*, *Schmett.* *Ent.* t. 87, does not agree with the form figured by ourselves; the aberrational development of the original, however, lies in the same direction, as shown by the partly confluent spots, and it appears therefore advisable to extend the application of the name to the variety represented on Pl. 63 e, which is generally known under that name. Also *reichenstettensis* is a similar stage in the same direction of development.

- The egg of the species elliptic, flattened above. The young larva blackish green, with black hairs, later brown or reddish, the 6 anterior segments reddish yellow above, the rest of the back white, the body armed with yellow or white thorns. On gooseberry, currant, nettles, hops, elm, hazel, honeysuckle (*Ribes*, *Urtica*, *Humulus*, *Ulmus*, *Corylus*, *Lonicera*). Pupa brown, with dark spots, the back strongly constricted, laterally with metallic spots; head produced into short points. As stated before, the butterfly appears in 2 or 3 broods, hibernating as imago. Distributed over Europe to North Africa and through Asia to Amurland. The butterfly occurs most frequently at the edges of shrubs and woods, reposes on the leaves or on the ground, with spread wings, and sucks at the sap exuding from wounded trees. — **cognata** Moore is the name of the race from the western Himalaya and Kashmir. Somewhat larger than the European form, the lobes of the wings more obtuse; in two broods, which differ from one another. The wet-season form is reddish brown with strongly developed spots, the underside being marmorated with grey-brown and whitish, while the dry-season form is paler, variegated with yellowish before the edge of both wings, the spots being smaller, the underside more uniform and the edge more sharply dentate. Occurs up to 4500 m. — **agnicula** Moore (= *tibetana* Elw., *aquicula* Stgr.) is but slightly different from the preceding. There are hardly any trenchant characters; the wings are on the whole more acutely angulate and the markings generally are noticeably reduced, the blackish discal band of the hindwing being sometimes absent or but slightly indicated. Also this race has two seasonal forms differing in the same way: the wet-season form more brightly coloured, with the darker underside strongly marmorated with grey and brown; the dry-season form paler, with the underside duller. Himalayas (*Nepal*, *Chumbi*, *Sikkim*, *Bhutan*), in the North-west extending towards Tibet. — **hamigera** Btlr. (= *fentoni* Btlr.) (64a*) is distinguished by the larger, more elongate, and more strongly sinuate and dentate wings. The ground-colour of the ♂ is brighter red-brown, with a but slightly paler tint towards the distal margin (*fentoni*), while in the ♀ the ground-colour is somewhat lighter and the spots smaller. The distal area of the hindwing is in the ♂ usually somewhat less dark and the brownish submarginal spots are more broadly lunate than in the figure. ab. **lunigera** Btlr. is presumably the wet-season form; the wings are less sharply dentate, the ground-colour is more yellowish (ochreous), all the spots are enlarged, especially those in the hindmarginal area of the forewing, the costal ones confluent, and on the other hand the light distal patches of the ground-colour very small; the underside prominently marmorated with light and dark brown, variegated with reddish distally and bearing a median band, the white L or C being usually modified into a J. On account of the great individual variability of the race the distinguishing characters do not hold good throughout. Common in the mountainous districts of Central Japan and in Yesso. LEECH obtained the *lunigera*-form from June till August, *hamigera* only in October. Specimens from Corea and Northern China doubtless belong here.
- P. gigantea** Leech (64b) is larger than the preceding form; the wings broader with similar outline of the margin, and the underside very differently marked, bearing inter alia a conspicuous blue submarginal zigzag band (but feebly marked in our figure). In the nymotypical form, apparently belonging to the wet season, also the forewing beneath bears a hook-shaped white mark. The dry-season form probably is ab. **extensa** Leech (64a, ♀); recognizable by the more obtusely dentate wings, the paler ground-colour, the reduction of the dark markings and by the underside being diffusely marmorated and shaded with lighter tints. West and Central China. The type of *gigantea* come from Ta-t sien-lu, *extensa* having been obtained at Kiukiang in June—July (LEECH). — A third form belonging here is **bocki** Rothsch., with pale yellow ochre ground-colour and much increased black marking; on both wings the light marginal line is suppressed by the marginal band, the outer row of spots of the forewing is modified into a broad irregular band, the hindmarginal spot connected with the apical cell-spot, the double cell-spot enlarged to a broad quadrangle, and the basal area strongly shaded with black. The underside on the contrary is paler, dull olive-yellow, marmorated and pencilled with dark brown, the blue zigzag band being very distinct at the distal margin from the abdominal margin forward, stopping short in the centre of the distal margin. It is impossible to say, if this is a local race or an individual aberration. Central China: I-chang. OBERTHÜR (Bull. Soc. Ent. France 1904) mentions a specimen of *gigantea* which is nearly all black above and may belong here, from Siaohu.

P. egea Cr. (= *triangulum* F., *i album* Esp., ♀ = *vau album* Esp.) (64c). A species similar to *c-album* with the wings more strongly dentate and narrower, and the underside more thinly marmorated and pencilled, the hindwing beneath bearing in the centre a white angle-, hook- or J-mark. The ♀ flying at the same season as the nymotypical ♂ has the wings less sharply dentate, is paler, less prominently and more sparsely marked, and agrees with Esper's rather primitive figure of *vau album*, while *i album* Esp., which name is usually applied

*) On Pl. 64 row a it should read: *hamigera* U instead of ♀, and *hamigera* ♀ instead of U.

to the summer-form, appears to be identical with the ♂ of the nymotypical form. *) Time of appearance of the butterfly: May—June, until about the middle of July (Digne). ab. **autumnalis** *Curo* (? *Stefan*. i. l.) (64c as *autumnalis*. j-album) is the autumn-form, which has the wings more strongly angulate and of a darker ground-colour. The spots are very prominent, the distal margin of both wings is darkened, the light submarginal spots of the hindwing are very distinct, though small and isolated, and the underside is darkened. South Europe and western Asia Minor, Armenia. — **interposita** *Stgr.* (described as *c-album* var.) is a form occurring in Asia, with the distal margin particularly dark in both wings, the spots of the upperside large, and the underside very dark, the white mark of the hindwing showing a tendency to disappear. Central Asia: Alatau, Turkestan to Chitral and Kashmir; Baluchistan and (?) Persia. Besides this race there flies a variety, ab. **undina** *Gr.-Grsh.*, which stands in about the same relation to *interposita* as *egea* (♀ i-album) to *autumnalis*; above very light reddish brown with small spots, the discal and hindmarginal spots having a tendency to become obsolescent, being sometimes absent. The underside is rather pale, the ground being whitish grey, with the minute pencilling of the nymotypical form and a dark-bordered median band. Described from the Pamir (Osh, March—April), similar specimens occurring also in Asia Minor (Smyrna). — The larva of the species feeds on *Pierataria diffusa* *Kch.* (Urticaceae) in July and October; as food-plants are also mentioned *Ulmus*, *Urtica*, *Ribes*, *Lonicera*, *Corylus* (*Spuler*). It is blackish or slaty grey, with yellow and black belts, the body bearing minute white hairs and dark branched spines; on the back there are pairs of large bluish black spots on a pale ground; the spiracles are edged with yellowish, beneath them there being a reddish yellow line; the head heart-shape with 2 spine-like processes. Pupa grey-brown, tuberculate above, without metallic spots, the head not produced into points.

10. Genus: **Araschnia** *Hbn.*

Smaller species with black and white or black and brown colours, and strongly developed seasonal dimorphism. Eyes hairy; palpi villose; antennae about half the length of the forewing, with a flat club. Forewing a right-angled triangle, the apex being obliquely truncate in some species, slightly angular; subcostal 5-branched, only one branch emitted before the apex of the cell, the latter closed. Hindwing broadly ovate, the distal margin somewhat undulate, the anal angle mostly angulate; precostal simple, curved outward; the cell open. — Larva with branched spines. Pupa suspended, with small tubercles, the head produced into obtuse prominences. The butterflies have usually a graceful pendulating flight, occurring at the edges of shrubs and woods and in clearings; they frequently settle with open wings on the ground or on the leaves of low bushes and shrubs.

A. levana *L.* (64d) has on a reddish ochreous ground a characteristic pattern of spots, some whitish sub-apical and distomarginal spots on the forewing and a row of blue bars near the distal margin of the hindwing. The underside of the forewing on the whole agrees with the upper, but the apical area bears violet dusting, the ground-colour is paler, and there are sharply defined white lines at the cell-spots; the hindwing is for the greater part red-brown, bearing in the centre a pale transverse band which widens behind, in places light lines traverse the wing and there is a dull violet smear in the distal area; the margin of both wings bears thin black lines. This is the first brood, which flies early in the spring (April—May). There occur among the ordinary form occasionally specimens in which the black basal and costal markings are confluent and both wings dark-margined, while the other markings of the wings (in the centre) are quite or nearly obsolete, these areas therefore being nearly uniformly red-brown. This is ab. **frivaldszkyi** *Aigner*. The summer-brood (July till August), sometimes also a third brood (September—October), is essentially different, being known as ab. **prorsa** *L.* (64d). Black, the forewing with white spots, the hindwing with a white transverse band; for the greater part red-brown beneath, with whitish lines and bands. On the upperside there appear vestiges of reddish yellow lines at the distal margin; specimens in which these lines are absent or only in places slightly indicated, while the white markings are narrowed, are ab. **obscura** *Fruhst.* (64f). If the white marking is narrowed to a yellowish stripe, or if the hindwing is entirely black, the name ab. **schultzi** *Pfitzn.* may be employed. Specimens, in which the upperside is entirely without white bands, the small spots in the distal area being either present or absent, have been named ab. **weismanni** *Fisch.* (artificially produced). On the other hand the individuals with the bands partly yellowish and the reddish yellow distal markings strongly developed may be named ab. **intermedia** *form. nov.* (64d); not rare in nature, being especially frequent in wet and cold summers. It forms the

*) CRAMER's figure of *egea* (also in HERBST) is likewise very primitive, especially conspicuous being the entirely light ochreous margin of both wings and a stripe on the underside with a white ground. The originals are said to be from Smyrna and Constantinople. The specimens before me from there (Smyrna, Attica) do not show any essential differences from specimens from South France and Dalmatia, those characters therefore must be considered to be of no weight and the figure to be badly drawn.

porima. transition to ab. **porima** O. (64d) which is already so much changed in the direction of the spring-brood that the reddish yellow colour in the distal area forms the ground-colour, the bands of *prorsa*, however, still being visible. Finally, ab. **diluta** Spul. is an artificially produced variety which resembles *porima*, but the forewing has an archaic Nymphalidian character in the row of spots recalling the ocelli found in the Satyrids. All these forms are connected by intergradations, *prorsa* being considered the more recent form, which can be changed by the application of cold into *levana* (the ancestral form), while the inverse does not take place. — The egg of the species is ovate, flattened above, ribbed, of a greenish colour. The larva feeds on *Urtica dioica* gregariously; it is black or pale brown with black stripes, sometimes with a reddish side-line, armed with short branched thorns, which are black, sometimes yellow. Pupa brown, spotted with blackish, the projections of the head and back obtuse, sometimes with metallic spots. The pupa of the last brood hibernates. The species is distributed over Central and East Europe (except England) southward to Dalmatia, through Armenia, Siberia, Amurland, Ussuri, Corea to Japan (here apparently in 3 broods), the varieties recurring in the East without showing any striking or constant differences from those of the West.

burejana. **A. burejana** Brem. (64c) is a very similar but larger species, with the margin of the hindwing evenly undulate, not being angulate at the lower radial. Also of this insect several apparently seasonal forms have received names. In ab. **strigosa** Btlr. (64e) the black markings are so enlarged that this colour may be considered the ground-colour, on which the bands of the following form already appear. ab. **fallax** Jans. (64e) corresponds to ab. *prorsa* of *A. levana* and resembles the same so closely that they might be confounded, but the posterior portion of the band of the forewing is more erect in *burejana* (vertical to the hindmargin), obliquely inclining towards the base in *prorsa*. — The two first forms are distributed throughout Amurland, Central and West China, Corea, Central Japan, whereas *fallax* has been recorded only from Japan (Hakodate, Yokohama, Oiwake).

prorsoides. **A. prorsoides** Blanch. (64f) resembles *fallax* on the upperside, but is recognizable by the different position of the outer costal spots of the forewing, the markings in the distal area, and the 3 almost parallel stripes resp. bands of the hindwing. In ab. **levanoides** Blanch. (64d) all the markings are reddish brown and partly more prominent but narrower; corresponds nearly to *strigosa*. West China, ? Japan (Oiwake); also in North India: *flavida*. Naga Hills. In ab. **flavida** Oberth. the pale markings are very much extended; the forewing bears in and the below the cell large yellowish patches, the posterior spot of the costal halfband is prolonged into a streak; the hindwing brownish and whitish from the base to the submarginal band, only the basal area bearing still some dark spots; the distal margin dark brown, the inner edge of this band arcuate and near the same a row of dark spots on the light-coloured portion of the wing. The underside is whitish for the greater part, both wings bearing some dark-edged brownish spots in the basal area and indistinct yellowish and blackish shadows and stripes in the middle and outer areas. From Siaolu.

doris. **A. doris** Leech (♂ 64e, ♀ 64f) again closely resembles *burejana*, but also recalls *strigosa*. It differs from both in the more rounded wings and in the markings of the distal marginal area of the hindwing. On the latter the blue-spotted submarginal band is absent, being replaced by a row of rounded or partly quadrangular black spots, also the underside of the hindwing exhibiting some essential differences, so that the specific distinctness appears to be established. — Central and West China (June, July).

davidis. **A. davidis** Pouj. has on the forewing reddish yellow irregular transverse bands and lines on a black-brown ground, placed as in the next form, but broader. The hindwing bears in the outer half a broad reddish brown band, in whose centre there is a round black spot, other black spots, irregularly shaped, being situated before and behind this spot; the basal area is traversed by several reddish brown lines. The underside is reddish brown, variegated with black, the veins being pale, especially on the hindwing, the bands as above but paler, in the distal area of the forewing some whitish spots on a violet ground and in the distal area of the hindwing a row of black-edged white dots, of which the central one is less distinct, being situated on a bluish smear; at the distal margin 3 black lines on a light ground. East Tibet: Moupin. — **oreas** Leech (64f) is perhaps only a seasonal form of the preceding, with narrower bands and lines, which have partly a yellowish tint; near the edge of the hindwing a row of blue elongate spots. The underside more brightly marked, the ground-colour being almost red. West China: Wa-ssu-kow, Chow-pin-sa, Pu-tsu-fong.

11. Genus: **Symbrenthia** Hbn.

Small light brown butterflies with black-brown bands on the upperside and more or less brightly marbled and spotted underside. Eyes hairy; antennae about half the length of the forewing, clubbed; palpi with short ovate end-segment. Forewing a right-angled triangle, the subcostal 5-branched, the 1. branch

rather distant from and the 2., close to the upper angle of the cell, the 3. far beyond the same; 1. discocellular atrophied, the 2. joining the 2. radial in a short curve, cell closed by a thin oblique cross-vein. Hindwing nearly triangular, with rounded apex and pointed anal angle, the distal margin bearing an acute tooth at the 3. radial, precostal indistinctly forked, cell open. — Larva cylindrical, armed with branched spines. Pupa suspended, head and back with pointed prominences. — The genus inhabits particularly the Indian and Malayan districts, and extends eastward as far as New Guinea and northward into the Palaearctic Region.

Of the Palaearctic forms one, namely *lucina* Cr., is a subspecies of *S. hippoclus* Cr., the nymotypical form of which occurs in Amboina. There are two broods of *lucina*, which have received several names; these, however, do not apply to the specimens from different definite districts. The dry-season form is **daruka** Moore, which differs from the rainy-season form **lucina** Cr. (= *khasiana* Moore, *asthala* Leech nec Moore) (61d, e) only in the ground-colour of the upperside being more extended and of a paler brownish tint and in the underside being paler. The dark markings are correspondingly more or less reduced, especially in the ♀, the short band placed beyond the cell being usually interrupted, sometimes even reduced to a small spot. The brown subapical spot of the forewing, moreover, is more distinct in the dark marginal band. — The larva of the species is gregarious on Urticaceae (*Delregeasia* bicolor, *Girardinia* heterophylla); cylindrical, the head black, flattened in front, the vertex slightly cleft, minutely hairy, cheeks slightly tuberculate; third to last segment armed with a dorsal and four lateral rows of black branched spines; the body fuliginous black, 2. segment with a slender pale ochreous dorsal line, the other segments with 2 dorsal and 2 sublateral rows of pale ochreous spots. Pupa suspended, pale reddish brown, thorax and abdomen laterally protuberant, with 2 dorsal pointed prominences, the abdomen bearing rows of small points, head cleft. The principal area inhabited by the two forms are the Himalayas; they extend southward across Assam, Burma, etc., to the Malay Peninsula, being also known from South, Central and West China.

S. hypselis Godt. from Java is represented in the Himalayas and the adjacent territories by the following form, which comes nearest to *S. h. brabira* Moore: **cotanda** Moore (= *sinis* Nicév.) (61e), wet-season form, of moderate size, the ♂ deep red-brown with abundant dark markings, the ♀ paler, with the ground-colour rather more extended, sometimes appearing in the dark bands. **brabira** Moore (= *asthala* Moore), dry-season form, of lesser size, the dark markings of the upperside narrower, the ground-colour as a rule paler, the underside yellowish with small spots, the blue submarginal lunules of the hindwing reduced or absent. The butterfly has a habit of flying backwards and forwards in the narrow gorges so commonly formed in rocks by the mountain brooks in the Himalayas, and occasionally settling on the overhanging foliage (Nicév.). Himalayas as far as Kashmir, southward from Bhutan, Assam, Burma to the Malay Peninsula. — **hysudra** Moore is presumably a mountain form. Larger, the ground-colour ochreous brown, the dark bands sometimes interrupted in places; the underside similar to that of *cotanda*, but more yellowish. North-West Himalayas: Kashmir, Kulu, Kaleni; North-West Kumaon. — Also **sinica** Moore belongs here. Similar to *cotanda*, but the band-like subapical spot is prolonged and narrower, the underside has the black markings broader and closer together, the blue submarginal lunules being very thin. The ground-colour of the ♀ is somewhat paler above and more extended. West China.

Tribe Argynnidi.

Red-brown, black-spotted butterflies of medium to large size; the antennae with flat club, the eyes naked, the wings entire, without projections, the markings very uniform, exhibiting hardly any differences in a number of species, only the doubtless secondarily modified ♀♀ of an American species (*Argynnis diana*) and an East-Asiatic one (*A. sagana*) being exceptions. The butterflies vary very much, the foxy-red ground-colour assuming a lighter or darker tint, the black markings being modified; apart from such modifications the whole group exhibits a remarkable uniformity. — The larvae are stouter than in the *Vanessidi*, the spines being shorter and thicker in most species, the head usually heart-shaped, indented, but without distinct prominences. They feed on various plants, but the Violaceae and Scrophulariaceae are the prevalent food-plants. The pupae have shorter and more obtuse capital prominences, the thoracic tubercle also being less prominent than in the *Vanessidi*, or the head-part is quite obtuse, the pupa as a whole being more rounded and stouter; on the back there are often small tubercles. This group is of wide distribution, going as far northward as it is possible for terrestrial animals to live. In America Argynnids form the majority of the butterflies of the high north, *Argynnis chariclea* extending to Greenland and Nova Sembla. In the south only the greater part of Australia, especially its entire south and west, has no Argynnids, which are also absent from the most southern districts of Africa and America, reaching on the latter continent southward to North Patagonia. In other districts they are met with everywhere and generally as common butterflies. They fly in the sunshine on roads in the woods and on meadows, and visit all kinds of flowers, also being found on damp places on the roads, where many species, such as *Argynnis paphia* and *Atella*

phalanta, congregate in numbers or, like many high-alpine forms of *Melitaea*, sit closely packed together. The flight is skilful, becoming extremely fast in the larger species, such as *A. pandora*, *aglaja*, etc., when they are chased.

The various authors are not at one about the composition of this tribe. We include *Melitaea* — in opposition to REUTER — which genus this author separates together with the numerous *Melitaea*-like genera of America (*Coatlantona*, *Phyciodes*, *Ersia*, etc.) as a special tribe, *Melitaeidi*. On the other hand, we exclude the *Heliconius*-like genera (*Colarnis*, *Dione*, *Cethosia*), which are more naturally classified with true *Heliconius* and *Eueides*.

12. Genus: *Melitaea* F.

This genus, which is well defined in the Palaearctic Region, contains about 50 species, which are almost equally divided between the Old and New Worlds. These species have a very large number of local forms, which sometimes differ widely from one another. Often, however, the geographical differences on which named forms are based are so slight that without the knowledge of the locality it is impossible to say to which race a specimen belongs. Certain *Melitaea* of North America and East Asia attain to a considerable size, while the European forms are but of medium or small size. — Antennae rather long (above half the length of the forewing), often ringed, the club being flat and ovate-pyriform. Palpi not inflated, but the very long second segment covered with long and bristly hairs (with the exception of *M. acraeina*, which is perhaps better removed); the palpi themselves long, obliquely ascending, or almost entirely porrect. Tongue long and thin. Eyes naked. Thorax of medium strength; abdomen of the ♂♂ slender, anally widened, with a sometimes very large apical brush which forms a ring; abdomen of the ♀♀ occasionally very heavy and thick as compared with the small wings, especially in alpine forms.

The tibiae not particularly thick or long, spiny on the inside, with short, strong apical spurs. In nervation *Melitaea* differs from the allied genus *Argynnis* in the cell of the hindwing being open. — The larva short and stout, with short, thick, branched thorns, which are often soft, more resembling fleshy projections. They feed on various plants (*Plantago*, *Viola*), but prefer *Scrophulariaceae*. They are gregarious when young, and disperse later on, but unite again in clusters when accidentally meeting one another, reposing one close along the other. They hibernate, pupating in summer, the usually variegated chrysalis being rounded and marked with black. The *Melitaea* have generally but one brood in Central Europe and throughout the north of the Old World, in the south often two, which do not exhibit any distinct seasonal dimorphism. The butterflies occur in meadows, especially on grass-covered slopes and in grassy clearings in woods. They have a darting sailing flight, the antennae being held straight forward and the wings spread out. The sexes remain long united during copulation in exceptional cases.

- maturna*. **M. maturna** L. (= *cynthia* Esp., *mysia* Hbn.) (65a). One of the larger species. Basal and outer areas of the wings bright red-brown, the disc spotted with white. Underside orange-red, marked with black; the forewing with yellow spots in the cell, beyond the cross-veins and before the distal margin. The hindwing beneath has 3 rows of spots: one near the base, of which a lunule in the cell stands a little separate, further a median band divided by a black line, and thirdly a row of marginal lunules edged proximally by black arcs. Distributed over Central and East Europe, in the west occurring in but few places; on the whole rather sporadic, being entirely absent from large districts. Occurs northward as far as St. Petersburg and the Baltic Provinces, but does not go far south, apparently nowhere reaching the Mediterranean coasts. — In the *uralensis*. Ural it is represented by **uralensis** Stgr. (65a), in which the yellowish white spots of the upperside are more prominent, approaching *iduna*, which may be regarded the arctic form of *maturna*. — Further east flies *altaica*. **altaica** form. nov. (*Bang-Haas* i. l.) (65b), which bears a superficial resemblance to *aurinia*. The discal macular band, which is whitish yellow in the other forms, is here so much shaded with brown that it scarcely contrasts at all with the red-brown diffuse spots in the distal area of the wings. Beneath the entire costal and apical areas of the forewing are paler, only two black-edged cell-spots remaining deep red-brown; on the hindwing beneath the yellow marginal spots are larger and the black line dividing the yellow median band is partly vestigial, partly obsolete. We have here already a transition towards *ichnea*, which will be mentioned later and which can the less be kept separated from *maturna* as GRAESER has bred it at Wladiwostock and Chabarowsk „from true *maturna*-larvae“. In the Altai and the adjacent Central-Asiatic mountains. — In *wolfensbergeri*. **wolfensbergeri** Frey (65a), from the Alps (Albula, etc.), the basal area of the upperside is darkened by black markings on both wings, otherwise the prevailing colour of the upperside, and still more on the underside, is a very dark red-brown. *urbani*. — In ab. **urbani** Hirschke (65a) the black colour is prevalent above, especially the basal area of both wings being completely shaded with black, the black colour of the upperside, moreover, being deeper in tint. Beneath this aberration does not essentially differ from ordinary *maturna*, which also varies much; but the basal pale yellow macular band is occasionally composed of smaller, more widely separated spots, which also obtains

not rarely among true *maturna*: from the Salzach valley. Specimens with a cobalt-blue gloss on the dark markings of the upperside are named by SCHULTZ ab. **fulgida**, from the neighbourhood of Vienna. In ab. **schlumbergeri** Schultz the pale yellow spots of the forewing are prolonged to streaks, the reddish yellow marginal spots of the hindwing are wanting, the bands on the underside of the forewing are reduced, and the hindwing beneath has an evenly curved median band composed of pale smears; Austria. — As GRÄSER bred the Amur-form *intermedia* Mén. from *maturna*-larvae, these two forms must provisionally be kept united. **ichnea** Bdv. is nothing else but a very brightly coloured *intermedia* in which the black dots in the reddish yellow submarginal band of the hindwing are especially prominent. In the very similar but more uniformly red-brown **mongolica** Stgr. (65b), whose ♀ has a very light coloured marginal band to the hindwing, these dots, though often visible, are but dull above, more distinct beneath. These last three forms, *ichnea*, *intermedia* and *mongolica*, are not sharply separated. They occur in Amurland, partly together, true *maturna* being absent. *intermedia* may be considered a transitional form, which leads from *uralensis* and *altaica* over to the *iduna*- resp. *cynthia*-series. From China proper and Japan no forms of *maturna* are known. — Egg elongate-ovate, ribbed, dull white. Larva black, glossy, with thick soft black thorns, on the back a double, on the sides a simple row of small light yellow spots, between which there are small dots; until May on a great variety of plants, as Veronica, etc., but especially on bushes of, for instance, poplar, willow, ash, etc.; very often ichneumoned (RÜHL). Pupa dirty white, with dispersed minute black spots and yellow tubercles on the back. The butterflies from the end of May until July in one brood; they do not often occur in great numbers, but fly more singly and are very local, being found in meadows and on clearings in the woods; they are not shy, do not fly fast, and love to settle on young bushes of alder and juniper.

M. iduna Dalm. (= *maturna* Hbn.) (65b). This butterfly represents the preceding species in the high north of Europe and in the mountains of Northern Asia. ♂ and ♀ not essentially different. All the spots of the central area are ivory yellow above, with the exception of the cell, which contains 2 red-brown spots on the forewing and one on the hindwing. The underside similar to that of *cynthia*, but the pale yellow median and marginal bands much broader, the former moreover not being divided by a black line as is the case in *maturna* and *cynthia*. In Lapponia, Central and North-East Siberia, not rare. Specimens from the Altai differ from European ones in the stronger silvery gloss of the light markings, especially beneath. In ab. **sulitelmica** Schultz (65b) the light median band is narrower and the hindwing above is dusted with black. — The species flies early in July in abundance on barren alpine meadows at altitudes from 6—8000 ft. in company with *aurinia* and *cinxia*.

M. cynthia Hbn. (= *trivia* Esp., *mysia* Hbn.) (65b, c). ♂ and ♀ very different. ♂ above with milky white markings in the centre of both wings and in the basal area of the forewing; ♀ above either uniformly red-yellow, marked with black, or nearly as variegated as *maturna*, but always recognizable by the much broader discal band on the hindwing above. The reddish yellow submarginal band of the hindwing above and beneath, in both sexes, may bear black dots (65c) or may be without them (65b). The white markings of the ♂♂ vary likewise, specimens with an additional row of white spots before the distal margin on the upperside occurring side by side with individuals in which these spots are wanting. SPULER has based a form **pallida** on specimens from Piedmont with the upperside particularly pale. — *cynthia* appears to be restricted to the mountain-ranges of the Alps (records from other districts are doubtful); from the snow-line to below the tree-line. — Egg white, minutely ribbed. The larva black, the body as well as the thick fleshy processes so densely covered with black bristly hairs that the larva viewed from above resembles that of an Arctiid; the intersegmental incisions yellow, the sides and back bearing yellow dots, which are united to short streaks above the prolegs and on the first three segments. From July until the next June on low herbage (Viola, Plantago, Alchemilla), hibernating in a common web; according to RÜHL more than 90 % of the caterpillars are ichneumoned. Pupa suspended on grass and low foliage (BROMLOW), whitish grey with yellow striae. The butterflies are on the wing in July and August, being found particularly on the pastures above the tree-line, especially in places where a brooklet has produced a more luxuriant growth of grass. They love to repose on stones warmed by the sun and congregate on clusters of flowers. It is not easy to follow with the eyes the ♂♂ as they dart close above the ground rather quickly about the flower-covered alpine meadows.

M. aurinia. This wide-spread and common species varies so much that it is hardly possible to give a generally applicable diagnosis. Most forms bear in the cell of the forewing lighter yellow spots, which alternate with more red ones, and before the brighter red submarginal band a considerably paler one. The underside is much more uniform in colour, with the light contrasting colour of the preceding species. In the brick-red submarginal band of the hindwing there are always distinct black dots, which are surrounded by a pale halo

- on the underside. From the Atlantic coast throughout Europe and Northern Asia to Corea and Amurland, and from Finland and North Russia to Northern Africa. Among the individual aberrations, which have received names, though hardly any two specimens are alike, melanism plays the principal role, for instance in *ab. atricolor* *Schultz*, which is almost black above, and in the darkened *ab. obscurata* *Krulik*. In *ab. nigrolimbata* *Schultz* the distal margin is broadly and deeply black; in *ab. sebalus* *Schultz* the basal area of the hindwing below is bordered with dark and therefore contrasts particularly strongly with the light-coloured marginal area. Also the detail of the markings is variable, the discal band of the forewing exceptionally bearing dots (*ab. dubia* *Krulik*), or the submarginal band of the hindwing being without them on both sides (*ab. impunctata* *Schultz*). Further, some markings may become obsolete, as for instance the light basal spots of the hindwing beneath (*ab. sesostris* *Schultz*), or sometimes this and sometimes another transverse line of the forewing, etc.
- aurinia*. — The nymotypical ***aurinia*** *Rott.* (= *artemis* *Schiff.*, *matutina* *Thunb.*, *lye* *Abst.*, *matura* *Esp.*, *einxia* var. *Geoffr.*) (65c) flies in North and Central Europe as far as the Asiatic frontier, with the exception of the high mountains. It is one of the darker forms, being distinctly marked with black in both sexes; on the hindwing above the submarginal band broad and bright yellowish red, contrasting very strongly with the much lighter, pale ochreous or ivory yellow, discal band which stands at its proximal side. There are likewise pale spots in and below the cell of the forewing which are very prominent on the red-yellow ground, similar spots being occasionally present before the distal margin of both wings. — The specimens become considerably larger
- iberica*. and more fiery towards the south. The most beautiful of these southern forms is without doubt ***iberica*** *Oberth.* (= *desfontainesi* *H.-Schäff.*, *desfontainii* *Rbr.*, *beckeri* *Led.*) (65d, e), in which the submarginal band of the hindwing is of a magnificent deep russet-red colour and nearly occupies the whole outer half of the wing, being outwardly bordered by black lunules centred with pale yellow; from Andalusia and the opposite districts of
- provincialis*. North Africa, according to BROMLOW also at Nice. — ***provincialis*** *Bdv.* (65e) is nearly as large, but duller and more uniform in colour, the marginal lunate spots of the forewing not so extended and the submarginal band of the hindwing not so broad and less bright, the discal macular band of the hindwing, which in *iberica* always consists of a chain of magnificent pale reddish roundish spots situated in black, is distally but feebly defined or diffuse; the hindwing beneath almost uniformly shaded with pale brownish yellow, while in *iberica* it bears alternate red and whitish yellow bands. Mediterranean coasts, from South France to Asia Minor. —
- desfontainii*. In ***desfontainii*** *Godt.* (= *desfontainesi* *Bdv.*) (65e), which was separated as a distinct species, because it occurs in the same districts as *iberica*, the proximal edge of the submarginal band of the forewing is very strongly flexuose, the distal margin bears small light rings or lunules placed in dark hastate spots; the submarginal band is almost so broad as in *iberica* and contrasts strongly with the light yellow discal band which
- baetica*. stands at its proximal side and is broadly bordered with deep black. — In ***baetica*** *Rbr.* (65e), from Andalusia, the submarginal band is so broad that it occupies the external third of the forewing and almost the outer
- sareptana*. half of the hindwing. — ***sareptana*** *Stgr.* (= *sareptensis* *Stgr.*) (65d) differs from these forms in the proportionately large milky white marginal lunules of the hindwing and the very abundant light yellow markings of the forewing, which contrast strongly with the bright red colour of the cell-spots and submarginal band, this being the most brightly variegated of all *aurinia*-forms; in the South Russian Steppes, at the Black
- banghaasi*. Sea. — Specimens from the Kentei Mts., which I name ***banghaasi*** *subsp. nov.* (65e) after Herr BANG-HAAS, who kindly sent them to me, have the appearance of a small edition of the preceding. The submarginal band of the forewing being small, the red helmet-spots are large and entire, from the submarginal band basad there are regularly alternating red-brown and light yellow bands; the submarginal band is also on
- amasina*. the hindwing bright red, but not broader than in nymotypical *aurinia*. — ***amasina*** *Stgr.* (65d) only differs from *sareptana* in the marginal lunules being ivory yellow instead of milky white and in the reddish yellow and light yellow colours of the upperside less strongly contrasting with each other; from Asia Minor. —
- alexandrina*. ***alexandrina*** *Stgr.* (65e), from the Alexander Mts., is of about the same size, the submarginal band of the
- hibernica*. hindwing above is costally not bordered with black on the inner side. — The rather rare ***hibernica*** *Birch.* (65d), from Ireland, is a very brightly variegated form, in which the black markings are so much extended that all the bright-coloured bands are narrowed. — The black bands are also very broad and deep black in
- mandschurica*. ***mandschurica*** *Stgr.* (65d), which however is much larger and has a uniformly reddish yellow ground-colour; from the Amur, Corea, and North China. — ***sibirica*** *Stgr.* (= *davidi* *Oberth.*) (65d) is just as large, but the black
- sibirica*. markings of the upperside are on the contrary strongly reduced, so that, for instance, there is no distinct dark transverse line between the submarginal band and the discal one near it. North China, Mongolia and Dauria.
- pellucida*. — The very similar ***pellucida*** *Christ.*, from the Caucasus, is recognizable by the thin sealing, in consequence of which all the colours appear paler and the wings slightly transparent. The markings, however, are as
- laeta*. abundant as the colours are weak and inconspicuous. — ***laeta*** *Christ.* differs from the preceding in the denser sealing and more conspicuous colours, the upperside having a rather chequered appearance in consequence of the strongly developed and several times curved black discal bands; from the Vilui Mts. in Siberia. —
- orientalis*. ***orientalis*** *H.-Schäff.* (65d) is apparently a combination of the two previous ones, the upperside being as bright and variegated as in *laeta*, while the underside is as pale, dull and uniform in colour as in *pellucida*. Asia Minor and Armenia to Kurdistan. — The form which differs most widely from nymotypical *aurinia* is without doubt
- merope*. ***merope*** *Prun.* (65e); an alpine insect which is very small, especially in the ♂, being dull black, pale-spotted,

and with very obsolescent markings on the upperside, the reddish yellow colour of the upperside being only preserved in the dull reddish submarginal band of the hindwing. On the higher Alps, and in specimens with more brightly marked underside in the Altai. — A form similar to *merope* but still more unicolorous, is said to occur in the Alatau and was named **asiatica** by STAUDINGER. However, the specimens which usually are known *asiatica*. under this name come from Asia Minor and belong to *amasina*. As *merope* has also a different larva and food-plant than *aurinia* (according to RÜHL) and the butterfly has different habits and flight, this insect might perhaps be separated as a distinct species. — ELWES was right in saying of the numerous different forms of *aurinia* that a complete collection of this species from all its flight-places would consist of unbroken series which would render it impossible to sharply separate the hitherto named races. However, the differences between most of the forms mentioned above are constant and trenchant, sometimes even the habits being different. For instance, *merope* differs from nymotypical *aurinia* in its flight, as already mentioned. The latter flies about a yard above the ground with a quiet swimming flight, which is not essentially different from that of other *Melitaea*. The small *merope* with its pointed wings on the contrary almost has the rushing flight of a moth, darting so fast and low over the alpine meadows that it is hardly possible to follow a specimen with the eyes. — The eggs, of which the heavy-bodied ♀♀ contain very many, are deposited in batches; they are brown and ribbed. Larva of *M. aurinia* blackish, covered with numerous light dots, which are sometimes seriate dorsally and laterally; the short fleshy thorns black, paler at the base, densely clothed with black hairs; head black, abdominal legs brown, according to RÜHL only on *Scabiosa succinea*, according to BROMLOW particularly on *Centranthus ruber*, also on *Digitatis*, *Teucrium* and other plants. It hibernates gregariously in a common web, changing in spring into a dull white, black-dotted chrysalis with small yellow spots on the abdomen. The butterfly is on the wing late in May and in June (the alpine forms from July onward), being said to fly exceptionally also in August; on flowering meadows and particularly in openings in woods; with the exception of the outlying districts abundant in its flight-places, although these are scattered.

M. cinxia L. (= *pilosellae* Rott., *delia* Schiff., *trivia* Schrk., *phoebe* Godt.) (65 e, f). Above uniformly *cinxia*. pale yellowish red, marked with black, somewhat recalling a chess-board, the white fringes being checkered. A row of heavy black dots in the submarginal row of spots on the hindwing is characteristic. Excepting the pale yellow black-dotted apex, the forewing beneath uniformly reddish leather-yellow, with dispersed black spots, which vary in number. The species is far less variable than the preceding ones, and, though of wide distribution, has not developed into many races. Very black specimens in which the yellowish red colour of the hindwing has almost disappeared — ab. **obscurior** Stgr. in litt. (65f) — or is replaced by black on both *obscurior*. wings — ab. **horvathi** Aign. — occur singly in Austria and Hungary. — In the Altai there occurs a plentiful *horvathi*. and constant, very small and strongly blackish form, **tschujaca** form. nov., according to ELWES at an altitude *tschujaca*. of 7000 ft. — **clarissa** Stgr. (65f), from Syria and Mesopotamia, is in the ♂ likewise small, but very abundantly *clarissa*. light yellow, with the dots in the submarginal spots of the hindwing very feeble; in this form also the underside is strongly modified, the russet-red submarginal band of the hindwing being pale and the yellowish white median band much widened. — In **heynei** Rühl (65f), described from the Alai Mts. but widely distributed *heynei*. in eastern Anterior Asia, the black markings are much reduced above, which also occurs in occasional aberrations in Europe, either only in the outer half of the wings — ab. **fulla** Quens. — or on the greater part of *fulla*. the forewing — ab. **uhryki** Aign., but in this case only irregularly and in the various specimens not in the same *uhryki*. way. — Persian individuals are rather small and on the whole paler than European ones; this is **amardea** Gr.-*amardea*. Grsh. — Diffuse markings and abnormal distribution of the black colour above occurs in individual varieties (ab. *mocsaryi* Aign.), while ab. *wittei* Geest is distinguished by the underside, the forewing beneath bearing markings only before the apex and the two black lunate lines in the middle of the hindwing being united to a broad black macular band. — *cinxia* is not so widely distributed as *aurinia*; from the North Sea and the Baltic to the Mediterranean, but not occurring in North Africa, and from France and Northern Spain to the Altai, almost everywhere plentiful on wide grassy roads in the woods, in meadows and in clearings. Larva from July until April, black, with red head and bluish white small warts, the prolegs red-brown; hibernates gregariously in a common web; on *Viola*, *Veronica*, *Plantago*, *Hieraceum*, and other plants. Pupa whitish grey, with yellow warts. The butterflies in May and June (in the mountains later), locally single specimens observed also in summer.

M. arduinna Esp. (= *rhodopensis* H.-Schäff.) (65f). Not dissimilar to the preceding species, bearing *arduinna*. likewise black dots in the submarginal reddish yellow spots of the hindwing, but the forewing much more obtuse, distally broader, moreover usually duller coloured, being more brownish; the distal marginal area darker, the black markings being strongly developed, the median area with less markings, the black lunate lines being partly obsolescent, partly composed of irregular remnants. The underside, too, particularly on the hindwing, is essentially lighter in consequence of the black markings being broken up and reduced. From Croatia eastward, on the lower Danube, the Wolga, throughout the Balcan Peninsula and Anterior Asia to Turkestan, according

uralensis. to LEDERER also in the Altai. — In the form *uralensis* Ev. the marginal spots, instead of being lunate, are more square, the submarginal row of dots is double and the margin of the hindwing is deep black with a blue sheen; *rhodopensis*. in the Ural. — In *rhodopensis* Frr. (65g), which is similar, the ground-colour is much brighter and deeper yellowish brown, the marginal markings being distinct and those in the central area somewhat reduced, the markings in the basal area thin and less dark; the black lunate lines on the hindwing beneath partly broken up into small bars and hooks; in May and June in Armenia and the Transcaucasus, at a considerable altitude. *evanescens*. — In *evanescens* Stgr. (65f), from Persia and Mesopotamia to Central Asia, the black markings are entirely *fulminans*. absent from the outer third of the upperside, apart from the marginal markings. — In *fulminans* Stgr. the black markings have quite disappeared from the very brightly coloured upperside except some vestiges; from Persia and Turkestan. — Nothing is known of the earlier stages. In habits, particularly in its flight, the butterfly is said to resemble *cinxia* as well as the following species, *aetherie*, but does not appear to occur anywhere in abundance like the former.

aetherie. **M. aetherie** Hbn. (65f). This large insect has been separated from *phoebe* and lately been considered by all as a distinct species on the authority of certain authors; nevertheless there is in my opinion undeniably a very close relationship between them. The shape of the wings, however, is more as in *arduinna*; the forewing broad, rounded at the apex, the distal margin feebly but evenly convex, the black markings at this margin strong and distinct, the lunules at the 1. median vein reaching farther toward the disc than the others (difference from *arduinna*), the black markings in the basal and central areas much thinner and sparser than in any form of *phoebe* (distinction from the latter). The ground-colour on the hindwing beneath not so pale as in *phoebe*, *atgirica*. but with a pronounced yellow tint; Andalusia. — The much more abundant form from North Africa, *atgirica* Rühl, is more fiery and its black markings, especially on the hindwing, are reduced, the ground-colour of the *perlinii*. ♀, moreover, being paler; on detritus, where the ♂♂ fly up and down the dry beds of brooks. — *perlinii* Tur. (65g) is smaller than the previous forms; the ♂ very bright brownish red, with thin and sparse black markings; the ♀ has the forewing and the anal half of the hindwing black, sparsely marked with ivory yellow, the costal area of the hindwing being bright foxy red with black markings. The facies of the ♀♀ is almost exactly as in *didyma* ♀-f. *alpina* or *meridionalis*; from Sicily.

M. phoebe. The largest *Melitaea* of the Old World, at least certain of its forms. The forewing much more pointed than in the previous species; equally variable in colour as well as the distinctness of the markings. The black markings are usually united, in some cases even covering nearly the whole wings, but in other cases may be strongly reduced. It is characteristic for this species that the reddish yellow submarginal lunate spot situated between the two median veins reaches with its vertex considerably farther into the disc than the other yellow lunate spots. This is especially the case on the forewing, but also on the hindwing the submarginal lunule between the 1. and 2. median veins projects farther toward the disc than the others of the same row. In Central and South Europe and North Africa, throughout northern Asia beyond the Chinese Sea to the east coast of *phoebe*. Japan. — The nymotypical *phoebe* Knoch (= *corythallia* Esp.) (65g) varies itself in size as well as colour. Beside uniformly dark specimens, like the ♂ figured, there occur individuals in which both wings are traversed by a light yellow band which contrasts strongly with the reddish brown ground-colour. Sometimes the black colour of the basal area is dense, prominent and hardly interrupted by light spots, but reduced in the marginal area (= ab. *geyeri* Aign.), or in other aberrational specimens concentrated in large patches in the middle of the wing. On the whole the brightly variegated specimens occur more in the western and southern districts of the distribution area, the uniformly coloured and generally also large races in the east. But it happens also that a unicolorous form flies in the plains, while a brightly variegated one occurs in the neighbouring mountains. The largest races are known from East Asia, the smallest from North Africa. But there occur also dwarfed *occitanica*. specimens in all other countries (= *minor* Frey, *nana* Stgr.). — *occitanica* Stgr. (66a) is the most western form, particoloured, the light yellow median band contrasting with the red-brown ground. The submarginal band is broad and bright red-yellow, so that there is a superficial similarity to *aurinia iberica* from the same country; but this form of *phoebe* shows distinctly the projecting lunule between the 1. and 2. median branch, the hindwing being also devoid of the black submarginal dots which are always distinct on the hindwing of *iberica*; South Spain. — In certain localities of the Central Alps, for instance at Zermatt, I met with a form in which light and dark macular bands regularly alternate: the spots at the margin, those of the median band and some in the cells are bright yellow, while the submarginal band and the bands across the apex of the cells are red- *alternans*. brown. This form therefore is very brightly variegated and I name it *alternans* subsp. nov. — In Algeria *punica*. flies a very small form, *punica* Oberth. (66a), which is evenly leather-yellow, the markings being close together *tatara*. and regular; only below the costa at the apex there are some small whitish spots. — In the form *tatara* Krulik., from Kasan, the black markings of the hindwing beneath are thicker and both wings bear a dark double line *saturata*. along the distal margin. — Whereas in *tatara* the ground-colour is more darkened above, it is of a pronounced *tungana*. bright and fiery tint in *saturata* Stgr., a large race from northern Central Asia. — *tungana* Bang-H. i. litt. (65b)

is again strongly darkened, the ♂ being dark brown above, the ♀ almost black: from the Sajon district. — **caucasica** *Stgr.*, from the Caucasus and Armenia, is likewise a large race with the ♀ strongly blackened, the light spots beyond the centre of the wing, however, are absent, the colour on the whole very bright, particularly beneath. — Greek specimens are paler yellow and more delicately spotted: **ogygia** *Fruhst.* — **tungusa** *Herz* is considerably smaller, being likewise strongly darkened in the basal area of the wing, but pale-spotted beyond the centre of the wing; intermediate between the preceding form and the following one; from the Witu and Vilui Rivers in North-East Siberia. — **ornata** *Christ.*, from the Ural, is one of the brightly variegated forms, the white markings alternating with the reddish yellow ground-colour. — **aetherea** *Ec.* (= *aetheria* *Dup.*, *melaina* *H.-Schäff.*) (66a) is a rather large form with very thin black markings, occurring from the mouth of the Danube through Anterior Asia to Turkestan, apparently particularly in the flat steppes, also in Algeria, for instance on the parade grounds at Constantine, at Batna, on the hills lying towards Festis, and in other places of North Africa. The upperside is almost uniformly bright reddish yellow, only the median band and the lunate spot between the 1. and 2. median veins being somewhat paler. — In **telona** *Fruhst.* the ground-colour is lighter, the black markings being thinner, more broken up, the underside paler yellow: Jerusalem. — **scotosia** *Btlr.* (65h) closely agrees with the preceding form in colour, but the ♀ as a rule — not always — has the black markings larger and more diffuse. Especially, however, is this form larger than all European ones; from Amurland, North and Central China, Corea and Japan. — Very large specimens, by far the largest known Melitaea of the Old World, have been separated as **mandarina** *Stgr.* (65h); from Mongolia. — The form **changaica** *Bang-H. i. litt.* (65h), from the Changai Mts. in Mongolia, agrees with the previous in size, being of a deep colour, the ♀ brightly variegated. — Larva grey, with red-brown, obtuse, soft, branched thorns, blackish dorsal lines and numerous small white granules; head black; otherwise similar to the larva of *didyma*. From the autumn until May on *Centaurea*. Pupa dull yellowish, with dark yellow and black markings. The butterflies are on the wing from June until August (in North Africa and the most southern districts of Europe already from April); they are fond of meadows and sunny slopes, but also occur frequently in stony places. They bask in the sun with the wings spread out, reposing on warm stones or on roads, and show a preference for thistles and scabious, on which latter they often sleep with closed wings at night and in dull weather. In Europe and the adjacent districts of Asia they are usually abundant though local; the large forms of Eastern Asia occur more singly.

M. sibina *Alph.* (66a, b). As large as nymotypical *phoebe*; above fiery red-yellow, recognizable by the central area being completely without markings and forming a magnificent contrast with the heavy black distal margin with its silvery white fringes. In this black distal margin there are on the hindwing of typical individuals lunules of the ground-colour, which are quite absent or but vestigial in other specimens: ab. **delunata** *Schultz.* If the central area has no traces of black markings whatever, we have ab. **neglecta** *Schultz.* (locally more abundant than the nymotypical form). Underside of *sibina* similar to that of *phoebe*, with which it has also in common that the yellowish red marginal lunule between the median veins projects basad. In Ferghana, the Pamir to Kuldja, and in Turkestan up to 7000 ft. — In **aulicana** *Bang-H. i. litt.* (66a) the broad dark distal margin is scaled with gold and therefore has a metallic brown gloss; from the foot of the Alexander Mts. — **dschungarica** *Gr.-Grsh.* has small yellow spots before the margin of both wings; Central Asia. — The butterflies appear in May in a larger form and again in the summer in a considerably smaller one and are extremely common, for instance in the Koksus Pass.

M. saxatilis. This species is recognized by the fiery red upperside, which is as vividly coloured as in the ♂♂ of *didyma* and has sometimes a golden sheen as in the ♂ of *Chrysophanus virgaureae*. A number of races have been distinguished according to the development of the spots, which are on the whole fewer in number than in the various preceding species, being sometimes even absent, as well as on account of differences in the undersides. — **maracandica** *Stgr.* (66b), from Bokhara, is entirely without spots above and beneath; the upperside vividly brick-red with black distal margin; underneath dull whitish grey, with a reddish tint, the disc of the forewing ochreous. — **lunulata** *Stgr.* (66b), from the mountains of Turkestan, is similar, but the hindwing bears small black lunules before the margin and is proximally of a glossy black, which is much deeper than in the preceding form. — **fergana** *Stgr.* (66b) is all golden red above, bearing only traces of dark discal spots or being entirely without them, only the distal margin being black. The hindwing beneath bears small red and black striae and thin transverse lines, forming a kind of pattern, by which *fergana* is at once distinguished from the otherwise similar *maracandica*, which is unicolorous beneath. Ferghana. — Also **infernalis** *Gr.-Grsh.* is almost exactly like *maracandica*, but while in the latter the black distal marginal band is proximally dentate, this border is even in *infernalis*. From the Tianshan. — In **athene** *Stgr.*, from Saisan, the more yellowish red upperside bears already stronger black markings, also the underside showing a greater contrast between the colours and distinct black markings, so that there is a superficial resemblance to *didyma neera*, the black markings of the upperside, however, remaining much sparser than in the lightest coloured *neera*.

saxatilis. — Nymotypical *saxatilis* Christ. is above and beneath so abundantly spotted and otherwise marked that it resembles *didyma didymoides* (66e), but is smaller and above more fiery red, sometimes with golden sheen; *hyrcana*. from Persia. In ab. *hyrcana* Stgr., which flies in the same localities as *saxatilis*, the markings of the upperside and the russet brown basal and submarginal bands of the underside are more prominent, nearly as in true Central European *didyma*.

acraeina. **M. acraeina** Stgr. (66e). This desert insect stands quite by itself in the genus. Above uniformly pale yellow, with black apex and a few black dots on the forewing, thus not resembling any known *Melitaea* but curiously enough a Chinese *Acraea*, *Pareba vesta*, which is not sympatric with this *Melitaea*. In fresh specimens also the abdomen is scaled sand-yellow. — Ferghana (Kokand), in the spring.

M. didyma. The most variable Nymphalid and, if one considers every grade of melanism and each peculiarity as worthy of a name, the butterfly of the whole Region which is richest in forms. In consequence of its enormously wide distribution, from Portugal to the Pacific and from North Europe into the Sahara, it has separated into a large number of races. — The nymotypical *didyma* O. (= *cinxia* Esp.) (66e) occurs throughout Europe except its northern part, in North Africa and in Western Asia, being partly the only form occurring, partly interspersed among other local races as a more or less frequent exception. Its true home is Germany, Austria-Hungary, France and some parts of Switzerland. The ♂ is fiery red, with a narrow dentate black distal border and a moderate number of small black dots and spots, which are dispersed over the basal half of the wing and end with a short band extending beyond the cell from the costa into the disc. On the underside, which is very abundantly marked with small black dots and hooks, a flexuose subbasal band and a curved submarginal one are situated on a delicately greenish, or yellowish, white ground. In the ♀ the forewing and the anal area of the hindwing are much paler, being moreover dusted with blackish, while the costal half of the hindwing has preserved the red tint; the whole wings are much more abundantly but less prominently marked with black. The light rings on the abdomen are very characteristic for both sexes, being absent only from *deserticola*, which deviates most from the nymotypical form, while at least vestiges of the rings are visible in all the other races.

speciosa. There occur sometimes specimens with a blue gloss on the upperside: ab. *speciosa* Schultz. Although it is very difficult to find two specimens exactly alike, even if there is abundant material to select from, numerous variations in the distribution of black on the upperside have been regarded as deviations from the normal and have partly been fixed by names. Very strongly melanotic*) specimens (ab. *nigra* Balestre, ab. *nigerrima* Schultz) oder brownish ones (ab. *ziegleri* Stich.) have indeed a peculiar facies; such ♀♀ do not rarely occur in the high mountains. SKALA has distributed a number of names among the specimens according to differences in the shape (ab. *oblongomaculata*) or arrangement of the dark spots. The spots may have increased in number (ab. *nigra*, ab. *striata*), or may be united to form a median band (ab. *fasciata*), or connected to short streaks (ab. *radiata*) or longer ones (ab. *zinburgi*), or merged together to a marginal band (ab. *marginata*), or on the contrary strongly reduced (ab. *tennisignata*, ab. *pallida*). Forms in which the spots are united in irregular groups, leaving certain places of the wings free, are named by AIGNER ab. *kempelini*, ab. *fischeri*, and individuals with pale ground-colour by STICHEL ab. *pubica*, and those with ochreous underside by SKALA ab. *ochracea*. Among the constantly recurring aberrations some are found only in one sex (particularly often in the ♀) and are not everywhere equally frequent among the ordinary form, forming in certain localities the majority, in others a minority

alpina. of specimens, while they are rare exceptions in other places again. ab. *alpina* Stgr. (66f) has both wings strongly shaded with black, the markings being large and the costal half of the hindwing foxy red and more sparsely variegated; the ground-colour of the forewing appears only in a few places, being dull ivory yellow or whitish, sometimes with a light blue tint. This is the commoner form in the higher Alps, where nymotypical *didyma*-♀♀ also occur

meridionalis. as exceptions. — **meridionalis** Stgr. (66e) flies in the extreme south of Europe (South Italy, Sicily, Greece, and Syria), the ♂♂ being lighter brick-red and more sparsely spotted, the ♀♀ paler and evenly and minutely dusted with black; the most magnificent specimens are found in Sicily, a ♀ from there being represented by the 5. figure on Pl. 66e. A slight aberration of the preceding (ground-colour of the ♂ darker, ♀ with paler spot before the

crasnensis. apex, wings larger, more elongate) is described by Hormuzaki as ab. *crasnensis* from the Bukovina. — **graeca**

graeca. Stgr. has the ground-colour of the ♂ dark brick-red with a very broad black distal border; ♀ with the forewing

caucasica. dusted with dark greenish; from various places in Greece. — The ♂ of *caucasica* Stgr. (= *kaschtschenkoi* Christ.), from Transcaucasia, does not essentially differ from *graeca*, but the ♀ is not dusted with greenish grey, but

occidentalis. yellowish red, being similar to the ♂, the forewing bearing light spots only before the apex. — **occidentalis** Stgr. (66d) is the commonest form in certain districts of Southern Europe, North Africa and Armenia, being very

persea. pale yellowish red, almost orange, with sparse but deep black spots. — **persea** Koll. (= *araratica* Stgr.) (66d), from Anterior Asia — certain specimens of the late summer brood from Dalmatia (= ab. *dalmatina* Stgr.) and

*) ab. *nigra* has also been obtained by the artificial application of heat on the pupa (44° C.).

Italy (= ab. *romana* Calb.) resembling it very closely, however — is light orange-yellow, like *occidentalis*, but very slightly duller and more sparsely spotted. — **robertsi** Btlr., from Kandahar, is a small *persea*-form in *robertsi*. which the forewing is more elongate and the hindwing considerably smaller than in Persian specimens. Moreover, the upperside is duller and paler yellow, the black markings being sparser and less sharply developed. — **deserticola** Oberth. (66d), from the Sahara, of all *didyma*-races differs the most from the nymotypical form. The *deserticola*. black distal border is absent from the bright ochreous wings, being replaced by black dots: the black is also entirely wanting in the basal area, the dark colour being restricted to the middle of the wing. The head, antennae, and abdomen, moreover, are pale orange-yellow, and even the larva of this form differs entirely from that of ordinary *didyma*. Only in the most southern districts of Algeria. — In **neera** Fisch.-Wald. (66e), *neera*. from South Russia and various districts of North Asia, the ground-colour is very fiery red in the ♂ and pale reddish yellow in the ♀. The hindwing almost without markings except the submarginal dots and the black colour at the base, the forewing bearing a figure of 8 below the cell, which is sometimes also found in other races. The black border is sharply defined and narrow, the fringes being intensely white. — **turanica** Stgr. *turanica*. (66d) is a very large, more orange-coloured form with broad black distal border: beneath the orange bands of the hindwing are traversed by broad vein-streaks of the ground-colour; in Turkestan, especially large and typical specimens from the foothills of the Alexander Mts. — **sutschana** Stgr. (= *sibirica* Rühl), from East *sutschana*. Siberia is of a deeper red and has larger spots, the ♀♀ being more strongly dusted with dark scaling. — **ala** *ala*. Stgr. (= *latonia* Gr.-Grsh.) (66f) is above in the ♂ remarkably similar to *sibina*. The wings are broadly edged with deep black, the disc of the forewing being very sparsely spotted and that of the hindwing not at all. The ♀ is almost exactly like ab. *alpina*, but the costal area of the hindwing is duller red and more sparsely spotted; from Central Asia (Ferghana, Tian-shan, Alatau, Bokhara, etc.). — **chitralensis** Moore. (66f) is a very yellow *chitralensis*. small form from the Hindukush. — These Central Asiatic forms are nearly related to the Eastern Asiatic ones which follow. The most conspicuous form is **latonigena** Ev. (66e), of which the ♂ has a very wide black margin, *latonigena*. the discal spots of the forewing being arranged in an almost uninterrupted transverse band. The ♀ is still more remarkable, the ground-colour being a dirty white and the black markings forming a net work; this form flies in Eastern Siberia, where it is the only race in some places, while in others it occurs as an aberration among other *didyma*-forms. — A very peculiar ♀-form is before me from the Karagatai Mts. The colour resembles that of ab. *alpina* ♀♀, but the pale pinkish yellow forewing contrasts prominently with the orange-coloured hindwing in consequence of the reduction of the black markings, which quite disappear on the hindwing except for some vestiges and the marginal border. I call this form ab. **bicolor** ab. *nov.* (66f), but it must *bicolor*. be noted that not all the specimens from there are so very pale as the one figured, the markings of the hindwing being more or less feebly indicated. — **mandchurica** form. *nov.* (66e); the form from Manchuria may be *mandchurica*. thus named; it is distinguished by the elongate pointed forewing. Bright brownish yellow, with dentate black border, which is broad on the hindwing: ♂ with the hindwing almost without spots, ♀ with the forewing very strongly spotted with black and shaded with dark; abdomen laterally spotted with orange-yellow on a white ground. — Resembling the preceding in shape, but still larger and pale leather-yellow is a subspecies of which I caught a larger series of quite similar specimens. Forewing with very long costal margin, in the ♀ not much more spotted than in the ♂ and not shaded with dark, the dark distal border paler and narrower; the antennae yellow, the abdomen also being almost uniformly honey-yellow. In Pechili: I call this form **pekinensis** form. *pekinensis*. *nov.* (66e), as it occurs occasionally in the streets of the suburbs of Pekin. — **didymoides** Ev. (66e) also is similar *didymoides*. to *mandchurica*, varying strongly in size and being widely distributed at the east coast of China. North Chinese specimens appear to be much larger than those from Shanghai; but above all the forewing is much shorter than in the similarly coloured and marked *mandchurica*, and the black margin of the hindwing is not dentate at its proximal edge, but evenly curved. — **polaris** Gr.-Grsh. is beneath exactly like the preceding, *polaris*. but above resembles more *trivia*; the ground-colour of the ♀ is pale reddish above. In the more northern coast-districts of East Asia. — **didymina** Stgr. (66f) might be regarded a small form of *neera*; but the ground- *didymina*. colour, especially in the ♂, is not so bright and the black dots before the margin are paler and more reduced, the colour of the underside, moreover, is not so intense as in *neera*, and the ♀ is paler throughout. — Like the butterflies of this species so also vary the caterpillars. The larva of nymotypical *didyma* is lighter or darker lead-grey with velvety black intersegmental rings and reddish brown or yellowish brown, soft, spine-like processes, there being a yellow line above the legs; venter grey, with dark mesial line; head yellowish brown. On low plants like *Plantago*, *Scrophularia*, *Linaria*, *Veronica*, *Valeriana*, *Viola*, etc. At Biskra I bred the form *deserticola* from almost uniformly black larvae, which I found at the top of bushes yards high. Pupa in Central Europe likewise leaden grey to dirty yellow, with the shoulders somewhat projecting and small tubercles on the abdomen, being minutely and regularly spotted with black. The butterflies have in the north of the distribution-area one brood, which flies in July, in the south two broods, one in May and the other in the summer. They are extremely common wherever the species occurs, visiting flowers of all kinds, particularly Compositae, such as thistles and scabious. As the ♂♂ do not fly fast and keep the wings spread out horizontally, their red colour lends them a very beautiful and brilliant appearance. The flight of the ♀♀ is more irregular on account of the generally very heavy abdomen. The mating is usually effected sitting on flowers, the sexes sometimes remaining united for a long time.

- agar.* **M. agar** Oberth. (67e). This form is doubtless closely allied to *didyma*, with which it agrees in the shape of the wings and size. The markings, however, are much more prominent, in the ♂ a number of spots being always united to cyphers, between which there are, especially on the hindwing, but small narrow interspaces of the bright reddish yellow ground-colour. The ♀ has the hindwing above so densely shaded with black that only traces of the ochreous ground-colour are left; the whole basal half and the margins of the forewing are black, the outer half being reddish yellow with 4—5 rows of black spots. Beneath the species is characterized by the proximal, flexuose, russet band being interrupted below the median nervure by the pale yellow ground-colour. However, such ♀♀ are not the ordinary ones. At Ta-tsien-lu the entirely black ♀, which I call *ab.*
- obtecta.* **obtecta** ab. nov. (67e), is much the commoner; in this the upperside bears only some dull yellowish grey, quite obsolescent rings and spots before the apex. The forewing beneath bears several rows of black dots or bars, which may be absent except for one row (LEECH's *agar* var. a). — In West China (on the upper Yang-tse-kiang) common, and in Tibet, from 5—11000 ft, in July and August.
- casta.* **M. casta** Koll. Unknown to me, doubtless belonging to one of the other species of *Melitaea*. KOLLAR's description agrees with most of the *Melitaea* from Anterior Asia, as nothing is mentioned which is characteristic of a definite species. The upperside is described as being reddish yellow with black bands and black outer margin; the forewing beneath bears "an irregular black macular band, the hindwing being pale yellow, with 2 dull reddish yellow bands with black bars and a row of less distinct black marginal dots". Occurs in Persia together with *didyma perseae* and *phoebe* F. — STAUDINGER-REBEL place this form between *sibina* and *saxatilis*; it is not known to me, if they have examined the type.
- romanowi.* **M. romanowi** Gr.-Grsh. (66g). One of the smallest *Melitaeas*. The ♂ russet-red, fasciated with black and white. The ♀ pale orange-yellow, with some minute black dots. As regards shape the hindwing is remarkably small in comparison with the elongate forewing, the abdomen also being long, reaching in the ♂ far beyond the anal angle of the hindwing. — Kentei Mts., Altai, Tibet.
- trivia.* **M. trivia** Schiff. (= *iphigenia* Esp.) (66g). At first sight somewhat similar to *didyma*, but the black lunules before the margin united and the disc traversed by a strongly flexuose macular band, the hindwing with abundant, connected, black markings on the disc. The ♀ with the ground-colour centrally more or less pale, especially on the forewing. In Austria and Hungary, all along the lower Danube and the coasts of the Black Sea, throughout Asia Minor, in Persia, South Russia and South-West Siberia, and in Spain. — Nearly
- fascelis.* all somewhat darker specimens of *trivia* are sold and exchanged as **fascelis** Esp. (66g), such as occur not very rarely among the ♀♀. The name *fascelis*, however, most probably should be restricted to the large South Russian specimens, which are not only almost black in the ♀, but also have a dark brown ground-colour in the ♂. The summer-specimens from the South Russian steppe (for instance, Sarepta) have been distinguished
- nana.* by STAUDINGER as **nana** (= *phoebe* Esp.) (66g), the typical specimens of this form being still smaller than the one figured, so that there is a remarkable difference between this form and true *fascelis*. — The Turkestanian
- catapelia.* form **catapelia** Stgr. (66g) also differs distinctly from *fascelis*, the ground-colour being light leather-yellow; from
- collina.* Ferghana and Bokhara. — In **collina** Led., from Asia Minor and Mesopotamia, the dots composing the median band of the forewing are less widely separated from each other, the ♀ bearing a row of black dots before the margin of the forewing. — Larva of *trivia* leaden grey, with bluish dots and dark dorsal stripe, the sides being striated with brownish, the soft spines whitish, the prolegs dotted with black. In June and again from August till April on *Verbascum*. The pupa very stout, anteriorly somewhat swollen, pearl-grey or dull whitish yellow, with small black dots, of which those on the wing-cases do not correspond to the spots of the wings. Some of the black spots, especially those on the abdomen, are ornamented with red or yellow. The butterfly has just the same habits as *didyma*, flying like the latter in meadows and on roads, particularly also on sunny slopes, and is not rare in most places where it occurs, but does not often fly in such numbers as *didyma*.
- bellona.* **M. bellona** Leech (67e, f). One of the largest *Melitaeas* and so variable that hardly two specimens are alike. The bright reddish yellow ground-colour, which is somewhat paler in the ♀, is covered with very heavy spots which are united to form broad bands and other markings: the distal margin very broadly black with a golden brown sheen, bearing sometimes small spots or very thin lunules of the ground-colour. The underside likewise very variable, variegated; the basal band and the proximal portion of the median band ivory-white.

the outer part of the median band, which is often separated as round spots, is silvery white like the marginal band. — In West China, in June and July, up to 10000 ft.

M. aurelia Nick. (= *athalia* Hbn., *parthenie* Hbst.) (66h). Dark russet-brown, so strongly marked with *aurelia*. black that the ground-colour is reduced in the ♂ to very small spots. On the whole similar to *athalia*, but smaller, with the black markings deeper in tint and heavier, the ground-colour darker, more brownish; beneath the marginal line before the fringes is absent or but very indistinct. The species is recognizable by the palpi bearing foxy red hairs, while the palpi of *athalia* are whitish, being occasionally somewhat reddish yellow and then only at the base. Very pale yellow specimens are named by SPULER ab. *latonigena*. A large and dark *latonigena*. form, which is plentiful in the Bukovina, but occurs also elsewhere (Transsylvania, etc.), is ab. *dictynnoides* *dictynnoides*. *Hormuz.*, whose forewing is more elongate and acute, while the hairs of the palpi are dark. In ab. *stangei* *stangei*. *Gillm.* the black is reduced on the forewing and increased on the hindwing. — **britomartis** Assmann (66h), *britomartis*. though connected with the nymotypical form of *aurelia* by all intergradations, is easily recognized by its facies. The black is more regularly arranged above, and the reddish yellow spots within this network differ less in size from each other, the spots of the same row being usually of equal size, whereas in nymotypical *aurelia* a row mostly contains quite small spots of the ground-colour beside large ones, others disappearing altogether. A reliable distinction between *britomartis* and *aurelia* appears to be afforded by the colour and shape of the larva. Occurs in South Germany and Switzerland, the Danubian countries, Anterior Asia, said to be found as far as the Altai. — **rhaetica** Frey (66h) is a rather more yellowish red form from the Alps (Grau- *rhaetica*. bünden) with thinner black markings. — **norvegica** Auriv. (= *varia* Lampa, *scandinavica* Stgr.) (66h) is the *norvegica*. form from the north of Europe; the brownish yellow spots, especially in the median area, are considerably larger than in all the other European forms of *aurelia*, while the base is almost uniformly black on both wings; southward to the Baltic provinces. — **mongolica** Stgr. (66h) is not inconsiderably larger than *norvegica* and *mongolica*. has enlarged yellowish brown spots like the latter, especially in the median band, but the colour of these spots is much darker, more brownish, also the spots in the basal area being often enlarged. — In the Sajon district, west of Lake Baical, there occurs a very remarkable form, which is similar to *britomartis* and may be named **seminigra** *form. nov.* (66h). Above blacker than *dictynna*; in the ♂ all the spots are reduced in size, those standing in the basal and marginal areas being almost obsolete; these spots also in the ♀ so much reduced that there remain on the hindwing only the submarginal ones and vestiges of cell-spots, the hindwing being otherwise all black. Moreover, the characteristic red hairs of the palpi are so intermingled with black ones that the palpi appear entirely dark. — **amurensis** Stgr. (66h) closely resembles above the large-spotted *mongolica*, but the *amurensis*. median area is rather lighter. The underside is characteristic, there being a regular, evenly brown, band before the margin and another across the cell, between which lies a broad ivory-white band; Amurland. — The eggs of *aurelia*, which are deposited in 1 or 2 layers, are globular, glossy pale yellow, being somewhat flattened beneath and above raised into a small cone (micropylar cone). Larva black, with black processes, minute white dots and yellow lateral spots. The larva of *britomartis* on the contrary is said to be pearl-grey with black markings and white processes bearing dark hairs and standing in orange-red spots. From August until May, on *Melampyrum*, *Chrysanthemum*, *Digitalis*, and *Veronica*. Pp grey, spotted with black, the wing-cases with brown markings, the abdomen bearing small yellow warts. The butterflies are on the wing in June and July, flying in rich meadows and on grassy slopes with a sailing graceful flight, which is lower and less darting than in *athalia* and more powerful than in *parthenie*, with which species *aurelia* often occurs together. It is much less abundant, much more local and less widely distributed. When flying in meadows it does not seem to leave them so readily as do *athalia* and *parthenie*, usually returning when arriving at a wide road, apparently avoiding to fly across it. Although it is very difficult to find trenchant differences, there is no longer any doubt that *aurelia* and *athalia* are distinct, independant, species. No sufficient evidence has been brought forward to show that the specimens recorded as hybrids between these two species are really hybrids.

M. athalia Rott. (= *maturna* Hbn., *alphaea* Hbn.) (66i). Extremely variable, small dark specimens resemble *athalia*. *aurelia*, lighter ones *parthenie*. In most specimens the reddish yellow spots of the median area are considerably larger and paler than in *aurelia*, the insect itself being larger with the markings heavier and better defined. In doubtful specimens the palpi are a sure guide, which, when viewed from above, do not show any red hairs but blackish ones slightly intermingled with yellowish hairs beneath. The markings of the underside are usually somewhat coarser, but too variable to afford any distinguishing characters. The variability in the extent and position of the black shading on the upperside has given rise to a variety of names (*tesselata*, *samonica*, *pyronia*, *eos*, *asteriades*, etc.). In the almost entirely black-sealed ab. *navarina* *Selys* the black colour prevails *navarina*. considerably, while in ab. *corythalia* Hbn. the light ground-colour is prevalent; both aberrations occur among *corythalia*. ordinary specimens, not being at all rare in some years. — Specimens with the hindwing entirely black are the only or the prevalent form in certain localities, being exceptions in others; this is ab. *caucasica* Rühl. — *caucasica*. Large southern forms are **mehadiensis** Gerh. (66i), with the ground-colour bright and the markings mostly more *mehadiensis*.

magna. regular and apparently less variable, from Hungary, and *magna* Stgr. i. l. (66i) with the ground of a brilliant fiery yellowish red and the markings deep black but thin, from South Spain. — *helvetica* Rühl, from Graubünden (Bergün), has the spots of the median band of the hindwing enlarged to streaks, the median band of the hindwing beneath being silvery white. — *iberica* Stgr. (67a) is considerably lighter above, especially in the centre, being more pale or orange-yellow, and some of the dark markings are obsolete; one of the largest forms. Castilia. *hertha*. — In a northern aberration, ab. *hertha* Quens., the forewing beneath bears brown longitudinal stripes; Scandinavia. *orientalis*. — A number of other races fly in Asia, where the species extends to the coast of the Pacific: *orientalis* Mén. (67a), from Kamtschatka, appears more variegated above, on account of the contrast between the lighter and darker bands; the median band of the underside is almost white and somewhat wider; the insect, moreover, is small and inconspicuous, in accordance with the northern climate. In ab. *ambigua* Mén. the pale band of the hindwing beneath is pure silvery white; likewise from North-East Asia, very likely among the preceding. — In *latefascia* Fixs. (66i) also the white median band is widened, but much more so than in the previous; one of the largest known forms of *athalia*; Corea. — *niphona* Btlr. (= *mandschurica* Fixs.) (67a), though above similar in colour and markings to nymotypical *athalia*, is much larger, the submarginal band of the underside being deep russet-brown and below the costa not interrupted. In southern Amurland, Corea and Japan. — *kenteana*. *kenteana* Stgr. i. l. (67a) is a somewhat doubtful form from Kentei. All the specimens from Central Asia which belong here have been considered to be either *aurelia*, *athalia* or *parthenie*; most of them presumably belong to *athalia*, the more western *parthenie*, at least in its nymotypical form, not extending into Asia. — The form *alatauica*. *alatauica* Stgr. (67b), which STAUDINGER places under *parthenie*, appears to me to belong rather to the group *aurelia-athalia* than to *parthenie* according to its facies, especially the outline of the wings; from the Alatau. It is rather dull ochreous, the black markings have a yellow sheen and therefore are not prominent.

The forms of *athalia* are most numerous in individuals in Central and East Europe, for instance in South Germany, Austria, Eastern France and Switzerland; they are the commonest Melitaeas in these countries, being indeed among the most abundant butterflies. The eggs are deposited in clusters; they resemble exactly those of *M. aurelia*, being glossy pale yellow, globular with the micropylar pole conical (GILLMER). Larva black, with transverse rows of white dots and on the sides small yellowish warts; the fleshy tubercles are yellowish brown with pale tip and dark hairs; head black. From August until May, in the southern districts again in June, on Plantago, Melampyrum silvaticum and nemorosum. Pupa pearl-grey, spotted with black, the abdomen above bearing rows of small tubercles with yellow bases. The butterflies are numerous at the edges of woods and on wide grassy roads, being much less restricted to meadows than *aurelia* and *parthenie*; they are on the wing in May and June and again in August.

dejone. *M. dejone* Hbn. (= *beata* Car.) (67b). In spite of its great similarity to *athalia*, this South-West European form is considered specifically distinct, particularly, it seems, because the wings are more elongate and there occur in South France and Spain also forms of *athalia* with which *dejone* is not identical. In markings more resembling *athalia*, in colour more *parthenie*. In the ♀ the reddish yellow median band of the upperside is somewhat paler, so that there are two contrasting tints of reddish yellow. The underside nearly as in *parthenie*, the light bands of the hindwing as in *parthenie* not silvery and not divided by a black line. The individuals even from the same place differ so much that one might be inclined to place some with *parthenie* and others with *athalia*. Perhaps the insect will in future be proved to be a local or seasonal form of one of the allied species. Only on the Iberian Peninsula, in the opposite districts of Africa and the adjacent parts of South France. — *berisali*. OBERTHÜR refers to this species a form from Berisal in Valais, *berisali* Rühl (= *berisalis* Fav. & Wulfschl.) (66i), which appears to be rather restricted as regards occurrence. The forewing being remarkably pointed and the markings of the hindwing beneath very peculiar, OBERTHÜR believes it possible that *berisali* is a distinct species. The russet bands of the hindwing beneath are very bright in colour and heavily edged with black, the ♀ bearing heavy black lunules before the fringe in the light marginal band. The forewing beneath is very vivid reddish yellow, being much variegated with black in the apical area. — *nevadensis*. *nevadensis* Oberth., from the southern slope of the Sierra Nevada (Lanjaron), is paler on both sides, the black transverse lines are more strongly curved and the dark basal area of the wings is not interrupted by the ground-colour. — The larva of *dejone* is dark brown, with white dots and dirty yellow spines with black hairs; head black. Until June on Linaria. The butterfly in June and again from the end July onward; at higher altitudes perhaps in one brood only.

parthenie. *M. parthenie* Brk. (= *parthenoides* Kef.) (67a). Above very similar to *athalia*, especially in pattern, but the black markings much thinner, yellowish red the prevalent colour. While in *aurelia* and *athalia* the yellowish red spots may be said to be united to bands, *parthenie* has orange bands of almost even width and traversed by thin black veins; the median band especially is very broad, the spots composing it being almost twice as long as wide, which is hardly ever the case in European *athalia*. The underside likewise resembles *athalia* in

pattern, but is brighter, more variegated, the black edges of the various bands being more prominent, the colours contrasting more distinctly. In Western Europe, eastward to Hungary and Moravia, said to occur also in Russia and Scandinavia. *parthenie* varies, however, almost as much as *athalia*. „If names are required“, SPULER proposes to call particularly light-coloured specimens ab. *corythalia*, and dark ones ab. *navarina*, as in *M. athalia*. The distribution of colours is very peculiar in ab. *jordisi* Rühl (= *varia* ab. *Oberth.*) (67a): above the distal margin is broadly black, the basal area strongly spotted with black, but the median area fiery orange-red and almost without markings. Beneath the black colour is likewise restricted to the basal and distal areas, the entire median area being on the forewing reddish yellow, on the hindwing dull white without markings except the dark veins. Local, for instance in some places near Frankfurt a.M., not plentiful and not every year, only in one brood among normal specimens. A similar variety occurs also among *varia*, but only as a rare exception which does not deserve a name, likewise among other Melitaeas. — In *nevadensis* Spul. the ♂ is more fiery yellowish red and the ♀ more variegated on account of the paleness of the middle row of spots on the upperside than in the nymotypical form; the apex of the forewing in ♂ and ♀ more elongate; Arragonia. — A very strongly modified form, *sultanensis* Stgr., flies in May in the mountains near Samarkand. It is much lighter above than *parthenie*, many of the dark markings being obsolete, the insect therefore having a facies which is quite unusual among *Melitaea*. The underside differs less from that of *parthenie*, the forewing, however, is more unicolorous, being almost without markings. STAUDINGER originally described this form as a variety of *parthenie*, but has separated it as a distinct species in the Cat. Palaearct. Lep. of 1901, in which he was presumably right. — *varia* M.-Dürr (67b) is a smaller form from the higher Alps, recognizable by the markings on the hindwing beneath, which are pale yellow in the nymotypical form, being silvery white. In the ♂ the markings in the median area of the forewing are usually somewhat obsolescent, the network formed by the veins and transverse lines being interrupted or paler before the apex. The ♀ often shaded with blackish, the ground-colour having a tint of brass-colour or olive; the abdomen very heavy. — The larva of *parthenie* black, with black head and red-brown spines with pale tips; small white warts dispersed over the body. In May and again in July on *Plantago* and *Scabiosa*. Pupa pearl-grey, with rather heavier black markings than in *athalia*, otherwise similar to the latter, but the tubercles of the abdomen not yellow. The butterflies are on the wing in May and June and again from August in the south, from June until August in the north and in the high Alps (*varia*), being very plentiful almost wherever they occur. They love luxuriant meadows, especially if there are single trees, the alpine *varia* being particular to grassy slopes with single larches. They visit flowers, especially scabious, and move the spread wings frequently up and down when sucking. The flight of the ♀♀ of *varia* is often almost booming on account of the heavy body and the very small wings.

M. dictynna Esp. (= *corythalia* Hbn.) (67b). Above much darker than the various previous species, the black markings heavy, in the ♂ only some small rounded spots on the forewing and a submarginal row of dots on the hindwing reddish yellow, in the ♀ the outer half of the upperside variegated with ivory yellow and ochreous spots, the fringes being white in both sexes. Beneath marked as in the *athalia*, but the bands of the hindwing more chestnut. Throughout Europe (except the extreme north and south, as well as Great Britain), also in North and Central Asia eastward to the coasts of the Pacific, being in the west abundant almost everywhere, rarer in the east and north. Particularly light resp. dark specimens are not rare and, according to SPULER, should be named ab. *corythalia* and ab. *navarina* respectively. — The form *erycina* Stgr. (67c), from Amurland and the Altai, is above almost exactly like European specimens, the spots being somewhat paler; beneath more variegated, the brown submarginal band being paler below the costa but not interrupted; the specimens from northern Amurland a little smaller. Not plentiful anywhere (GRAESER). — *erycinides* Stgr. (67c) is a large race from Central Asia and certain places farther east, the upperside being spotted with dark in the ♂ and with whitish yellow in the ♀, while the submarginal band of the underside is much darker brown than in European specimens, the margin of the forewing beneath being broadly shaded with dark brown. The specimens figured are from Kentei. — Larva of *dictynna* dark grey with yellow spines; the body with bluish dots, 2 such dots on the head; on the back black longitudinal stripes. From the autumn until May on *Plantago*, *Veronica*, *Valeriana*, etc. Pupa silvery grey or yellowish grey, dotted with black, dorsally on the abdomen rows of small russet-yellow warts. The butterflies from June until August in swampy meadows, especially near water-ditches and in meadows in woods. They are slow fliers, perhaps the least fast among all the Melitaeas. In the high Alps they frequent the same localities as many *Erebias*, with which they fly together. They occur up to 10000 ft.

M. plotina Brem. (67e). Above like *aurelia*, the costal margin of the forewing dusted with greenish grey; recognizable by the underside of the hindwing whose markings are separated into numerous small, rounded, irregularly placed spots, and by the forewing beneath being very strongly marked with dark. — In West and East Siberia, in July, sporadic and local, but not exactly rare where it occurs. The flight-places are clearings, where the insect flies about with a peculiar rushing flight observed in no other *Melitaea* except *asteria* (GRAESER).

protomedia.

M. protomedia Mén. (66g). Above with thin but non-interrupted black markings which form with the dark veins a black network on a reddish or yellowish brown ground. The shape of the forewing of the ♂ is characteristic, the apex being costally somewhat obliquely truncate and therefore the costal margin feebly angulate in front of the cross-veins. The markings are very regular; a black marginal band, a flexuose submarginal and an external discal one as well as an inner discal band crossing the apex of the cell in both wings are nearly parallel with one another; in and below the cells irregular double markings. The forewing beneath pale ochreous with abundant black or brown markings, which are pale only on the disc. The hindwing dull white in the nymotypical form, with an inner band including the cell-spot and an external one which is interrupted below the apex, both bands being russet. In Eastern Siberia, Corea and throughout Palaearctic China, locally plentiful (at Chang-Yang). FIXSEN gave the name ab. **argentea** to specimens in which the bands on the hindwing beneath are silvery instead of ivory-white. — Herr GEORG KON, of Vladivostock, has been so kind as to send me the description of the hitherto unknown larva of *protomedia*. The larva is „similar to that of *dictynna*, velvety black; along the back a row of white false spines accompanied towards the sides by a row of orange-red ones, further laterad again white but smaller spines, between which there are white dots. All false spines bear short black bristles. Head and thoracic legs black, prolegs whitish. Size as in *dictynna*. On *Veronica sibirica*, usually singly. Changes in June into a black-marked white pupa which likewise resembles that of *dictynna*, bearing 2 rows of orange dots; the butterfly appeared in 12 days.“ LEECH treated *protomedia* at first as a local form of *dictynna*, but considered it later as a distinct species, in which he was doubtless right, as there occurs a true *dictynna*-form in Eastern Asia according to GRAESER and STAUDINGER.

minerva.

M. minerva Stgr. (67c). The nymotypical form of this species is small, not being larger than the smallest *parthenie*; above yet lighter, the dark bands always obsolete or vestigial in the costal area of the hindwing, mostly also in the greater part of the wing, the basal and abdominal areas of the hindwing on the contrary broadly dark coloured. Beneath also similar to *parthenie*, but the band situated beyond the cell distinct and somewhat different in position. From Central Asia: Ferghana, Ala-tau and Issyk-kul; very common in the Koksus-Pass.

pallas.

— **pallas** Stgr. (67c), from the Pamir, varies in size like the preceding form; the black markings are all completely obsolete except some at the base, while in ab. **palamedes** Gr.-Grsh. the submarginal bands are still distinct. —

pamira.

Here belongs most probably also **pamira** Stgr., in which the upperside has more black than in *pallas*, but less than in *minerva*, while the underside of the hindwing is much brighter than in the other forms of *minerva*, which are dull beneath. — In the ♀♀ of all these forms the upperside bears some pale colour before the apex beside

expressa.

orange. — In the form from Bokhara, however, **expressa** Gr.-Grsh., the pale yellow centre of the forewing of the ♀♀ above contrasts considerably with the fiery reddish yellow distal band.

arcesia.

M. arcesia Brem. (67d) is very similar to the preceding species, some of its forms having been united with it several times, but the dark bands of the forewing are on the whole much straighter, the band situated below the apex of the cell and extending from the cross-veins to the middle of the hindmargin is much less flexuose, being often exactly vertical to the hindmargin. The underside not so bright as in *pamira*. The ground-colour of the upperside and the size are exceedingly variable. The smallest specimens from the high mountains have been

minor.

separated as **minor** Elw. (Stgr. i. l.) (67d); the ground-colour duller, darker on account of the increased black markings, almost recalling *aurelia*; the ♀ here figured is a comparatively large specimen, the ♂♂ being considerably smaller, being hardly the size of *asterioides*; in the Altai district. — ab. **baicalensis** Brem. is only an accidental form, which occurs among ordinary specimens at Lake Baical and on the Amur, being distinguished by a somewhat different arrangement of the black markings above and by the still duller colouring of the underside; the rows

baicalensis.*chuana*.

of dots and spots of *arcesia* are but vestigial in this aberration. — The form **chuana** Gr.-Grsh. (= *sindura* Alph.) (67d) also is darker than true *arcesia*, not on account of an increase in black, which on the contrary forms thinner bands, but because the ground-colour is a deeper, richer brownish yellow. — This species is distributed from the Central Asiatic mountains, the Altai and Sajanskij, to the coasts of the Pacific, but does not extend to Japan or China proper. The small alpine form occurs together with *cinxia*, *iduna* and *aurinia* in the Altai, being common in July in grassy places.

sindura.

M. sindura. Likewise widely distributed and very variable. Its size varying from that of *varia* to that of *athalia*. The markings above recalling *parthenie*, but the veins much less black and much thinner, the network so characteristic for European Melitacae being absent from the upperside, at least in the ♂♂, only the ♀♀ of some forms showing the same. The median band is always much broader than in the other Melitacae, partly because the band itself is wider, partly because the two middle macular bands are merged together on account of the absence of one of the black transverse lines. Beneath the light submarginal lunules appears

*) STAUDINGER has already drawn attention to the fact that *baicalensis* being the first described form the species should bear this name according to the rules of nomenclature and *arcesia* treated as a variety.

to be farther away from the fringe, the russet-brown marginal band being rather broad. — The nymotypical *sindura* Moore (nec Alph.) occurs in West Tibet and also in the North-Western Himalayas, being represented in India by the much darker *sikhimensis* Moore. — In Palaearctic Kashmir flies *balbita* Moore (67e), whose *balbita*. facies strongly recalls our *dictynna*, to which the species is closely allied. This form from Kashmir differs from nymotypical *sindura* by its larger size and by the less deep coloured and less heavy black markings, which occupy less space. — In *tibetana* Fawe., from Southern Tibet, the ground-colour is more pale brass-yellow in the basal *tibetana*. area of the forewing and a row of small marginal lunules on the upperside of both wings is white. — In the very small ab. *amoenua* Fldr. only the marginal markings are strongly developed; the black colour being other- *amoenua*. wise restricted to some small spots at the base and in the cell, the median area bearing only a row of equal-sized minute dots. — In ab. *solona* Alph. (67e) this row of dots is absent, being replaced by a thick black line *solona*. on the forewing, while the costal half of the hindwing is altogether devoid of dark markings. In the ♀ the fiery yellowish red median area contrasts strongly with the pale ground of the forewing, rendering the insect superficially somewhat similar to certain *didyma*-forms (*alpina*, *bicolor*); Tian-shan. — *asterioidea* Stgr. (67d), which *asterioidea*. connects the series of *sindura*-forms with *M. arcesia*, is the smallest form, with pale ochreous ground-colour; it has of all forms united under *sindura* the black markings most abundantly developed, even the median area of the hindwing not being quite devoid of them; from the Ala-tau. — *pallida* Stgr. (67d) is somewhat larger, *pallida*. but as pale ochreous as the preceding and beneath more abundantly marked with black; from Ferghana and the Issyk-kul. — *clara* Stgr. (67d), from the western Tian-shan, agrees in its small size exactly with the typical *clara*. *asterioidea*, but is fiery reddish yellow instead of pale ochreous, the upperside bearing as few black markings as *solona*. — *variegata* Stgr., from Boro-Choro in the central Tian-shan, agrees above exactly with *asterioidea*, *variegata*. but the hindwing beneath is more brightly variegated. — *jezabel* Oberth. (67d) resembles *balbita* most on the *jezabel*. upperside, but the underside is much more uniformly brick-red, the pale band of the hindwing also being dusted with this colour; from eastern Tibet and Se-chuen. — In *maculata* Stgr. the black transverse stripes of *maculata*. the median area are separated into rows of spots and the underside bears a row of conspicuous black spots; from the mountains of the eastern Tian-shan. — The enormous extent of the area inhabited by *M. sindura* and the physical differences of the various localities render it intelligible that the insect has been split up into such a large number of named forms. However, as three names apply to specimens from Tibet and four to such from the Tian-shan, the number of forms will perhaps be reduced in future, and probably *arcesia* also included in the present species. But this can only be done in a monographic revision based on a very large material. The forms of *sindura* are mountain-insects which fly in July and August for the most part at very considerable altitudes (up to 11000 ft.), being abundant at their flight-places.

M. asteria Frr. (71e). The smallest *Melitaea*; dusted with dark russet, the whole insect appearing blackish. *asteria*. The ground-colour is represented only in the distal area of the wings by small dull spots. The underside is bright, the russet-yellow forewing being broadly margined with yellow and heavily spotted with black, and the hindwing bearing on a pure pale yellow ground deep brown bands, which are almost black in the basal area. Widely distributed in the higher Alps, but not below 5000 ft. — *altaica* Stgr. is somewhat larger than *altaica*. the European form, the forewing beneath still more heavily spotted with black and the upperside slightly paler; in the Altai, only at considerable heights (7—8000 ft.; ELWES). — Larva black, with black head and black hairy spines, like the *cynthia*-larva with yellow belts between the segments and small yellow spots, but more strongly yellow-spotted, the yellow prolegs being externally brown. The butterflies occur in the Alps in July, according to RÜHL in 2 broods; ELWES found in the Altai the form *altaica* already worn at the end of June. They fly on grassy slopes with a peculiar rushing flight, which, in connection with the dark upperside, renders the insects quite dissimilar to other *Melitaeas*.

M. yuenty Oberth. (67e, f). This *Melitaea* deviates entirely from the others in its remarkable pattern, *yuenty*. which shows already a certain similarity to the species of the next genus, *Timelaea*. The wings strongly rounded, hence the Chinese name (yuen-ti = round); the black transverse and curved lines are separated in very regularly placed rows of spots. The underside bears likewise curved rows of dots, which are especially present on the hindwing at the base, in the pale yellow median band and at the margin. — The butterflies occur in June and July in West China, not being rare in certain places and being found in the mountains up to 10000 ft.

13. Genus: **Timelaea** Luc.

The forms which became first known were described as *Melitaea*. The genus contains medium-sized species, which are black-spotted on a red-brown ground like *Melitaea* and *Argynnis*. Easily distinguished from *Melitaea* as well as *Brenthis* and *Argynnis* in the underside being exactly marked and usually also of nearly

the same colour as the upperside, the hindwing beneath not bearing the markings so characteristic for the other *Argynni*. Palpi clothed with hair-scales, the end-segment prolonged, rather pointed; antennae with the club flattened and pear-shaped. Body delicate and slender. Distal margin of forewing straight or slightly rounded, of hindwing undulate. The genus, which contains but 3 known forms, is restricted to China and Tibet, and is found only in the Palaearctic districts of these countries; in South China, which belongs to the Oriental Region, no single form appears to occur.

maculata. **T. maculata** Brem. & Gray (71e) has the size of our *Arg. niobe*, and is uniformly reddish yellow above and very regularly spotted, the black dots being particularly numerous in and around the cell. — Widely distributed in China, on the entire Yang-tse-kiang, northward to Peking (BREMER and GRAY). In June and July; does not appear to be common.

albescens. **T. albescens** Oberth. (71e). More sparsely spotted above, especially in the basal area of the forewing. Recognizable by the disc of the hindwing being white above and below. The antennae less marked with white beneath. According to OBERTHÜR only a race of the preceding. — In West China, in June.

nana. **T. nana** Leech (71e). Much smaller than the two previous, the spots much closer together, many touching each other; the ground-colour duller above and paler beneath than in the other two *Timelaea*. — Only known from West China: Mupin, Wa-shan, Omei-shan; apparently only in the mountains.

14. Genus: **Argynnis** F., Fritillaries.

Head large, in small species broader than the thorax; eyes very large and strongly convex, naked, usually dark green, containing dark red or black parenchyma; antennae rarely above half the length of the costa, with heavy, flat club; palpi inflated, beneath bristly, only the acicular end-segment naked. Legs strong, the forelegs minutely hairy, the mid- and hindtibiae spinose. Wings hard, powerful, entire, rarely the hindwing dentate; cell closed in both wings; the shape of the wings often different in the sexes. The larvae are rather stout, bearing 4 rows of medium-sized spines on the back and one row on each side, and ventrally at the sides minute warts. The anterior spines are often prolonged, resembling antennae. The larvae are usually black or brown, being spotted with red or yellow, and live on Violaceae as a rule. The thorax of the pupa bears a hump, behind which there is sometimes a deep depression, occasionally with metallic projections and warts; the fore part of the pupa is either rounded as in *Melitaea*, or produced into 2 horns (*paphia*) as in *Vanessa*, and sometimes (*niphe*) the whole pupa is covered with tubercles. The species of *Argynnis* vary from being moderately small to large, the colour being red-brown with black spots, differing only in some ♀♀ (*sagana*, *diana*) to same extent from the normal. It is characteristic that nearly all the forms bear silvery markings in certain places of the underside, which have been likened to dew-drops and small mirrors. These silvery markings are not equally constant in the various species. While they are never absent from some species, they are wanting only exceptionally in some forms, commonly in certain other species, and constantly in certain localities in other species again. The apex of the forewing beneath is always marked and coloured like the hindwing, contrasting with the disc in a similar way as in *Melitaea*.

Argynnis is a genus rich in species, but quite homogeneous, comprising about 250 forms, which are often very similar to each other. The large number of species, which are difficult to group, appears to almost render a separation into several genera necessary; but there are weighty objections. The separation of single species, such as (*Speyeria*) *idalia*, (*Semnopsyche*) *diana*, and (*Damora*) *sagana*, does not simplify the classification. If SCUDDER had known the early stages of *diana* so well as they are now known, he would probably not have attempted to separate the species, notwithstanding the different ♀. There would be more justification in separating the forms *striped* beneath from those bearing silver *spots* (*Dryas*), as they are said to have also an incurved distal margin, though this is not true in all forms. It is also not possible to strictly separate the smaller species as BRENTIS from the larger ones, as ELWES does. Therefore we deal with the genus in the usual wide sense and even unite with it (*Acidalia*) *niphe*, which is essentially tropical. The geographical distribution is shortly characterized by stating that the genus is essentially Palaearctic with the centre of distribution in Europe. Though particularly the large forms extend across Northern Asia to Japan, there is no country where, as in Europe, about 50 well distinguished forms are found in a relatively so small district as Europe proper. Eastern and North America come next, the largest known *Argynnis* occurring in North America (*cybele*, *idalia*, *diana*). There occur also a few species in South America and Central Africa, widely separated from the true home of the genus, one essentially Indian species extending to Australia.

The larvae of *Argynnis* often live well concealed, in contrast to the larvae of *Melitaea*, which usually feed in day-time and do not conceal themselves. Almost without exception they can be fed up on Violaceae, but many also accept Polygonum, Sanguisorba, Rubus and Spiraea. They hibernate and always keep close to the ground. The larvae of some species (*paphia*) are known to migrate, fast crawling *Argynnis*-larvae having been found covering the roads in the woods. The pupae are suspended low above the ground, hanging rarely more than 2 feet high on low plants or stalks and pieces of bark. The butterflies are very plentiful, except at the boundaries of the area of distribution, occurring often in great abundance and flying in meadows, on slopes, clearings in the woods, at road-sides and on fields. Their flight is usually rather fast, alternately darting and buzzing, only the very large species having an undulating or sailing flight. They visit flowers of all kinds, but especially scabious and thistles, and also drink on damp places on the roads, sometimes congregating in numbers; at the exuding sap of trees, however, I have met with only one species in one single case (*A. anadyomene*), the specimen having probably been attracted by a crowd of *Vanessas*. Most species are not shy, being easy to catch, for instance on alpine pastures, brambles and thistles.

As regards variation, the *Argynnis* show a decided tendency to melanism, like the *Melitaeas*. All intergradations are known from specimens with a somewhat stronger development of the dots of the upperside to examples in which the spots are merged together to large black central patches or in which even the whole upperside is black. This kind of development may be accompanied by an increase in the silvery markings on the underside, the under surface of the hindwing being sometimes all silvery, hardly interrupted by the veins (*valdensis*, *argyrorhyses*). Albinism may obtain in all parts of the upperside, even on both sides, but may also be peculiarly modified. There occur for instance occasional specimens in which the ground-colour has remained reddish yellow, while the black spots of the upperside are replaced by whitish ones. I have before me also specimens (*dia*, *paphia*) in which the 4 wings bear large pale central patches, which are quite evenly developed in shape and colour. Aberrations in the complicated pattern of the underside of the hindwing have been found in nearly all the species.

A. aphirape Hbn. (= *eunomia* Esp., *tomyris* Hbst.) (67f). Above pale reddish yellow, with a narrow black *aphirape*. margin and small black submarginal lunules; the basal area separated from the central area by a black dentate line and bearing heavy markings. The median area with but one very regular row of dots in the middle, at the proximal side of which there are often feeble shadows in the ♀. Hindwing proximally dull ochreous, with yellowish macular bands near the base and in the middle. The distal area of the hindwing beneath light yellow, with a row of small white-centred ocelli and thin hastate markings before the margin. In Germany, Holland, and almost the whole of North Europe, especially Russia, and in Armenia. — **asiatica** Stgr. (67f) differs in the *asiatica*. distal area of the hindwing beneath and the basal and median bands being white instead of pale yellow; in Siberia eastward to the coast of the Pacific. — **ossianus** Hbst. (67f) closely resembles the preceding above, *ossianus*. but is much more prominently marked beneath, the forewing beneath being much more intensely marked with black and the ground-colour between the silvery bands of the hindwing being cinnamon instead of leather-yellow; the silver-markings of the marginal spots much more glossy, the ocelli before the margin much larger, more blackish, with strongly silvery pupils. In Scandinavia, North Russia, and East Siberia. This northern form is exceedingly variable, especially on the underside, which differs even in specimens from the same locality. MEWES describes the following aberrations: ab. **selenoides**, resembles *selene* in the hind- *selenoides*. wing beneath being brightly variegated; ab. **decorosa**, the underside on the contrary is unicolorous, darkened, *decorosa*. with strongly developed silver-spots; ab. **inops** has the median band of the hindwing beneath several times *inops*. interrupted by black; in ab. **rudolphi** on the other hand the underside has less black, only the veins being *rudolphi*. distinctly dark; in ab. **discalis** the median band of the underside of the hindwing interrupts in several places *discalis*. its external shadow; in ab. **limbalis** the outer half of the hindwing beneath is almost uniformly yellowish red *limbalis*. with very few markings; in ab. **basalis** the basal band of the underside is strongly reduced or entirely absent; *basalis*. in ab. **cultrimacula** the light basal spot is connected with the light median band. All these forms of *ossianus* *cultrimacula*. intergrade, some being based on single specimens. — A further form of *aphirape*, **obscura** Stgr. (67f), has the *obscura*. upperside so extended black that only very small spots remain of the ground-colour, which are also more brownish; from North Finland. This is a constant form, occurring in both sexes. ab. **aino** Sahlb., on the *aino*. other hand, from the same country, represents an occasional case of melanism, the black markings of the upper-side being partly confluent; the ground-colour is densely shaded with black between the silvery white bands of the hindwing beneath. In ab. **kullervo** Sahlb., likewise a melanotic form from Finland, the remnants of the *kullervo*. ground-colour between the macular bands of the hindwing beneath are replaced by two deep black bands and the black spots on the forewing beneath are confluent. In ab. **isabella** Tengstr., from Finland, the ground- *isabella*. colour is whitish on the upperside, honey-yellow beneath. — **tricularis** Hbn. (= *ossianus* Bsd.) (67g), from Labrador *tricularis*. and the central mountains of the United States, occurs also in Siberia according to ELWES and is to be united with GRAESER'S „conspicuously paler“ form from Nicolajevsk. The ground-colour is light reddish yellow and very pure, the black markings being prominent but very thin. The median area is pure yellowish red, with a

very regular row of distinct but not large dots. The markings of the underside are likewise better defined and more prominent than in the nymotypical form. — The larva is stout, grey (*aphirape*) or yellowish brown (*ossianus*), with blackish or brownish head, yellowish red spines and a pale lateral stripe which is shaded with dark below; on *Viola* and *Polygonum*, until May, feeds only at night. Pupa earth-grey, with dark markings, silvery tubercles and a pale lateral stripe. The butterflies are on the wing from June until August, occurring almost exclusively on moors and in swampy woods. They are exceedingly local, being common in one place, rare in another, the flight-places lying widely dispersed over the northern districts of both hemispheres. On close comparison the specimens from different places exhibit some distinctions and a series of individuals can be selected which connect the above-mentioned forms and which render a sharp separation of the latter the more impossible the more specimens are compared, so that with ELWES the forms *tricularis* and *ossianus* must be called „inconstant“. The butterflies usually are found sitting in a lethargic state on flowers during the morning, when they are easy to obtain (STÖCKHERT).

hegemone.

A. hegemone Stgr. (67i). In size like the preceding, but the markings of the upperside consisting of isolated spots. The hindwing bears beneath an irregular dentate median band and a black dot in a pale patch in the cell, otherwise the pattern of the underside of both wings closely resembles that of nymotypical *aphirape*. In the mountains of Turkestan, the Pamirs, at altitudes of from 4—6000 ft. According to ALPHÉRAKY specimens from Kuldja are constantly different from the individuals from Margelan, which statement ELWES does not confirm. — Distinctly different, however, is a form from the „dry mountains“ (Kuruk-tag), south-east of Korla, **erubescens** Stgr. (67i); its upperside is fiery red, with the black markings reduced to little dots. June till August.

erubescens.

selenis.

A. selenis Ev. (67g). Above deeper brown than the preceding, the black spots much larger than in *hegemone*, but not united to dentate bands as in *aphirape*. On the hindwing beneath the basal band consists of but 3 small pale spots which hardly touch each other; the median band is rather narrow and the pale spot placed in the same at the apex of the cell projects less distad and is less silvery than in the otherwise not dissimilar *A. euphrosyne* and *selene*. In typical specimens from the Ural Mts. the outer half of the hindwing beneath is scaled with yellow and brick-red, while in **sibirica** Ersch. (= *selenis* Graes.) (67g), from the mountains of Southern Siberia and Amurland, it is clouded with purplish violet. Widely distributed but very local, in June and much more plentiful again from August onward.

sibirica.

selene.

A. selene Schiff. (= *euphrosyne* Bgstr., *euphrasia* Lew., *silene* Haw.) (67g). Forewing above and beneath very similar to that of the preceding. Hindwing beneath with the median band distinct but not broad, the costal spot of the band, the large tooth above the apex of the cell and the one below the cell-end being vividly silvery like the marginal lunules; the broad interspace between the median band and the marginal lunules is leather-yellow and bears below the apex and above the anal angle two large dark cinnamon clouds; obsolescent silvery

selenia.

macular bands extend from the costal and abdominal margins towards the centre of the wing. ab. **selenia** Frr. (67h) is the name of the darkened specimens of the much smaller second brood found in many places of Central Germany and perhaps occurring also in other parts of Central Europe, its underside being hardly different. ab.

marphisa.

marphisa Hbst. flies as a rarity among normal specimens in Northern Europe; upperside so extended black that

intermedia.

only isolated spots of the yellowish brown ground-colour are left. In ab. **intermedia** Spangb. the upperside is similar, only the outer margin bearing yellowish brown spots; the hindwing beneath has only one large silver-spot besides the triangular marginal markings; likewise from North Europe, rather rare among typical

thalia.

specimens. In ab. **thalia** Esp. (= *pales* Brgstr.), from Esthonia, the upperside is entirely black. ab. **gerda**

gerda.

Schultz is partially melanotic, the spots of the submarginal row radiating towards the margin. ab. **fulva**,

fulva.

described by GILLMER from North Germany, is completely brown above, with violet sheen beneath. — **perryi**

perryi.

Btlr. (67g) is a but slightly modified form of *selene* from Corea; the figure taken from the type in the British Museum proves clearly that this form has nothing to do with *iphigenia*. Differs from nymotypical *selene* only in the brown spots of the underside being more strongly developed: the apex of the forewing is almost entirely occupied by a cinnamon patch and the two cinnamon spots in the distal area of the hind-

hela.

wing are so enlarged that they are united. — **hela** Stgr. (67g) is a very small form with dark upperside from the high North, the beautiful silvery colour of the marginal and median spots being replaced by dull yellow with an oily gloss; the clouds between the median band and the distal margin, which are of a beautiful cinnamon colour

dilutior.

in nymotypical *selene*, are dark sepia-brown in *hela*. Lapponia, Finmark, and northern Siberia. — **dilutior** Fixs. (67g) is paler than the European form; on the hindwing beneath the silver-spots are larger and between the median band and the marginal spots there is a much broader halfband than in nymotypical *selene*, consisting of 3 silver-spots and extending from the costa backwards. Amurland and Corea. This form is the only one on the Suifu, while it occurs in other districts of Amurland but singly among specimens resembling European ones.

Similar to these darkened forms is ab. **transversa** Tutt, in which a number of dark spots placed on the proximal side of the marginal area of the upperside are united to form a black transverse band. ab. **rinaldus** Hbst. is the name for a variety of northern specimens with melanotic upperside (*lycorias*, *plinthus* Ljch.), in which the silver-spots of the underside of the hindwing are arranged in radiating stripes; in Scandinavia and Finland, very rare. — Egg green, conical, with strong ribs. Larva with pale spines and white dots, the spines placed behind the head longer than the others: ground-colour black, with a lead-grey macular band on the back and reddish yellow spots between the spines; from July until May on violet, strawberry, and wortleberry. Pupa greyish brown, with black markings and small obtuse tubercles. The butterflies fly in May and, perhaps only part of this brood, again in August, everywhere in woods, on heaths, and in fields and meadows, the flight being graceful and floating. The species is distributed all over Central and North Europe and North Asia as far as Amurland, but has in the most northern districts and Amurland only one brood, which is on the wing in June and July.

A. oscarus Ev. (67g). This rather large species differs above but little from its nearest allies, but is distinguished beneath by the median band being very regular and the silvery gloss entirely absent. The median band is wax-yellow throughout, and the marginal spots, which also are silvery in allied species, are white with a feeble silky gloss. In eastern North Asia, from the Altai and Sajon to the Amur. — **australis** Graes. (= *oscarus australis*, major Graes. i. l., maxima Fixs.) (67h) is the large southern form from the Ussuri and Corea; the upperside is of a pure and brighter colour, the black markings being more prominent. The spots of the forewing beneath are also more intense, while the colours of the hindwing beneath contrast somewhat less, the markings being less sharply defined than in *oscarus*. — The species flies in swampy meadows and in places with brooks, being plentiful in some localities, in May and June.

A. iphigenia Graes. (= *iphigenia* Elw.) (67h). Distinguished by the forewing being elongate, the colour of the upperside purer and by the hindwing beneath being only a mixture of yellow and reddish yellow, without a trace of violet; the ground-colour in the costal area of the underside of the hindwing is as yellow as the median band, the latter bearing a single silver-spot and being externally merely separated from the disc by dark lines and not contrasting in colour with it. The apex of the forewing beneath broadly pale yellow. — Found near Nicolajevsk, the middle of June.

A. angarensis Ersch. (67h). About the same size as the previous; the forewing less elongate. The underside of the hindwing bears a very close resemblance to that of *A. selenis sibirica*, but the costal spot of the median band is essentially different in shape, as shown in the figure. Moreover, *angarensis* has a row of silvery marginal spots, which are absent in *sibirica* or only indicated. The ♀ larger and paler. — In Amurland, in June, locally very common.

A. euphrosyne L. (= *niobe* Müll.) (67h). Very similar to the preceding species, especially *selene*, but brighter red and the black markings thinner in typical specimens. Easily recognized by the hindwing beneath, which is bright brick-red at the base, not brown as in *selene*, the median band bearing only one silver-spot (across the apex of the cell) and the incomplete silvery band in the distal area being replaced by some yellow smears without any silvery gloss. The silvery marginal spots of the hindwing beneath are but very rarely absent, namely in ab. **obsoleta** Tutt. Moreover, *euphrosyne* is usually a little larger, the seriated dots in the distal area of the hindwing beneath, which are blind in *selene*, bear pale centres. The species, however, varies somewhat even within the same country. It is very widely distributed, occurring, besides Spain and the islands in the Mediterranean, nearly throughout Europe to the high North and throughout Central and Northern Asia to the Pacific Ocean; it is not found in Japan, but local forms occur in North America. — **finjal** Hbst. (67h) is the smaller northern form, which is darker above and beneath, from Scandinavia, North Russia and North Siberia, **nephele** H.-Sch. from Esthonia being a transition towards it and **obscurior** Stgr. i. l. (67h) from Kuusamo in Finland its extreme development. — On the other hand, **apennina** Stgr., the southern form from Italy, is above more fiery reddish yellow, the black markings being thinner and more sharply defined and occasionally reduced, = ab. **pauca** Tutt. — A number of forms intermediate between these extremes have received names: **answina** Fruhst. are small Scandinavian specimens which are similar to *finjal* with the ground-colour paler and the black dots large. Fruhstorfer even believes to perceive subspecific differences in the specimens from the North-German plains (Berlin), the Alps, the Jura, etc., the first being indeed larger and lighter than individuals from South Germany and the Tyrol. — Towards the east of its enormous area of distribution *euphrosyne* varies as follows: **anka** Fruhst., from the Caucasus, is smaller than the Central European specimens, with thinner and more delicate black markings above, the silver-spots of the median band as well as the black submarginal dots of the hindwing beneath smaller. — A form from Sajon (Siberia) bears on the hindwing beneath, between the distal margin and the median band, dark brown clouds, which render the outer half of the hindwing similar to that of

umbra. selene (from which it is separated by having only *one* silver-spot in the median band). I call this form **umbra orphanus**. *form. nov.* (67h). — **orphanus** *Fruhst.*, from East Siberia and Amurland, is paler than Central European specimens above and beneath, the spots of the upperside being large and united to bands; beneath more uniform, with larger silver-spots on the hindwing, especially at the margin. — **kamtschadalis** *Stgr. i. l.* (67h) is the most eastern form; the underside much brighter and bearing slight brownish clouds in the outer area (transition to *umbra*). — Egg conical, ribbed, green, later brown. Larva stout, black, with bluish macular stripes on the back and at the sides, the spines being yellowish with black hairs or all black; head indented, cordiform, black; until April on Violaceae, leaves its hiding place in day-time in order to bask in the sun. Pupa greyish brown, yellowish dorsally, with black markings and metallic dots. The butterflies appear in warm years already in April and are on the wing until July (in the high mountains into August), in but one brood, being found on broad sunny roads in the woods and at the edges of woods. The butterfly resembles *selene* on the wing, but is easily recognized by the brighter red upperside. Appears to be abundant wherever it occurs.

A. pales. Varying above from fiery red-yellow to nearly black, the markings also being very variable, all intergradations occurring between specimens with only vestiges of black and such with the black markings so heavy and confluent that the ground-colour is suppressed. Recognized by the characteristic underside of the hindwing, and especially by the shape of the hindwing, which has a nearly straight costal margin forming almost a right angle with the outer margin. The species is distributed all over Europe, Central and Northern Asia, being partly confined to the high mountains. In the Himalayas it is one of the few *Argynnis* which extend into Indian territory; it is absent from North Africa and Japan. — True **pales** *Schiff.* (67i) is characterized by a red-brown upperside, which bears moderately heavy black markings, and above all by the forewing beneath having hardly any black spots and the hindwing beneath being but sparsely marked with silver. The colour of the upperside is occasionally pale ochreous: ab. **isis** *Hbn.* (67i), or may be shaded with dark olivaceous greenish, which occurs only in the ♀: ab. **napaea** *Hbn.* (67i). Specimens with the upperside almost entirely black, bearing only vestiges of the reddish yellow ground-colour in the outer area, are ab. **thales** *Schultz.* In ab. **mediofasciata** *Schultz* the great development of black is confined to the median area. In ab. **killiasi** *Rühl* the markings of the forewing are absent apart from slight traces, but rather more strongly developed on the hindwing than usual, the base, disc and the veins being more extended black. — **graeca** *Stgr.* (68b), from the Veluchi Mts. in Greece, but which I also received from the Parnassus through Herr KRAEBER, is a rather large form, whose ♂ is very bright red; it differs in the very distinct ocelli in the outer half of the hindwing beneath and in the chequered fringes; somewhat resembling *arsilache* by the strong markings of the underside of the forewing. — Specimens from the mountains of the Balkan Peninsula, called **balcanica** by REBEL, form a transition to *graeca*. — **caucasica** *Stgr.* (= *arsilache* *H.-Sch.*) (68b) is smaller, the ♂ is likewise very bright brick-red above, but much paler beneath, and the dark markings of the ♀ are sometimes as if dusted with flour. — **sifanica** *Gr.-Grsh.*, from Amdo in Tibet, differs from *caucasica* only in being smaller, which character is of little weight, considering the great variability of *pales* in one and the same place. — **arsilache** *Esp.* (= *napaea* *Dup.*) (68a) is the form of the plains, recognizable by the distinctly black-spotted underside of the forewing, the spots being sometimes as prominent as above. Also the shape of the insect is different, the wings being broader and more rounded, and the specimens usually larger than alpine *pales*. In North-East Europe (Russia, North-East Germany), in swamps, and at the border of lakes of Western Switzerland (Wallis, Waadt) and Graubünden; also in Siberia. — **inducta** *Spangb.* is a darkened form of northern *arsilache*, corresponding to the *napaea*-form of *pales*. — As **lapponica** *Stgr.* specimens from western North Europe have been separated (Lapponia, Scandinavia, Belgium) which connect *pales* with *arsilache*; it is smaller than *arsilache*, the forewing beneath bears diffuse markings, which are hardly more washed out than in certain specimens from the high Alps and much less than in individuals from East-Prussia and Russia. — **generator** *Stgr.* (68a) has in the ♂ the upperside very bright reddish yellow with very small dot-like markings, which are sometimes obsolete in the median area, while the ♀ bears whitish lunules before the outer margin. Throughout Central Asia. — **korla** *Fruhst.* (68a) is a much larger form; the upperside, is as red as in the preceding, but has a violet gloss, the wings being broad and strongly rounded, and the markings of the hindwing beneath dull and obsolescent; from Korla. — **eupales** *Fruhst.* (68b) is characterized by the very brightly variegated underside, beautiful moss-green spots alternating with cinnamon smears, which are both much more dentate and indented than in nymotypical *pales*; the silvery gloss, however, is strongly reduced; in Tibet, at 9000 ft., rare. — **palina** *Fruhst.* (68b), from West China, is a rather small form, whose ♀ is strongly marked above and has but little silvery gloss beneath; the red-brown colour strongly enlarged in all the spots, bands and dots; Sze-chuen. — **darjana** *Stgr. i. l.* (68a) is still more fiery red than *generator*, the median area is entirely without markings and the black colour is reduced at the base of the forewing and the abdominal margin of the hindwing; from Syr-Darja. — Whereas the forms from Central Asia mentioned above belong to the *pales*-series, a form from Kentei which Herr BANG-HAAS has kindly sent me is an *arsilache*; its upperside is very strongly spotted with black, the forewing beneath bearing weak spots and the hindwing being very silvery. I name it **banghaasi** *form. nov.* (68a). — At the boundary of the Pale-

arctic Region, in the North-Western Himalayas, there occur several more forms of this widely distribute species, for instance *sipora* Moore (68b); forewing above and beneath as in *arsilache*, the black markings abundant and *sipora*. rather prominent; the spots in the middle of the forewing thinner and sparser in the ♂, the base on the contrary very black, so much so in the ♀ that on the hindwing only the outer marginal area is not black; from Kashmir. — *baralacha* Moore (68b) differs from *sipora* mainly in the sparse markings of both sides; the base of the wings *baralacha*. is hardly blackened in the ♂ and the hindwing beneath is almost unicolorous on account of the various colours being weak and diffuse; likewise in the North-Western Himalayas. There occur all intergradations between these two forms. — The larva paler or darker brown, with a dark dorsal line bordered by light spots, in front of the spines of each segment velvety black spots; the dorsal spines yellowish, the lateral ones whitish, between the latter yellowish tubercles; head black with yellowish brown eye-spots; prolegs reddish brown. From July until June on Violaceae. Pupa greyish brown, with blackish markings. The butterflies are not rare in most places where they occur, the alpine forms often appearing even in abundance. Fresh ♂♂ are very fiery red when on the wing, almost like *Melitaea didyma* ♂♂. They rush close along the ground in a straight and very fast flight rapidly moving the wings up and down, and love to bask with wide-spread wings on warm stones. They visit flowers of all kinds, especially Composites and Calamint. The habits of the *arsilache* of the northern moors and of the small high-alpine *pales* differ in several points.

A. chariclea Schneid. (68c). Shape of wings somewhat less irregular than in *pales*, the apex of the hind- *chariclea*. wing less distinctly angulate. Markings more distinct above, ground-colour not so fiery red, in the ♀ often darkened by black dusting. The hindwing beneath is characteristic, bearing instead of a median band 3 irregular light yellow spots on a bright cinnamon-red ground variegated with whitish yellow; marginal spots white with a greasy gloss and not distinctly silvery. In the high North, Scandinavia, Lapponia, North Russia, in July and August, usually not plentiful. — The arctic form *arctica* Zett., from Greenland and northernmost Siberia *arctica*. (Nova Sembla) extends perhaps farthest north of all the butterflies; differs from the nymotypical form in the darkened upperside. — The species is circumpolar, and aberrations have been found in the Old World (ab. *kolaensis*) as well as the New (ab. *obscurata*, *boisduvali*); these latter will be dealt with in Vol. V of this work. Nothing is known of the early stages. The butterfly is on the wing in July and August, flying only at noon, with preference at the foot of rocks which are especially well warmed by the sun; it becomes at once lethargic when struck by the cold wind.

A. freija Thnbg. (= *lapponica* Esp., *tullia* O., *freya* Godt.) (68c). Upperside almost exactly as in *dia*, *freija*. the size also being the same. The hindwing beneath resembles that of *chariclea*, but is more variegated, with a distinct silvery white band between the central and marginal areas; a large rhomboidal silver-spot in the centre of the costa and rather long silver-spots at the margin. From Esthonia and Livonia northward, in northern Scandinavia, Russia and Siberia, in Amurland and Dauria, also in arctic America. ab. *obscura* Schoy. *obscura*. is dusted with dark, while ab. *pallida* Elw. (68c), which is the prevalent form in certain localities in Asia, is *pallida*. paler above and especially on the underside. — The distribution of this species is very remarkable: while it is absolutely confined to the arctic zone in Europe, extending hardly below 60°, its boundary is more southward in Eastern Asia, somewhere between 50° and 60°, the insect going in North America even as far south as the 40° (Colorado). The larva — if correctly identified — is stout, greyish violet, with yellowish green spines bearing black hairs, the head and spiracles black, the prolegs reddish brown (SANDBERG). The butterfly occurs in May and early June on peat-moors and swampy meadows, in Eastern Asia in damp larch-woods; rather plentiful in some places.

A. polaris Bsd. (71e). Similar to the preceding species, but more variable, the hindwing beneath more *polaris*. variegated, the black median band of the forewing above heavy, deep black, deeply sinuous proximally. In the marginal area regular rows of submarginal spots. The forewing beneath almost as distinctly marked with black as above, but paler. On the hindwing beneath the ground is marked with mother-of-pearl in the basal area and the narrow band which separates the central from the marginal area bears silvery teeth. — In Norway, Finland, Lapponia, in July and August.

A. frigga Thnbg. (68e). Above pale reddish yellow, the black markings in the central and marginal *frigga*. areas very straight, being parallel with the distal margin. The under surface is very characteristic on account of the broad cinnamon margin of the forewing and the but little variegated hindwing, only the paler distal margin of the latter somewhat contrasting with the cinnamon basal area. The median band, like the ground dusted with cinnamon, is but slightly prominent, only an irregularly rhomboidal pale spot before the middle

improba. of the costa being conspicuous. North Europe and North Asia as far as Dauria and Amurland. — *improba* Btlr., one of the Lepidoptera which go farthest north, from Nova Sembla, is smaller and above darker; on the hindwing beneath the median band is somewhat less bright yellow and the rhomb before the middle of the costa is vivid bluish white. — *alpestris* Elw. (68e) has the forewing pale yellow, in part almost whitish, and the hindwing beneath uniformly cinnamon, only the costal rhomb and a light tooth above the apex of the cell being conspicuous. From the highest parts of the Altai. — *annae* *Suschkin*, from eastern Tarbagatai, is rather large, with a very dark upperside. The black markings of the forewing are broad and diffuse, all the veins being broadly bordered with black. Hindwing black from the base beyond the cell, the light median band vestigial, the marginal area pale yellowish red. — In the (occidental) ab. *tapio* *Sahlb.* the basal area of both wings is coal-black above, and the underside is much variegated on account of the whole apical third of the forewing and the basal and median bands of the hindwing being pale whitish yellow and contrasting with the reddish and brownish yellow ground. Finland. ab. *ahti* *Sahlb.* has only the basal half of the hindwing above black; the basal half of the hindwing beneath is entirely whitish yellow and contrasts vividly with the red-brown outer half. From Finland. — Egg wax-yellow, conical, flattened above. Larva greyish brown, pale-spotted at the sides, with light brown spines. Feeds on *Rubus* in captivity. In July in Sphagnum-swamps, mostly not plentiful.

dia. **A. dia** L. (68f) is the smallest *Argynnis*. Above usually more extended black than the other species; the basal area of the hindwing as a rule quite dark, the marginal area with a row of heavy black dots. The hindwing beneath variegated with purple and bearing silvery spots at the margin, in the median band and at the base. Throughout Central, North and East Europe, also in Anterior Asia eastwards to Mongolia. Specimen with a broad confluent median band are ab. *vittata* *Spul.* (= *mediofasciata* *Schultz*). In ab. *hudaki* *Aign.*, especially plentiful among the 2. brood, only the narrow median band of the hindwing is reddish yellow, the margin as well as the base being broadly black. — *alpina* *Elw.* (68f) is the form from eastern Central Asia, described from the Altai; the ground-colour is duller, more leather-colour than reddish yellow. — Larva paler or darker grey, with a pale-edged blackish dorsal line and a reddish brown side-line; subdorsally there are small light spots in a blackish patch; the spines pale yellow with dark yellow base; in June and from September till April on *Violaceae* and *Rubus*, said to feed also on *Prunella vulgaris*. Pupa brown; on the back with rows of small pointed tubercles. The butterfly in April and May and again from August onward in open places and clearings of woods, flying low and frequently visiting flowers. One finds the sleeping butterfly commonly hanging on flowering heather at night, the underside being admirably adapted to its small flowers. The species does not appear to be rare wherever it occurs, nor ever to be found in such large numbers, as for instance the following species.

amathusia. **A. amathusia** *Esp.* (= *diana* *Hbn.*, *titania* *Esp.*, *dia major* *Esp.*) (68e). Above similar to large specimens of *A. euphrosyne*. The hindwing beneath very characteristic, being strongly variegated with purple, its distal band deeply dentate on both sides and bearing purple-brown partly pale-centred dots. In the nymotypical form the forewing beneath also shews at the distal margin pointed teeth which project far on to the disc. In ab. *nigrata* *Schultz* the whole proximal area of the wings from the base far on to the disc is black, in ab. *radiifera* *Schultz* the black markings are united to rays and in ab. *nigrofasciata* *Favre* to a band. Specimens with the wings abnormally bleached by atmospherical influences have also been observed (ab. *blandina* *Fruhst.*). In the Alps. — *bivina* *Fruhst.* is the eastern European form; smaller, paler, with somewhat thinner black markings; darker beneath, the median band of the hindwing more uniformly yellow, not being variegated with red; from Saratow. — In *sibirica* *Stgr.* (68f) the band occupying the distal area much less deeply and more evenly indented on both sides; from the mountains of South-West Siberia, the Kentei, a. o. — *altaica* *form. nov.* (68f) has the black markings of the forewing beneath so much reduced that not even the marginal arcs and spots are all developed. The rhomboidal costal spot of the median band of the hindwing beneath is much broader, not so elongate as in nymotypical *amathusia*, and the median band itself less interrupted; from the Altai. — The larva greyish brown, with a black head; a dorsal and a lateral stripe are composed of black elongate spots and dots, the spines dark yellow, the prothoracic ones being the longest and palest. On *Violaceae* and *Polygonum bistorta*, from August until May. Pupa brownish, anteriorly marked with blackish, posteriorly bearing small black tubercles. The butterflies in July and August, not rare in most localities, occurring everywhere on alpine pastures at high altitudes, sometimes in large numbers, and here usually flying in company of *A. euphrosyne*, from which *amathusia* is hardly distinguishable on the wing. It can be separated from the latter by the black markings being somewhat more regular than in *euphrosyne*. The ♂♂ have a rather fast flight, the ♀♀ being considerably more clumsy.

gong. **A. gong** *Oberth.* (68d). This splendid butterfly is above at once recognized by the intensely black markings on a fiery yellowish red ground. Base and hindmargin of forewing and the basal two-thirds of the hindwing are thickly dusted with black, the distal margin and the fringes being chequered. The hindwing beneath is

marked with brick-red on a yellow ground. Long red rays filled in with silver extend from the edge of both wings far on to the disc, other silvery spots being situated in the median band and at the base. The aberrations described of this species are of a similar kind as those known of the other *Argynnis* belonging to the *Brenthis*-group. LEECH mentions specimens in which the black markings form a median band; there also occur dark-margined specimens and others with pale discal spots; these aberrations have not received names. The species has a very wide distribution, flying throughout West China, in the mountainous districts of Sze-chuen, at Moupin, Ta-tsien-lu, and the neighboring districts of Tibet. — **charis** Oberth. (68d) flies in Yunnan, *i. e.* outside the Palaearctic Region; we describe it here only, because the other forms of *gong* are exclusively Palaearctic. The ground and the dusting of the hindwing beneath are darker, the dusting being sometimes russet- or cinnamon-brown; the silver is much increased, especially the marginal rays, which are linear streaks in *gong*, are enlarged to triangles with broad bases. — **evan** Gr.-Grsh. (68d), from the Dehatar and Sinin Mts., but probably occurring throughout the highlands of Tibet, is at once recognized by the absence of the black dusting at the base of the wings; moreover, it is smaller, more fiery reddish yellow, and has hardly any spots at the distal margin of the forewing. — The species appears to be confined to the mountains, occurring up to considerable altitudes and being extremely abundant where it is found, at least at the upper Yang-tse-kiang, whence LEECH received hundreds of specimens.

A. jerdoni Lang (68d). Above resembling *gong* in the forewing being dusted with black at the basal and along the hindmargin; the hindwing as in nymotypical *gong* also black from the base to the orange-red distal band. However, this insect comes much nearer *euphrosyne* in the markings of the underside, especially of the hindwing, except that the median band does not bear *one* silver-spot as in *euphrosyne*, but *three* as in *selene*. The species is at once recognizable by the black submarginal spots having silvery centres and thus forming an even row of ocelli on both wings. Kashmir. — **chitralensis** Moore is a smaller western race; the hindwing beneath is more strongly red and has smaller silver-spots. From Chitral, probably also in Afghanistan. — The species is as yet but little known.

A. gemmata Btlr. (68d, e). This species, which occurs in Palaearctic Tibet as well as Sikkim, is at once recognized by the apex of the forewing being pointed as in *pales* and by the silvery markings of the hindwing beneath being very abundant, recalling *lathonia*. These markings have given the insect its name. The ♂ is of a beautiful dark orange above, with abundant black markings, the ♀ being duller, with a white line before the black distal margin. It is worthy of note that the triangular marginal silver-spots are broad at the margin and that the silver-spot placed across the apex of the cell is ∞ -shaped. In the Tibetan and Sikkimese valleys of the northern slopes of the Himalaya, not rare. — **altissima** Elw. is a very small form with the same underside as *gemma*. From the highest localities of the Himalaya, where there is vegetation. Paler above, the marginal lunules and the fringe-spots whitish. It hardly occurs on Palaearctic territory. — On the other hand, **mackinnoni** Nicév. extends into the Palaearctic Region in the North-Western Himalayas. It differs from *altissima* in the whitish colour of the spots of the forewing above and the stronger cinnamon-red dusting in the basal area of the hindwing beneath. From the Gonass Pass, at 15000 ft. — The last two mountain forms are so different from *gemma* that many authors consider them forms of a separate species.

A. eugenia Ev. (= *vega* Christ.) (68e) is similar to the preceding; above with the general characteristics of the other smaller species of *Argynnis*; beneath like *gemma* with abundant silver markings on the hindwing and in the apical area of the forewing, but the spots more rounded, the spot across the cell more tooth-like, the marginal spots not triangular but circular or ovate and a little removed from the edge. The ground-colour of the ♀ is more greenish grey than reddish yellow. From South Siberia (Sajan, Irkutsk), Tibet (Hokow) and West China. — **genia** Fruhst. (68e) has the hindwing beneath paler, the silvery median spot across the cell is more produced distad, somewhat resembling in shape the same spot of *gemma*. The base of both wings above is much darker (brownish green in the ♀) and the black markings are stronger. From West China. — **rhea** Gr.-Grsh. has the same long silver-spot as *genia*, but is brighter yellow above, the base of the wings being less dusted with black. Amdo. — **montana** Bang-H., from the central Altai, is paler and its markings are thinner. The ♀ especially is lighter, and the black marginal band of the upperside is less prominent. Beneath the shorter silver-spot at once distinguished it from *genia*. — Little is known of the habits of this species.

A. astarte Dbl. While the nymotypical subspecies, described from Alberta, Canada, occurs exclusively in boreal America and will be dealt with in Vol. V of this work, several *Argynnis* are found in the Palaearctic Region which can be united with *astarte* in one species, although some authors treat them as different species. In size they agree with true *Argynnis*, being hardly inferior to *niobe*, for example. In pattern, however, they bear a resemblance to *thore* and *hecate* of the *Brenthis*-group. — **amphilochus** Mén. The black markings of the upperside are united to form a net-work, with the exception of the heavy black submarginal dots. The

underside, as in *thore*, is without any silver, the pale yellow basal spots, median band and very long hastate marginal spots are separated by more or less brown interspaces. In these marginal spots, which are yellow or brownish distally, the black dots of the upperside are distinctly marked. This form from the Amur should really receive a new name, as *amphilochus* was based by Ménétries on an abnormally black specimen. — Still paler than this Amur-form are the specimens from the Kentei Mts., which STAUDINGER has separated as *elatus* (68d) on account of their colour and larger size. — *erda* Christ. is above more orange-red, *amphilochus* being brown-red; beneath the interspaces are more cinnamon-red or dark chestnut-brown, while they are dull brick-red in *amphilochus*. North-East Siberia (district of the Vilui R.). — The larva of *amphilochus*, which hibernates very young, feeds on a species of *Saxifraga*; the later stages are not known. The butterflies occur at precipices and on stony slopes and do not appear to be abundant. They visit with preference the flowers of *Leontodon taraxacum* (GRAESER).

thore. **A. thore** Hbn. (68e). The nymotypical form of this species is easily recognized by the prevalence of black on the upperside. This colour predominates to such a degree as in other species is only the case in melanistic aberrations. Also the ground-colour of the underside is duller than in all the other *Argynnis*, the hindwing varying from dark brick-red to cinnamon-brown, only the median band being dark yellow. In the Alps, but at moderate heights in the forest region, not above 6000 ft. Also in the high North, Scandinavia and Finland. Northern specimens on the whole paler than alpine ones. — The species is represented in the Pyrenees by **hyperlampra** Fruhst. (68e). Smaller and paler, the black markings of the upperside more interrupted, all the spots of the forewing being isolated; the underside more unicolorous, paler. — In **borealis** Stgr. (68e) the ground-colour is essentially paler, more leather-yellow, but much reduced by the confluent black markings, which are especially heavy in the median area; from East Siberia. — **hypercala** Fruhst., from the Altai, differs from *borealis* in the lesser size and the paler yellow colour of the upperside, the black markings usually being sparser. — **excellens** Krulik., on the other hand, is a larger form with bright reddish yellow ground-colour and very prominent black markings; from East Russia. — **hyperusia** Fruhst. has the black markings isolated like *hyperlampra*, but the ground-colour is light ochreous; the submarginal spots of the hindwing are exceptionally large. Only the median spots of the hindwing are confluent; from the Amur. — Egg conical, flattened above, ribbed, pale greenish yellow. The young larva pale yellowish with black head; adult black, inclusive of head and legs, with longitudinal brownish yellow or flesh-colour stripes and grey spines. The half grown larva black with orange-red spots (CHAPMANN); autumn until May, can be reared on violets. The butterflies occur from June until August in damp meadows in the valleys and the woods on mountains; they show a preference for the flowers of *Geranium aconitifolium* and like to rest on low bushes of *Juniper*. They are not rare where they occur, but do not appear in such numbers as *euphrosyne* and *amathusia*.

hecate. **A. hecate** W. V. (68f). Darker red-brown than most of the preceding species, above similar to *niobe*, the wings more rounded, the spots thin but sharply defined, all separated from each other, only the median dentate line of the hindwing continuous. The underside is very characteristic; it has no silver and is alternately light yellow and cinnamon-red; the light yellow median band is somewhat shifted basad and is less curved than in *euphrosyne*, *thore*, *amphilochus*, etc. In Central and South Europe, France, Northern Italy, especially Austria-Hungary, Russia and Asia Minor. — **caucasica** Stgr. (68f) is a rather large form, which is more yellowish brown above and very light yellow on the hindwing beneath, the cinnamon-brown being much reduced; from the shores of the Black Sea, especially Armenia. — **alaica** Stgr. (68g), from the Pamir and the Ala-Dagh, is rather strongly edged with black above, while the black markings are much reduced on the rest of the surface, especially in the outer third of the forewing. — **aigina** Fruhst., from Andalusia, is paler on both sides, the basal half of the hindwing above lighter and the hindwing beneath more uniformly yellow, the russet-red being entirely absent or only vestigial as some smears. — Of individual aberrations ab. **priscilla** Schultz is characterized by a broad black median band and ab. **avernensis** Guill. by the darkened upperside having a bluish sheen. — The larva is not yet described; it is said to be found on *Doryenium suffruticosum* from September until May. The butterflies occur from the end of May till July on mountain meadows and clearings in woods, being very local.

ino. **A. ino** Rott. (= *dietyinna* Schiff. nec Esp.) (68g). Above somewhat resembling *hecate*, usually rather brighter red-brown and more coarsely spotted. The median band of the hindwing beneath is strongly shifted basad as in *hecate* and is straighter than in all the above-mentioned species, commencing at a considerable distance proximally to the centre of the costa and ending not far above the anal angle. The band as well as the basal area bordered by it are light yellow; on the outer area, however, there are cinnamon-brown clouds, part of the submarginal row of ocelli being shaded with this colour. Central and South Europe (not occurring in Great Britain), going further north in the East. — **clara** Stgr. (= *achasis* Fruhst.) (68h), from the Kentei

Mts., is larger and paler, especially beneath, the cinnamon clouds in the distal area of the hindwing being replaced by vestiges of ochreous shadows. — **sibirica** *Stgr. i. l.* (68h) is as large as the preceding. Very strongly marked with black, especially beneath, the yellow median band on the hindwing beneath being very prominent in consequence of its sharp black borders; the basal area, moreover, is clouded with brown and the median band has a greenish tint as in the next form; Sajon Mts. — **amurensis** *Stgr.* (68h), from Amurland and Corea, is the largest form, somewhat resembling *daphne* in size, shape and colour. The upperside is heavily marked with black; the underside bears dense violet-brown clouds outside the greenish yellow median band. — **tigroides** *Fruhst.* (68h) is considerably smaller than *amurensis*, the wings are more rounded, and the heavy black spots on the fiery yellowish red upperside are rounded. Japan. — **borealis** *Stgr. i. l.* (68g) is a small form, smaller than European specimens, the pure yellow median band of the hindwing beneath contrasts vividly with the basal area and the clouds in the distal area, which are deep cinnamon-brown; from the Witim R. in Siberia. — **siopelus** *Fruhst.* (= *herzi Stgr. i. l.*) (68g) is the form from Kamtschatka; not larger than the previous, the black markings above less sharply defined and the base of both wings somewhat blackish; the underside very pale, the markings obsolescent, the whole outer half of the hindwing almost uniformly pale ochreous. — **paidicus** *Fruhst.* (68g), from the Altai, is hardly larger; the upperside marked as in nymotypical *ino*, but the ground-colour much lighter yellowish red. Also the underside paler than in European specimens, but the black submarginal dots of the hindwing especially prominent. ♀-f. **discolus** *Fruhst.* (68h), from the Altai, but perhaps of wider distribution, has the upperside darkened, especially the basal area. — **acrita** *Fruhst.* is a transition from *discolus* to *amurensis*; similar to European *ino* in colour and size, but the black distal border broader and the dots larger; the hindwing beneath more uniform in colour, with the brownish violet clouds reduced. Siberia. — Larva of a whitish or yellowish grey; a pale-edged brown dorsal line, a whitish yellow lateral line with a brown one above it, head brown, with two black spots, spines yellowish with black bristles; from the autumn until May on *Sanguisorba*, *Spiraea* and *Rubus chamaemorus*. Pupa yellowish brown, with darker marmoration, on the back yellow points. The butterfly in June and July on moors and swampy meadows of the low lands and the valleys in the mountains, visiting with preference thistle-heads and the flowers of brambles. The species is very sporadic and in many districts one of the rarer *Argynnis*.

A. daphne *Schiff.* (= *chloris Esp.*) (69a). Mostly larger and lighter yellowish red than *ino* from the same locality. The markings of the upperside very sharply defined and deep black; otherwise similar to *ino*, especially beneath, but the whole outer area of the hindwing from the median band is more strongly and evenly clouded with violet, even the spot of the median band situated at the apex of the cell being shaded with violet. In South and Central Europe, northward to Lüneburg and Central Russia, and from Spain to Asia Minor and Armenia. In ab. **daphnoides** *Schultz* the whole upperside dusted with russet, but the markings are nevertheless distinctly visible. In ab. **gritta** *Schultz* the violet in the outer half of the hindwing beneath is replaced with red. In ab. **conjuncta** *Tutt* the seriated spots of the upperside are partly merged together in bands, which again are connected with one another in places. In ab. **asopis** *Schultz* the black markings of the upperside are concentrated into a median band, the ocelli of the hindwing beneath being reduced, while in the very similar ab. **weidi** *Gillm.* also the base is dusted with dark above. — Towards east we meet with the first local race in the South Russian steppes: **epidaphne** *Fruhst.* (69a). It is but little larger than German and Austrian specimens, but the ground-colour above is darker ochreous and the black markings are reduced. — **ochroleuca** *Fruhst.* (69a) is a large form from North China and Amurland. It stands in the same relation to European *daphne* as *amurensis* to nymotypical *ino*; it is however of a beautiful orange-yellow, being otherwise similar to the next form. — **rabdia** *Btlr.* is the Japanese form, which is the largest of all; above lighter, with less strong markings. — **fumida** *Btlr.* differs (individually?) in the duller ground-colour and larger black dots; Corea. — Larva blackish brown, with yellowish brown head, a yellow dorsal double line and yellow lateral line; the spines yellow with black tips; until May on violets and raspberry. Pupa yellowish grey with small golden yellow or golden red warts on the back. The butterfly in June and July in meadows and valleys of the mountains, and especially often found on the flowers of brambles. The species is widely distributed, but does by no means occur everywhere, and is plentiful only in certain localities. The flight-places are generally not very extensive and are sparsely scattered over the area of distribution.

A. lathonia *L.* (= *latonia Godt.*) (69a). The small fritillary is brighter red than the preceding, the markings of the upperside being very regularly arranged. The disc of the forewing beneath yellowish red, with large rounded black spots, the hindwing and the apex of the forewing bearing large silver-spots, the marginal ones being contiguous; between these silver-spots there are russet-brown clouds, in which stand small ocelli with silver-pupils. This species has more silver than any other, and therefore cannot be mistaken. One of the most widely distributed species, occurring from the Canaries to beyond the Tibetan eastern boundary of the

Region and to North India, and from North Europe to the oases of the Sahara, being absent however from the Pacific districts (Amurland, Eastern China and Japan). In some individuals the black spots of the upperside are united to form stripes and horseshoe-figures, which happens especially in the autumn brood. Sometimes the whole upperside is blackened, the wings being marked with brownish only along the veins; this is ab. *obscurascens* Schultz. ab. *valdensis* Esp. (= *lathonia* Hbn.) not only is uniformly black above, but the silver of the underside is so extended that the hindwing and the apex of the forewing are entirely silvery, except at the veins. In ab. *paradoxa* Fuchs the silver is extended, but the upperside is not black, the hindwing above bearing irregular silver-spots. — *lathonia* does not vary much geographically. I found at Zermatt, in Wallis, at 1600 m, remarkably large specimens with the silver-spots about twice the ordinary size. — Specimens from the Taurus, *saturata* Rüb., are a transition to the Himalayan form; they are distinguished by a reddish brown darkening between the silver-spots of the underside on the fore- and hindwing; the upperside is paler yellow. *isaea*. — The Himalayan form, *isaea* Gray (69a), is considerably paler above, especially at the margin. On the underside the disc of the forewing is a much duller colour, the silver-spots are larger, the anal one especially is prolonged, extending often (not always) as a halfband to near the apex of the cell. Throughout the Himalayas, in Kashmir, Tibet as far as West China, southward reaching India (Sikkim). — Egg conical, flattened above, white, with flexuose ribs. Larva dark grey, with red spines and black head: a well-defined dorsal line white, the membrane between the segments and a lateral line brownish yellow; on violets, presumably also on other plants, from June until April. Pupa golden brown, with a white belt, yellow dorsal line, white tips to the wing-cases and small golden dorsal tubercles. Several broods, which are not sharply separated, the butterfly is on the wing from April till the end of October and appears to hibernate with us, as one finds very faded and worn specimens as early as April and quite fresh ones late in October. According to exact observations also the larva hibernates and sometimes the pupa. The butterflies have a fast swimming flight; they fly up and down sunny roads and love to settle with spread wings on the ground. They frequently visit *Leontodon* and also thistles and scabious, and are everywhere common, but never occur in very large numbers. The ab. *valdensis* has been found in many localities, always as a rare exception.

clara. **A. clara** Blanch. The pattern of the upperside recalls small specimens of *A. aglaja*; at once recognized by the underside, the base and middle of the hindwing bearing long, streak-like, silver-spots on a greenish ground. Before the margin a row of triangular silver-spots. The disc of the forewing beneath of a greenish or greyish yellow tint; from Kashmir. — *clarina* Stgr. (69a) has the black markings of the upperside reduced and is not strongly dusted with dark scaling, the silver-spots of the underside being reduced and partly obsolete; from *manis*. Amdo. — *manis* Fruhst. (= *claudia* Fawc.) (69a) is the eastern form, from Tibet and the adjacent districts of the Indian Himalayas (Sikkim), in which especially the ♀ is much dusted with black above; the verdigris dusting of the underside is more conspicuous than in the other forms. — *clara* appears to be restricted to the range of the Himalaya, where it is widely distributed and is apparently not rare in summer.

elisa. **A. elisa** Godt. (= *cyrene* Bon., *eliza* Lang) (69b). The same size as *clara*, but distinctly a transition to *aglaja*. Rather variable, above fiery brown-red to light orange-yellow, the black markings rather small and at the distal margin almost obsolete. The hindwing beneath entirely dusted over with green, sometimes a small patch before the distal margin excepted; the silver-spots numerous but small, angular, sometimes reduced to heavy dots or comma-spots, the central ones having usually a dark edge. — The species is restricted to the mountains of Corsica and Sardinia, where it is locally abundant in June and July, for instance on the Monte Gennargentu near Lanusei.

aglaja. **A. aglaja** L. (69b). The large fritillary is fiery reddish yellow above, the basal area of the ♀ being always duller. The markings are constant: a black margin, a row of deep black but thin marginal arcs, a very straight, central row of dots, of which only the last one of the forewing is shifted distad; between this row of dots and the base there are six thin black transverse bands extending from the subcostal vein into the wing. The underside of the hindwing is characteristic; it bears numerous silver-spots on a partly verdigris partly leather-yellow ground, but never a row of ocelli in the marginal area, as is the case in the forms of *niobe* and *adippe*. *A. aglaja* occurs throughout Europe, with the exception of the Canaries (which belong to Africa geographically), also throughout North and East Asia, in a number of different forms. — Already in Turkey, but especially *ottomana*. in Asia Minor, there occurs a special form, *ottomana* Rüb. (69b); larger, the upperside deep red-brown, with the base greenish, not blackish. On the underside the silver-spots are entirely absent from the apex of the forewing and reduced in size on the hindwing. The yellow distal band on the hindwing beneath is reduced

in consequence of the verdigris dusting being extended distad. — **fortuna** Jans. (69c) is still larger, the ♂ *fortuna*. being pale yellowish brown above and the ♀ less dusted with black. The silver-spots of the hindwing beneath are large and partly dark-edged. Eastern Asia. — In **myonia** Fruhst. (69b), from Japan, the upperside is *myonia*. more brown- than leather-yellow, recalling *ottomana*, but with a much broader marginal band and increased black markings; on the underside the ground-colour of the hindwing is dusted with brownish green instead of verdigris, this shading being so dense that even the leather-yellow distal band is concealed except for some traces. — **bessa** Fruhst. (69b) has a very yellow ground-colour and beneath very large silver-spots (especial- *bessa*. ly at the distal margin of the hindwing) on a ground shaded with olive, the black markings on the forewing beneath and on the upperside being very large; West China. — **vitatha** Moore (69c), which several authors *vitatha*. consider a distinct species without sufficient reason, extends farthest towards the south, occurring in typical specimens in Kashmir and North-West India. Considerably smaller than nymotypical *aglaja*, paler, especially on the disc of the forewing beneath, where the black markings, moreover, are reduced; the verdigris sealing of the hindwing beneath often interrupted by the leather-yellow ground-colour and sharply separated from the pale yellow distal area. — The number of named aberrations is proportionate to the abundance and enormous distribution of this species. Black forms may show different degrees of melanism. ab. **avernensis** Brams. *arvernensis*. has blacker markings above and the silver-spots of the underside form three smears, while in ab. **emilia** *emilia*. Quens. (= *aemilia* Lamp.) only the upperside is darkened, but so much that it appears almost completely black. In ab. **suffusa** Tutt the upperside is darkened throughout, as in *paphia* ab. *valesina*. In other cases *suffusa*. the basal black area only is extended and the black spots are so arranged as to form bands, streaks and variously shaped markings, and may also bear a blue sheen (particularly in blackened ♀♀), etc. As the species is so common, such aberrations are not rarely met with, almost every larger collection containing such specimens; many have been figured and some have even received names (ab. *obscura*, etc.); some might perhaps be produced artificially. The increase of black on the upperside is, as in other *Argynnis*, often accompanied by an increase in the number or size and the confluence of the silver-spots of the underside, as for instance in ab. **wimani** Holmgr. In ab. **charlotta** Haw. (= *carolotta* Germ.) the silver-spots are very much *wimani*. enlarged and merged together. The silver-spots are also enlarged in ab. **eridioides** Pflüger, but not united. *charlotta*. — The upperside is nearly always slightly blackish in the high-northern specimens, but only in the basal area, *eridioides*. while the outer half on the contrary is paler than in true *aglaja*; this is **borealis** Strand, in which the silver- *borealis*. spots are reduced in size in contrast to the before-mentioned aberrations. In ab. **aberrans** Lampa the silver- *aberrans*. spots are dull bluish green. — There occur also exceptionally pale specimens, in which the base and outer margin particularly are paler: ab. **pallida** Tutt, or which are very pale throughout: ab. **albicans** Dietz. — Larva *pallida*. black, inclusive of head and spines, with thin whitish dorsal double line and large red lateral spots; from May *albicans*. until August on Violaceae. It hibernates very small, feeds ravenously from May onward, lies concealed in day-time and shows a light red swelling behind the head when touched (GILLMER). Pupa dark brown, the tubercles and angles rounded off; it is usually suspended near the ground and well concealed. The butterfly in only one brood from the end of June until August; nowhere rare, in most districts and most years one of the commonest butterflies. The species is found in the neighbourhood of woods, particularly at their edges, and on broad roads in the woods, flying rapidly backwards and forwards; it likes the open ground much less. It appears in large numbers on the flowery slopes of the high mountain-ranges, occurring as high up as 10,000 ft., drinking in the early morning on damp places on the roads and sleeping at night on the flower-heads of scabious and thistles.

A. niobe L. (69c). Above very similar to *aglaja*, at once recognized by the much more variegated under- *niobe*. side. The hindwing beneath is without the even verdigris shading in the basal half, the latter bearing distinct leather-yellow patches, which are often centred, edged or shaded with brownish green. The nymotypical form has abundant silver-spots beneath, more than *aglaja*, as the distal band has no silver in *aglaja*, while it bears silvery centres in *niobe*. From the North and Baltic Seas and North Europe to the Mediterranean, and from the Atlantic to the Pacific; in the Alps abundant even at an altitude of 10,000 ft. (above Zermatt). ab. **eris** Meig. (= *niobe* Godt.) (69c) differs in the silver-spots being all or nearly all absent, only the minute *eris*. centres of the submarginal spots being often silvery; everywhere in Europe among ordinary specimens, from the Baltic provinces to the Mediterranean, often even the prevalent form. GILLMER describes as ab. **intermedia** *intermedia*. transitional specimens, in which the silver is strongly reduced but not absent. Much rarer are those aberrations in which the black markings of the upperside are united to large, deep black lobate patches or clouds, which occupy a large portion of the wing; this is ab. **pelopia** Bkh. Besides these partially melanistic specimens there occur *pelopia*. others which are entirely shaded with dark, sometimes bearing a blue sheen (ab. **obscura** Spul.), as well as pale *obscura*. individuals: ab. **pallida** Gillm. — Towards the East the species appears in a not inconsiderably modified form. *pallida*. Already at the Black Sea *niobe* is more fiery, being brighter fox-red above; it is also larger and the underside of the hindwing of the ♀, though without silver, is very variegated on account of the pale yellow spots, which correspond to the silver-spots of nymotypical *niobe*, being prominently edged with black. I call this well marked *kuhlmanni*. form **kuhlmanni** form. nov. (69d). — **orientalis** Alph. (69c), from the Tian-shan, is duller above, and paler and *orientalis*. more uniform in colour beneath, the black markings of the upperside being thinner and sparser. — **taura** *taura*.

Röb. (69d), from the Taurus, is close to *orientalis*; in the ♂ sent by Herr RÖBER for figuring the marginal lunules of the hindwing beneath are feebly silvery proximally, as in European ab. *eris*, but the specimen is larger than *eris*, the upperside having thinner black markings and the underside being paler and more unicolorous. — **tekkensis** *Christ.*, from Turkestan, comes likewise close to *orientalis*, being only a smaller form of it. *philistra*. — Syrian specimens are very peculiar: **philistra** *form. nov.* (69d); the hindwing beneath is shaded with blackish green in the basal area and on the distal band, the submarginal row of ocelli being in the ♀ almost concealed under this dusting. — Corresponding to the form *fortuna* of *aglaja* there occurs also of *niobe* a gigantic form, **gigantea** *Stgr.* (69c), the surface of which is about three times as large as in ordinary European specimens. The upperside is very bright foxy red in the ♂, greenish yellow-brown in the ♀; the underside has but little silver. *ornata*. From Astrabad in Persia. — **ornata** *Stgr.*, from the Pamirs and Northern Persia, is a transition from *gigantea* to *orientalis* or *taura*. — Egg conical, the top concave with projecting longitudinal ribs, at first pale yellow, later reddish. The larva is already developed in the egg in 2 weeks, but does not then emerge in our latitudes, hibernating in the egg-shell; it feeds on Violaceae from March until July: brown, with pale spines, of which the prothoracic ones are the longest, and with a dark-edged pale dorsal line; whitish spots and dark side-stripes on each segment; head and legs yellowish brown. Pupa reddish brown or greenish brown, with metallic points on the back. The butterflies occur from the end of June until August in company with *aglaja*, having the same habits as the latter.

alexandra. **A. alexandra** *Mén.* (69d). This rare butterfly is almost identical with the next in the markings and colour of the upperside and in shape, but the underside is quite different from that of any other *Argynnis*. The apex of the forewing and the ground-colour of the hindwing are beneath uniformly reddish yellow, hardly differing from the disc of the forewing; the whole under surface therefore is unicolorous, the ground-colour being only interrupted by the black discal spots of the forewing and some isolated silvery spots on the disc of the hindwing. — Armenia and Persia.

adippe. **A. adippe** *L.* (= *berecynthia* *Poda*, *cydippe* *L.*) (69d). Usually larger than the previous species, the wings more obtuse, the outer margin of the forewing quite straight and that of the hindwing feebly undulate in the ♀. Easily recognized by the thickened hairy streaks placed in the ♂ on the branches of the median vein on the forewing. Beneath the silver-spots are much larger than in *niobe*, particularly the marginal spots are much longer and broader. In the nymotypical form, which occurs throughout Europe except the high North and the Asiatic countries at the Black Sea, the silver-spots stand on a leather-yellow ground, which as a rule shows russet-brown scaling only at the edges of the silver-markings; the submarginal area of the hindwing always bears small russet-red ocelli, usually centred with silver. In certain specimens the silvery pupils are absent, while the other silver-spots remain present: ab. **intermedia** *Tutt.* In ab. **cleodoxa** *O.* (69e), on the other hand, the silver of the median and marginal spots is replaced by yellow, whereas the metallic centres of the ocelli are present as a rule; everywhere among ordinary specimens, in the South sometimes the predominant form. Specimens with the upperside suffused with blackish, which sometimes has a bluish sheen, bear the name ab. **suffusa** *Tutt* as in other species. — The specimens from the highest North, **norwegica** *Schultz*, are smaller than Central European ones, the markings are smaller and weaker, the marginal lunules are more distinctly separate from each other, the underside is more unicolorous, paler, with the silver less glossy. — **baiuvarica** *Spul.* (69d), from the Algäu, is very fiery and the hindwing beneath bears beautiful dark red-brown clouds, the whole wing appearing very bright in colour. — On the Iberian Peninsula *adippe* is represented by two forms, **chlorodippe** *cleodippe* *H.-Sch.* with abundant silver on a ground dusted with greenish, and **cleodippe** *O.* with the underside likewise strongly dusted with green, but bearing little or no silver. — In the Aurès Mts. in North Africa I found the form **auresiana** *Fruhst.* (70a), in which — only one specimen, a ♀, was obtained! — the silver is somewhat reduced, the ground being dark olive. — **taurica** *Stgr.* (69e) is very dark above, the yellow-brown is not fiery on account of a somewhat greenish dusting; the hindwing beneath is likewise dusted with green; from Tauria. — **tianchanica** *Stgr.* is a Central-Asiatic form which is smaller and paler, especially beneath, the silver being reduced and sometimes even absent. — Specimens with an especially dense emerald-green dusting from the Dshachar Mts. have been separated as **xipe** *Gr.-Grsh.* — **jainadeva** *Moore* (69f) is the most southern form from Asia, occurring in Kashmir; similar to the preceding, of a rather inconspicuous dull leather-yellow colour instead of the fiery tint of the Central European form; recognizable by the basal area of the hindwing beneath being thinly dusted with dull greenish grey, the silver-spots likewise being sometimes slightly dusted and therefore appearing less bright. — The forms of *adippe* from Northern Asia are much richer and more beautiful in colour than the southern ones: **ornatissima** *Leech* (69e) is a large magnificent form, the upperside being burning red-yellow, the underside recalling *chlorodippe* from Spain. The hairy streaks on the veins of the forewing of the ♂ are much more prominent than in the other forms of *adippe* and extend nearer to the base, which induced LEECH to treat the insect as a distinct species; from Ta-tsien-lu in Sze-chuen. — **xanthodippe**

Fixs. (69e) likewise resembles *chlorodippe* beneath, but is considerably larger, the spots on the forewing beneath are very large, the submarginal ocelli of the hindwing stand in red-brown halos, which are united into a band; from Mongolia and Amurland. — *chrysodippe* *Stgr.* also closely resembles the Spanish form, the silver being *chrysodippe*, sometimes almost as abundant, but specimens corresponding to *cleodippe* with little or no silver are commoner. The verdigris ground of the hindwing with its strong silky yellowish gloss is quite characteristic. In „incredible numbers“ (*Graeser*), distributed throughout Eastern Siberia, with numerous varieties and all transitions to the preceding and following form. — *vorax* *Btlr.* (69e) is apparently the largest form of *adippe*, the forewing *vorax*, being very pointed and the distal margin of the hindwing long and but little rounded. The underside is much duller, more unicolorous than in the previous form, the disc of the forewing being dull leather-yellow also in the ♂, the apex of the forewing and the hindwing feebly shaded with yellowish green, the former quite without silver, which is also not abundant on the hindwing, where it is absent from the base of the costal margin and restricted in the marginal spots to their proximal edge; the ocelli, whose russet-yellow halos are united into a band in *xanthodippe*, stand widely apart. In Central and West China, particularly along the Yang-tse-kiang, as far north as Shanghai. — *coredippe* *Leech* (70a) is the *cleodoxa*-form of the large East-Asiatic *vorax*; as in *coredippe*, *cleodoxa* the silver is replaced with pale yellow, but the spots are more prominent than in the European form on account of the greenish dusting of the ground between them; Manchuria, Shantung, Corea. — *Butler's locuples* is based on specimens with a very brightly variegated underside, which bears, especially in the apical area of the forewing, strong silvery and copper-brown markings on a greenish ground. — *pallescent* *Btlr.* is similar *pallescent*, to *vorax*, but differs in the apical area of the forewing beneath bearing three silver-spots and in its smaller size, which hardly surpasses that of Central European *adippe*. China, Japan, abundant. — Egg of *adippe* similar to that of *niobe*, at first pale greyish green, soon becoming darker. The larva, which is already developed in the summer, does not emerge from the egg before March, feeding until June on Violaceae. It is greyish brown or dark grey, with the head black-brown and the spines and small warts russet-red; on the back two well-defined white lines and on the sides dark oblique stripes. Pupa surrounded by a loose web, greyish brown or greenish grey, with some metallic points on the back. The butterflies are on the wing a little later than the preceding species, occurring from July until September. The flight is considerably more steady than in *niobe* and *aglaja*, but nevertheless fast. The butterflies are found on clearings and at the edges of woods and are very busy visiting brambles and thistles. They are common, and are easily caught when they have settled on flowers.

A. nerippe *Fldr.* (69f). On an average much larger than the preceding species, especially the ♀♀ often *nerippe*, gigantic; not dissimilar beneath to the large forms of *adippe*. Easily recognized by the upperside bearing single large circular spots in the broad median area and by the marginal lunules of the hindwing being in shape inverse as compared with those of *adippe*, their tips instead of their bases being directed towards the edge of the wing; from North Japan. — In the form *coreana* *Btlr.*, from Corea, the upperside is pale yellow and the black markings are thin and sparse, the spots smaller and often obsolescent. — In *nerippina* *Fruhst.* (69f), *nerippina*, from Sze-chuen and East Tibet (Ta-Ho), the underside bears smaller ocelli on the hindwing. — South Japanese specimens, *chlorotis* *Fruhst.*, are more abundantly dusted with green in ♂ and ♀ than North Japanese ones. *chlorotis*. — *megalotheimus* *Fruhst.* (69f) is a very remarkable mountain-form from the main island of Japan; the black spots are enormously enlarged, especially in the ♀, being united so as almost to form a band. — Nothing is known about the early stages. The butterflies are very common, being at Kiukiang even more plentiful than the *adippe*-forms. They are on the wing in July and August and visit Compositae. The flight is similar to that of *laodice*. *mega-theimus*.

A. laodice *Pall.* (= *cethosia* *Hbn.*) (70a). Bright leather-yellow, the ♀ with minute white spots before *laodice*, the apex of the forewing. Central and distal areas with very regular rows of round black dots. Underside without silver, a row of elongate white spots with an oily gloss separates on the hindwing the yellow proximal area, which has a greenish gloss, from the distal area, which is dusted with pinkish violet. Throughout Eastern Europe and North Asia, westward as far as Eastern Germany, but not extending beyond the Elbe; from Pomerania, Mecklenburg, Galicia, the Bucovina, South Russia, and the Caucasus as far as Eastern Siberia and Japan. — *samana* *Fruhst.* (69f) is the West-Chinese form from Sze-chuen; the whitish band of spots is slightly silvery, the basal half of the hindwing beneath, which has only a feeble greenish sheen, is more strongly dusted with green, and the outer area is more bluish violet along the silver-band instead of pinkish violet. Hardly separable from East European specimens. — *rudrina* *Fruhst.*, from Tientsuen, has the hindwing beneath almost as strongly green as *rudra*, to which it forms a transition, the outer area, moreover, being as green as the basal area, from which it is separated by the silvery and the violet-brown band. — *rudra* *Moore* (70e), *rudra*, from Kashmir and North India, is a fiery dark brown and larger form; the dark lines in the basal area of the hindwing beneath, which are thin in nymotypical *laodice*, are in *rudra* united to a heavy brown transverse band. — *ariana* *Fruhst.* (70e), from South Japan, is considerably larger than the European form, more leather-yellow than *ariana*.

orange-yellow, and the spots much deeper black, particularly the dots of the submarginal series on the upperside *japonica*. are very considerably enlarged, recalling *nerippe megalothymus* from the same country. — *japonica* Mén. (70a), from Northern Japan, is still larger, the underside very prominently coloured, with the basal area of the hindwing strongly contrasting with the distal area, the black spots of the upperside only moderately enlarged, the submarginal ones not confluent in normal specimens. The black spots, however, are in occasional individuals, *aspasia*. as happens in nearly all the species of *Argynnis*, enlarged and united into black bands; this is ab. *aspasia* Garb. — Larva not dissimilar to that of *niobe*, reddish grey, with rosy red spines, a yellow-bordered black dorsal line and deep black lateral spots. Until June on *Viola palustris* and other species of violets, feeding only at night, lying concealed in day-time and curling up when touched. Pupa glossy dark brown with black veins. The butterflies are found on meadows in woods and at road-sides, and are fond of Compositae; in Germany, at the boundary of the area of distribution, the species is generally very rare, its occurrence in certain advanced localities in Pommerania and Mecklenburg being ascertained by the very occasional capture of but single specimens. *A. laodice* becomes more common the further east we go, being very abundant at Wladiwostock, on Askold, etc.

kamala. **A. kamala** Moore (70c). Above golden yellow, very strongly shaded with greenish, the median branches of the forewing incrassate to form ridges. The forewing beneath is pale yellow, with heavy black markings, the apex being green and silvery. The hindwing densely dusted with verdigris, the silver spots forming narrow but very glossy bands, which are only interrupted by the veins. — In the North-Western Himalayas, in Kashmir and North India, not rare.

childreni. **A. childreni** Gray (70b). One of the largest and most beautiful *Argynnis*; above fiery reddish yellow, spotted with black, the very large hindwing dentate and its whole anal area shaded with blue. Beneath the disc of the hindwing is bright fleshy red, the hindwing olive, somewhat brass-colour, traversed by a number of silver-bands. Central and West China. — *sakontala* Koll. (70b) is somewhat smaller, the upperside duller, the dark anal shading of the hindwing more brown than blue and restricted to the immediate neighbourhood of the anal angle; in Kashmir. — This largest of all the fritillaries of the Old World is very common in India, but less abundant in the Palaearctic Region, only a small number of specimens being found at a time in the localities where the species occurs (LEECH). The butterflies love grass-covered places near woods, going up as high as 10,000 ft.

zenobia. **A. zenobia** Leech (71a). Smaller than the previous species, particularly the hindwing less large. Shape and upperside almost exactly as in *A. paphia*; fiery reddish yellow, the ♂ with black scent-streaks on the two median branches. The underside as in *childreni*, but the silverbands anastomose in several places. In North *penelope*. and West China and Tibet. — In *penelope* Stgr. the ♂ has 3 scent-streaks instead of 2 on the forewing, and the ♀ is shaded with dull greyish green nearly as in the *valesina*-♀ of *paphia*. On the Sutcheou, in Amurland and North China. — The butterflies are on the wing in June and July, not being rare in the south and west of the distribution-area, but very rare in the northern districts, on the Ussuri (DOERRIES).

ruslana. **A. ruslana** Motsch. (70c). Above almost exactly as in *paphia*, which it also resembles in shape, beneath very near to *laodice*. The ♂ with strong scent-streaks on the median branches. Eastern China, Korea, Amurland and Askold. — *lysippe* Jans. is the Japanese form, recognizable by its dark colouration. — The species is apparently abundant wherever it occurs, being very common at Chang-Yang. It flies in August and September, and LEECH believes that on account of their great similarity it is often confounded with the forms of *paphia* and *laodice*, which are likewise abundant in the same locality.

sagana. **A. sagana** Dbl. Hew. (71b). ♂ above similar to *paphia*, with 3 heavy scent-streaks on the median branches and the submedian vein. Beneath more closely resembling *laodice*, with very large hindwing, which is divided by a white macular band in a yellow basal and a violet-brown distal area. The ♀ quite aberrant, above black and white, being similar in colour and markings to *Limenitis*. China, especially on the Yangtse-kiang, occurring from Sze-chuen to Shanghai. — In the Amur form, *paulina* Nordm., which extends rather far north, the forewing is somewhat narrower, its costal margin longer and in the ♂ the distal margin and apex are more rounded; specimens from the Amur, moreover, are not so large as those from Sze-chuen, and the light bands of the ♀ are purer white. Throughout East Siberia and the most northern districts of China. — *liane*. *liane* Fruhst. (71b) is the Japanese form; the bands of the ♀ are much purer white, the apical band is broader, *ilona*. the marginal lunules duller, partly obsolete. Much smaller than nymotypical *sagana*. South Japan. — *ilona* Fruhst., from Tsushima, can hardly be differentiated; in the ♀ the marginal lunules are likewise dull and narrow, but the dark dots of the hindwing are much enlarged. — The butterflies occur from early June until September; at first only ♂♂ are found, later almost exclusively ♀♀. The latter are considered rare by some collectors, while I found them much more abundant in certain places than the ♂♂. This apparent contradiction

is explained by the fact that the ♀♀ fly not only at a different time but in different places than the ♂♂. These fly in July and August with a quick flight along the roads and the edges of woods; at such places I have never seen a ♀. On the other hand I found in August the groups of thistles in pine-woods so densely covered with ♀♀ that not a single bunch of thistles was without them; and I caught there only once a single worn ♂, the middle of August. In the same places I also found at the same time (still in August) very large ♀♀ of *Limenitis camilla japonica* (57b), so that I mistook the *sagana liane* ♀♀ for *Limenitis* in spite of the totally different flight, recognizing them only when they settled on thistles. The Chinese *sagana* fly in company with quite a number of similarly coloured species of *Apatura*, *Limenitis* and *Pantoporia*, so that one is easily taken in, if one does not pay close attention to the mode of flight.

A. anadyomene Fldr. (= *ella* Brem., *midas* Btlr.) (70d, 71b, c). At once recognizable by the peculiar shape of the hindwing, the costa is nearly straight, being almost without a trace of curvature. Above like *laodice*, leather-yellow, evenly dotted with black, the ♀ bearing a white spot before the apex. The hindwing beneath is shaded with silvery grey, having a strong metallic green gloss and being without the distinct silver-bands of *paphia*. Throughout Eastern Asia; first described from China, but also occurring in Tibet, Amurland, Corea and Japan. ab. **crassipunctata** Fruhst. are specimens with larger spots above, which occur among the otherwise very constant nymotypical form (LEECH). — Specimens from the island of Tsushima FRUHSTORFER names **prasoides**; the subapical spots on the forewing above of the ♂ are smaller than in specimens from China and Japan; in the ♀ the basal area of the upperside is more abundantly dusted with light green and the hindwing beneath has a deeper sea-green tinge. — The species is very abundant in most localities in the warmer districts of Eastern Asia, but does not appear to go very far north; though being still plentiful on Askold, it is according to GRAESER already rare near Wladiwostock, which is hardly further north. They fly somewhat later than *sagana*; in October I still found worn ♂♂ and numerous ♀♀ together with true autumnal species such as *Vanessa glauconia*, species of *Catocala* and *Arhopala*. They closely resemble on the wing the dark *paphia* ♀ occurring there.

A. paphia. Above fiery reddish yellow in the ♂, the forewing rather pointed, with three distinct scent-streaks. The ♀ has rounder wings and is somewhat shaded with greyish green above. In nymotypical **paphia** L. the hindwing beneath is verdigris, with a metallic gloss and broad silver-bands, which are partly somewhat curved. The ♀-f. **valesina** Esp. (71a), which is the ordinary form in the East, but is local in Central Europe or occurs here only as a rarity among ordinary specimens, has the upperside, particularly of the hindwing, shaded with dark scaling, which has sometimes a blue sheen. — In the extreme south of Europe the hindwing beneath is devoid of silver, the bands being dull ochreous on an often feebly green ground; this is **anargyra** Stgr. (71a), which is the only or prevalent form in Greece, Corsica, Sardinia and Southern Spain. — However, also in Central Europe there occur occasionally specimens in company of ordinary ones in which the bands of the underside have lost the silvery gloss; this is ab. **immaculata** Bell., which is otherwise normal. Sometimes the characters of *valesina* and *anargyra* are combined in specimens from the localities of the latter; this is ab. **atroviridis** Kollm. — The most magnificent form without silver is the one from North Africa; the ♂ has the upperside fiery red; the hindwing beneath is beautifully bright yellow, sometimes without any trace of green, in other individuals with greyish green bands. The ♀ differs less from Central and North European specimens, but has the hindwing more strongly dentate, as is also the case in the ♂. This is **diva** Oberth. (79e). — Towards east one meets already in Eastern Germany (Königsberg) a modified form of *paphia*. In Eastern Russia specimens with a darker upperside and more sharply defined silver-bands are a transition towards the Asiatic forms: **thalassata** Fruhst. — In Asia Minor (the Cilician Taurus) the ♂ is more red and the ♀ darker, of the colour of *pandora*, beneath both sexes are without the violet shade on the silver-bands; this is **delila** Rüb. — A very remarkable form with the metallic bands of the underside confluent occurs in the Caucasus: **argyrorrhyses** Alph. (71a), of which ALPHÉRAKY has been so kind as to send me a description and figure; we add the former beneath. — Among the Eastern-Asiatic forms we find **paphioides** Btlr. but little different from the European form; it is larger, and the ♀ is darker, although not so dark as *valesina*; from Japan, where I still met with quite worn specimens as late as October at Hiogo. — **tsushimana** Fruhst. (70e) is according to FRUHSTORFER, the most beautifully coloured of all the *paphia*-forms.

*) *Argynnis paphia* L. ab. *argyrorrhyses* ab. nov. The proximal half of the hindwing beneath is entirely silvery, the outer half being as in ordinary *paphia*. The rows of black dots on both sides of the forewing are reduced, the two external rows being feebly indicated on the underside in one of the two ♂♂ and almost absent in the other ♂. In the ♀ these rows of dots are less reduced than in the ♂♂. The ♂ figured was caught by S. ALPHÉRAKY near Jelesnowodsk in the northern Caucasus in June 1874 and a fine pair came from the Gouvernement Poltawa (southern Russia), where it was obtained by a zealous young Lepidopterist, A. N. AWINOV. Mr. AWINOV caught in the same locality a second ♂ which forms a transition to *argyrorrhyses* and has, which is worthy of note, the black dots already reduced.

The bands of the hindwing beneath are even darker green than in *valesina*, also the apex of the forewing being very deep sea-green. The silver-bands of the hindwing are exceptionally broadly white and very prominent, and the green submarginal spots are more isolated and not so diffuse as in Chinese *paphia*. Island of Tsushima. — The Chinese forms are all larger than European *paphia*, the ♀♀ being the largest of all, surpassing even the African form. The hindwing beneath is more abundantly dusted with green than in Europe, but remains lighter than in Japanese specimens. This is **megalegoria** *Fruhst.* In the northern districts of China (for instance near Peking) a *valesina*-like ♀ is the commoner form of this sex, ♀-f.-**valesinides** *Fruhst.*, occurring in some places almost as the only form; it closely resembles *valesina*, but is half as large again. — **neopaphia** *Fruhst.* (70e) is the name for the Amur specimens, which are intermediate in size and colour between the small true *paphia* and the large *paphioides*. — The conical, ribbed, yellowish grey eggs are deposited on tree-trunks, particularly pines; the ♀ commences about 4 or 5 ft. above the ground and with a few flappings of the wing flies higher up, depositing an egg at intervalls of $\frac{1}{2}$ to 1 m, flying around the tree in a kind of spiral. When reaching a height of about 4 m it leaves the tree in order to begin again in the same way on another one. The larva lives from August until the end of May on Violaceae, hibernating very small (GILLMER) and beginning to feed already in March. It is blackish brown, with a broad yellow dorsal stripe divided by a thin black line, and with numerous yellow dots, spots and streaks on the sides; the spines long, yellow at the base, the two anterior ones curved and prolonged, resembling antennae. The pupa is usually fastened low down on a pine-trunk; it is greyish brown, with pointed processes on the head and sharp angles, and has conical pointed tubercles, which are at first silvery and become golden before the emergence of the butterfly. The species is on the wing in Europe from July till September, in Eastern Asia till October; it is very common everywhere and flies particularly on broad roads in the forest and at the edges of woods. The butterflies visit especially the flowers of brambles, scabious and thistles, on which they can easily be caught. When desirous to mate the ♂ circles around the ♀, while the latter is flying with even flappings of the wings straight for a bush or a projecting branch. Here copulation takes place, the sexes being often so strongly united that they remain together for some time, frequently the one individual carrying the other about. On the whole the species varies only on the underside of the hindwing, apart from the directions of variation described above. The upperside shows but rarely an increase of black or pale patches (so-called water-marks).

A. pandora *Schiff.* (= *cinara* *F.*, *maja* *Cr.*) (71c). The largest European *Argynnis*. Above strongly recalling *valesina*, but brighter greenish, densely spotted with black. Beneath quite different, the apex of the forewing and the hindwing bright green, the disc of the forewing fleshy red and spotted with deep black, the hindwing with a few narrow bands, which are more white than silvery and vary strongly in number and development. In ab. **dacica** *Hormuz.*, a kind of *valesina*-form from Roumania, the basal area of both wings is darkened, contrasting with the distal area, which is slightly paler than usual. — **pasargades** *Fruhst.*, from the Alexander Mts., has the whole upperside pale, especially the forewing, which has hardly a trace of green, being also paler yellow beneath, with the black markings reduced. — **seitzi** *Fruhst.* (71c) has been described from specimens found by me in the Aurès Mts. in Algeria. Larger than European individuals, paler green beneath, darker greenish yellow above; the black markings more prominent and abundant, often confluent. — ab. **paupercula** *Ragusa* has no silvery white bands and spots; especially in the southern districts, where it is locally the prevalent form, for instance in Algeria. — Larva purplish brown, with black head, without the yellow dorsal stripe of *paphia*, otherwise similar to the latter, but the spines shorter; on the back of each segment a velvety black spot with 2 white dashes; until June on *Viola*. The species occurs particularly in the Mediterranean countries, being found in North Africa, the Canaries, Spain, South France northward to the Valais, where it approaches the German frontier, also in Italy, the south of Austria-Hungary, Turkey and Asia Minor, going eastward to the Tian-shan; plentiful in some places. The butterflies are on the wing from June onwards; their flight is fast and graceful, rushing or swimming, and they usually settle on those branches of trees which hang over the road, or on thistle-heads.

A. niphe *L.* (= *hyperbius* *Johanns.* [ante *Linn.*]) (71c, d). ♂ above fiery reddish yellow, ♀ leather-yellow with the apex of the forewing dark and traversed by a white oblique band. The hindwing beneath with irregular, silvery and black bars and flexuose lines. Everywhere in the Himalaya and its branches; common on the Yang-tse-kiang and in South Japan. — Larva black, with dark red bifid spines, the anterior pair being curved forward, a deep orange stripe on the back, and small pale yellow spots and dashes dispersed over the body; on *Viola*. Pupa blackish red-brown, with yellowish red wart-like acute tubercles and metallic points on the back. The butterflies occur throughout the year in tropical India, being on the wing only during the later half of the season in the Palaearctic Region. In Nagasaki I caught fresh specimens as late as the end of October. The ♀♀ are in China an exact copy of *Danais genutia* (28e), which likewise flies during the autumn. But there also occur ♀♀ which resemble the ♂, the apex of the forewing not being black and white (ab. **castetsi** *Oberth.*). The ♂♂ have a fast and untiring flight, occurring particularly on hill-tops; the ♀♀ are clumsy, only taking short flights and soon settling again.

15. Genus: **Atella** Dbl.

In facies very similar to the preceding genus. The head likewise very large, broader than the body, which is slender. Antennae rather long, the club not flat and spatulate as in *Argynnis*, but long and gradually incrassate. Palpi with long hairs. Eyes prominent, naked. The cell closed in both wings, which are rather broad, the hindwing being rounded. Upperside leather-yellow to yellowish brown, marked with black; beneath without silver. — The genus consists of but few species and is essentially Indian and African. On account of the large numbers of specimens the butterflies belong to the Lepidoptera most characteristic for Southern Asia and tropical Africa.

A. phalanta Dru. (71d). The sexes similar, above pale ochreous, the costal area of the hindwing dull *phalanta*. white, the whole surface of the wings marked with black arcs and dots, nearly as in *Argynnis*. The pattern of the underside, too, recalls to a certain extent *Arg. laodice*, but the under surface is much more uniform in colour, the disc of the forewing having the same colour as the apex of the forewing and the underside of the hindwing, and is marked like the upperside, but the black markings are more obsolescent. In Kashmir, South China and the most southern parts of Japan, apparently rare; in India very abundant, some closely allied forms occurring in Africa. — Larva dark red-brown to yellowish green; all the spines of nearly the same length, black with a pale dot at the base; on *Flacourtia*, probably also on *Viola*. Pupa very beautiful, pale olive- or grass-green, on the back rows of paired points marked with carmine, the wing-cases likewise edged with red. The butterflies occur at road-sides and on clearings in woods, and appear to have definite places where they congregate, like the *Cirrhochroa*. I often saw them fluttering around certain bushes by the dozen, but could not ascertain what attracted them. If chased away they assembled again in half an hour. The butterfly is otherwise only met with singly, particularly on the flowers of *Lantana* during the autumn.

Tribe Heliconidi.

This group is doubtless nearly related to the *Argynnidi*, the affinities being so close that a number of American genera, such as *Colaenis*, *Dione* and *Metamorpho*, have as yet no definite place in the system and are together with *Cethosia* often considered to be transitional forms. FRITZ MÜLLER was the first who separated these genera from the Nymphalids proper and united them with *Heliconius* and *Eueides* in one group, which he called "Maracujá-butterflies" from the food-plant (passion-flowers). We separate accordingly *Cethosia* from the fritillaries and allies and place it as the Old World representative of the American *Heliconius* in the present tribe, which therefore comprises both genera.

Head large; antennae quite different from those of the *Argynnidi*, very long and thin, quite gradually widened to a hardly distinct club; palpi with long hairs, rather long, not inflated. Forewing rather long, the apex somewhat produced but rounded off. Body slender, sometimes very thin. The larvae variegated, with long spines, the horns of the head usually particularly long; on *Passiflora*. Pupa very peculiar, usually with the black incurved, the head with two long flattened appendages, which are more than half the length of the body in the American genera (so-called hare-ears). The butterflies are very conspicuously coloured and marked; they fly generally rather slowly, visit flowers of all kinds and love to float slowly up and down clearings in the woods, always abruptly turning back at the same place and following the same course ("promenading"). They are evidently protected and are usually plentiful where they occur.

16. Genus: **Cethosia** F.

Large butterflies, with the upperside usually bright reddish yellow, the underside bearing peculiar strongly undulate and dentate lines. The larva with long spines bearing thin branches, the spines on the head curved. The chrysalis tuberculate, with deep dorsal saddle, the processes of the head longer than the head, flat on the sides. — The genus is especially Indian, the greater number of species being Malayan and only one reaching the Palaearctic territory in the south-east.

C. biblis Dru. (= *biblina* Godt., *pentheseilea* F. nec *Cr.*) (71d). Above brownish dark red, the apex and distal *biblis*. margin black with thin white markings. The basal area beneath bears on both wings bands which cross the cell and recall *Catocala*, there being whitish bands in the distal area with dark dots and arcs. — West and Central China, locally very plentiful, especially on the Yang-tse-kiang. The early stages of this species are not known.

Tribe Acraeidi.

This peculiar group is almost generally treated as a distinct family; but the larvae and pupae and to a certain extent also the butterflies come so close to *Melitaea* that I cannot but regard the Acraeids as a sharply defined and very homogeneous division of the *Nymphalidae* proper.

Head and thorax short; antennae not very long, strong, with distinct club; second segment of the palpi somewhat inflated. Wings elongate, of usual shape, entire, never angulate, dentate or lobate. Abdomen rather long, somewhat curved downward, smooth, above often glossy. On the naked underside each segment of the antennae with 2 deep impressions which become more shallow towards the middle line, which is carinate, the more deeply

impressed grooves therefore being rather widely apart (JORDAN). The larva stout, with false spines, usually bright-coloured. Pupa smooth, without long processes on the head, the latter being truncate, the shoulders somewhat carinate, the back with smaller or larger tubercles, which are sometimes produced into a point; usually bright-coloured and, like the pupae of *Melitaea*, spotted. The butterflies occur in all the main divisions of the globe, except Europe. They occur always in abundance, but are local. Their flight is weak and slow, but not awkward, in many species swimming as in *Melitaea*. They visit flowers of all kinds. When at rest they are so little shy that they can be taken up with the fingers. Many have a very disagreeable scent, which is also evident in the larvae, and obviously are protected.

17. Genus: **Pareba** Dbl.

Head thick; eyes naked; antennae gradually incrassate, the club slightly flattened. Wings elongate; the cell closed in both wings, in the forewing long and narrow, reaching beyond the middle of the wing. Ground-colour yellow, with more or less black markings. The ♀ after copulation with a horny pouch at the apex of the abdomen, nearly as in *Parnassius*. The larva with a smooth, hornless head, the dorsal processes rather pointed and longer than the lateral ones. Pupa anteriorly rounded, with two feeble tubercles on the head; long and narrow, with but small and low warts on the back. The butterflies are lazy fliers; they visit flowers and drink on damp spots in the beds of brooks. The genus is restricted to South Asia inclusive of the Malay Archipelago.

vesta. **P. vesta** F. (= *terpsichore* Cr., *anomala* Koll.) (71d). Upperside thinly scaled, pale ochreous, the costal and distal margins narrowly blackish brown, as is also a comma-spot on the crossveins of the forewing, the outer margin bearing a row of yellow spots. These spots are shaded with dull orange-red in the anal region of the hindwing. The upperside varies much in the extent of black, being sometimes entirely black (especially in the ♀), the ground-colour of such specimens being reduced to a few pale clouds. The larva emerges in the autumn, hibernating very small and being at first quite black; adult dark red-brown with light spots and reddish spines, head yellowish brown, bearing black spots and a white frontal stripe. It is gregarious on *Boehmeria salicifolia* and drops into the grass when disturbed (YOUNG). The butterflies are local and are always found near the food-plant. They occur from July until September, going up to 4000 ft. in the mountains. In Kashmir, West and Central China, locally extremely abundant. Besides these Palaearctic districts, the species is widely distributed in India.

Corrections and Additions.

1. Genus: **Apatura** (p. 160).

A. subcaerulea Leech (cf. p. 163) is the ♀ of *fulva* Leech (cf. p. 164) according to OBERTHÜR (Ét. Lépid. comp. 11.) (STICHEL).

modesta. **A. modesta** Oberth. is similar in shape to *A. fasciola* (p. 164) and does not appear to be specifically distinct. Upperside brown, forewing with an indistinct darker shadowy median band, likewise with a somewhat darker shade in the apical and distal marginal areas. On the distal side of the shadowy band, near the costa, there is an elongate whitish double spot, above and below the middle of the anterior median branch two small more indistinct light spots, and near the apex a small rounded white spot with a white dot below it. Both wings have a small indistinct ocellus in the anal area. The hindwing bears a dark edge to the outer margin and a feebly marked submarginal row of spots. Beneath paler, the basal half of both wings somewhat darkened, these spots with sharply defined S-shaped edges, otherwise the light spots as above, the ocelli with blue centre, at the distal margin of both wings a narrow dark shadowy band and indistinct submarginal spots. — Western China: Siao-lou, Moupin, Tientsuen. The author compares *modesta* with *A. phaeacia* Hew.; we cannot see any close affinity; but we learn from this remark by OBERTHÜR that *phaeacia*, an Indian species, extends northward to Tse-kou (Tibet). It will be dealt with in the volume on the Exotics.

laeta. In Tse-kou occurs a smaller subspecies of *A. schrenckii* Mén. (p. 164), which OBERTHÜR has named **laeta**. It has the white spots of the upperside and the yellow and bluish markings of the underside more sharply defined and brighter in colour (STICHEL).

3. Genus: **Neptis** (p. 173).

mothone. Lately another, smaller, form has been separated from *N. arandina* Oberth. (p. 178) as subspecies **mothone** Fruhst., based on a single ♀ with the forewing 35 mm long. The bands above and beneath, moreover, are *taphos*. paler than in the main form. Presumably from Chang-Yang. — Probably ab. **taphos** Fruhst. also belongs here; the ochreous bands are darker and more sharply defined, the yellow spots of the underside more extended and the middle violet zigzag line of the hindwing is stronger. West China. (STICHEL).

13. Genus: **Timelaea** (p. 226).

T. maculata. Add as a synonym of it *Argynnis leopardina* Luc. (SEITZ).

14. Genus: **Argynnis** (p. 226).

ab. *weidi* Gillm. (p. 235) is not a form of *daphne* but of *ino* (SEITZ).

Alphabetical List

with references to the original descriptions of the forms of the Palaearctic Nymphalidae.

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7. Family: Erycinidae.

This family, which contains considerably more than a thousand forms, is very unevenly distributed over the globe. More than 90 % of them inhabit America, the remainder occurring almost exclusively in the Malay-Archipelago and the mountain-chains of the Himalaya, only two species being found in Europe.

The *Erycinidae* are characterized by their small size and the *Lycaena*-like facies of the butterflies. The larvae also resemble those of the *Lycaenids*, being onisciform, with the exception of the very different *Libytheinae*. The genus *Libythea* differs also in the chrysalis being suspended, while those of all the other Erycinids are attached by the tail and held in position by a girdle, by which the family is distinguished from many *Lycaenids*.

Head small, being large only in *Libythea*; frons broad; eyes semiglobular, often hairy. Antennae evenly widening to form a long club only in *Libythea*; in the other forms long, thin, very straight, with small club; they are frequently held forward in a parallel position. Thorax not specially stout, but rather strong, appearing hard to the touch, almost as in *Hesperids*. Forelegs in the ♂♂ modified to a brush, while all the six legs are developed in the ♀♀. Abdomen short, usually not reaching the anal angle, extending beyond the same only in a few American forms (*Stalachtis*). Wings very delicate, the scales being so loose that the specimens become very easily defective. Cell relatively broad, sometimes very short. Outer margins very diverse, being entire, angulate or sinuous; the hindwing often tailed, sometimes modified to a linear appendage. The Erycinids are connected with the *Nymphalids* by the *Libytheinae* and on the other hand intergrade with the *Lycaenids*. The greater proportion of the species are rather rare, many even extremely scarce, only a few are common, as for instance *Nemeobius lucina*, but even among these it is quite the exception that a species is met with in swarms or in such numbers as in many forms of the families *Nymphalidae* and *Lycaenidae*. They love to keep to the shade when on the wing, and most of them have the habit of settling on the underside of leaves with the wings spread out, like *Geometers*.

A. Subfamily: Libytheinae.

This group, which consists of the single genus *Libythea*, deviates so much from the other Erycinids that there was justification for separating it as a distinct family; certain authors even have united the *Libytheas* with the *Nymphalids s. str.* These butterflies are very easily recognized by the strongly prolonged palpi, which project forward beyond the head, forming a beak. The head is broad, with a broad frons, the eyes naked, the antennae gradually enlarged to a moderate club. The wings broad, the forewing of the ♂ usually, of the ♀ always angulate below the apex, the hindwing rounded, without tail. The larvae, as far as they are known, slender, clothed with short minute hairs, green, without special distinctions, being somewhat similar to a half-grown larva of *Pieris napi*. Pupa smooth, without tubercles or angular projections, somewhat flattened anteriorly, incurved dorsally behind the thorax, with the wing-cases extending far down, suspended by the cremaster, without girdle. The butterflies as a rule fly singly with an irregular, somewhat flapping flight, but congregate sometimes in numbers about the food-plants in contrast to all the other Erycinids, which never occur in swarms. They settle on twigs or on the ground, and keep the wings closed when resting. — The single genus contains more than a dozen forms, which belong to 3 subgenera and 10 species. The geographical distribution is very remarkable, the genus being found in all the five divisions of the globe and only a single species occurring in most districts.

1. Genus: *Libythea* F.

The generic characters are the same as those of the subfamily. The Palaearctic species all belong to the subgenus *Libythea*, which differs from the African subgenus *Dichora* in the antennae becoming gradually thicker, and from the American *Hypalus* in the less strongly prolonged palpi.

L. celtis Fuessl. (71 f). Above black, with large yellowish brown spots; hindwing beneath very *celtis*. diversely coloured, several names referring to such colour-forms (*obscura*, *subochracea* Mill.), usually earth-grey, clouded, sometimes however uniformly shaded with reddish yellow or deep dark brown. In South Europe, northward to South France and the Tyrol, also in North Africa, Asia Minor, and Central Asia. — In Central and East Asia there occurs the form *lepita* Moore (71 f), which is somewhat larger, the fore- *lepita*. wing being more acutely angulate and the hindwing bearing on the upperside a 3 or 4-lobed longitudinal stripe instead of cloudy ochreous spots. From Kashmir to North India and eastwards to Japan. — Larva evenly cylindrical, not dissimilar to a *Terias*-larva, clothed with short velvety hairs, minutely dotted with dark, on the back a pale longitudinal stripe, on the side a rosy or purplish red stripe, the venter lighter. Only observed on *Celtis*, but in captivity takes also *Prunus*. Pupa pale green, without projections. The butterflies are found in Europe at different times from April till July. In the warmer districts they appear in June and July, being in Kashmir still frequent in October, while in Japan they prepare for hibernation already early in the season, becoming lethargic. They reappear from their hiding-places in March and

then pair. The eggs are deposited in the leaf-buds of the *Celtis*-trees when they are just beginning to open. Specimens from West China are somewhat brighter in colour, the yellow spots moreover being somewhat narrower than in Japanese specimens. The butterflies are very common and often congregate in numbers about the food-plants or at puddles on the roads; on the wing they recall the ♀♀ of *Zephyrus betulae*. The long palpi become easily broken in the net.

myrrha.

L. myrrha *Godt.* (71f). Similar to the preceding, but the yellowish brown discal patches, apart from the apical spots of the forewing, united to a longitudinal streak, which on the forewing runs from the base along the median vein below the cell to the apex, and on the hindwing from the middle of the hindmargin to the apex, these two stripes being parallel in the mounted specimen. On Palaearctic territory only in Kashmir, but widely distributed in India, occurring in a local form with broad yellow streaks in Sikkim (*sanguinalis*) and in another with narrow whitish bands in Ceylon (*rama*). — Larva green, bearing small tubercles on the segments: on *Celtideae*. Pupa green, obtuse, short. — The butterflies not rare, but usually flying rather high about the food-trees; in the north in two broods, in the south all the year round. In the Nilghiri-Hills I obtained specimens intermediate between the local races.

B. Subfamily: **Nemeobiinae.**

This group contains the remainder of the Old-World *Erycinidae*, about 80 forms, all the others being exclusively American. Head proportionally much smaller than in *Libythea*, frons broad, eyes not large, antennae long, thin, with distinctly marked, sometimes flattened club, palpi not specially prolonged, on the contrary often excessively small. Forewing entire; hindwing sometimes tailed or angulate at the median vein, sometimes the anal angle produced into a rounded lobe. — The larvae are known of but very few species; onisciform, with pale lateral line and distinctly marked dorsal one. The pupae, which are often clothed with small hairs, are fastened by the tail and a girdle. Whereas some species are on the wing throughout the year and are distinctly dimorphic according to season, other have but one brood. The butterflies occur at the edges of roads, especially near woods, they visit flowers and drink on damp places on the roads. The flight is very different in the various genera.

2. Genus: **Nemeobius** *Stph.*

Small, normally built butterflies with small head and but moderately broad frons. Eyes proportionately small, anteriorly edged with white. Antennae thin, ringed, with flat, distinctly defined club. Palpi rather short, rough-hairy, porrect. Brush-feet of ♂ densely hairy. Wings entire, above similar to those of *Melitaea*, the brownish yellow marginal spots of both wings bearing dark dots. The underside also recalls *Melitaea* by the hindwing being traversed by white macular bands. Only one species, which is confined to Europe.

lucina.

N. lucina *L.* (89a). The "Duke of Burgundy Fritillary" resembles above a small *Melitaea dictynna* or *aurelia*, but is at once recognized by the different flight, which is rather fast, somewhat hopping, almost as in Hesperids. On closer inspection only the colouration not the markings resembles that of a *Melitaea*. In the ♀ the pearly white spots of the underside are usually larger than in the ♂, the upperside in often of a lighter and more yellow tint and the hindwing is less black. Egg greenish yellow, one or two deposited at the time on *Primula* and *Rumex*. Larva onisciform, yellowish brown, spotted with red at the sides, with a yellow stripe over the spiracles; on the black, which is slightly clothed with short hairs, there is a blackish macular line. From June until April, changing into an earth-brown pupa which bears sparse small hairs and dark dots and shadows. The butterflies are on the wing from the end of April until the beginning of June at the edges of woods and road-sides, and love to settle on stalks of grass and on low herbage. The species occurs in a large part of Europe, extending from England and the Baltic provinces to the Mediterranean and from Spain to South Russia and Roumania. Frequent, but not in large numbers. — ab. **schwingenschussi** *Reb.* has been described from a pair obtained at Prisang in Carniola, which is not only much darkened on the upperside, but beneath has the ground-colour of the hindwing and the basal and apical areas of the forewing deep black-brown instead of light reddish yellow.

schwingen-
schussi.

3. Genus: **Hyporion** *Röb.*

This genus has almost exactly the same neuration as *Nemeobius*, which it connects with *Polycaena*. It differs from the latter therefore in the 5-branched subcostal, two of whose branches originate before the apex of the cell, as well as in the radial arising direct from the cell instead of being stalked with the subcostal as in the forewing of *Polycaena*. Moreover, the antennae are somewhat shorter, and the palpi somewhat less reduced than in *Polycaena*. The centre of distribution of this genus, of which so far only a few species are known, is Eastern Tibet, where some more forms may be expected to turn up, considering the insufficient exploration of the country.

H. mutata *Leech* (89a). Above very similar to *Nemeobius lucina*, but both wings with a distinct *mutata*. black distal border. The hindwing beneath is black, with 2 irregular white bands, one abbreviated and near the base, the other between central and outer areas. The ♀ above somewhat less black, otherwise very similar to the ♂. — From Sze-chuen, at a considerable altitude, in July. The specimens from the high plateau north of Ta-tsien-lu are somewhat smaller than typical specimens from Pu-tsu-fong. Also recorded from Eastern Tibet (OBERTHÜR).

H. lama *Leech* (89a). Larger and darker than the previous. Only in the ♀ the upperside has still *tama*. the red-brown colour of *N. lucina*, while the ♂ is entirely sooty black, apart from some small scattered yellow discal spots and the reddish yellow submarginal row of spots. The hindwing beneath ivory-yellow, spotted with black. From Sze-chuen and the neighbouring districts of Tibet. In specimens from the Dshachar Mts. the reddish yellow spots are duller. In two broods, showing seasonal dimorphism according to OBERTHÜR. — The form **lua** *Gr.-Grsh.* (89b), from East Tibet and West-China, has also in the ♂ the *lua*. upperside more extended red-yellow, especially the apical and disto-marginal areas of the forewing.

H. princeps *Oberth.* (89b). Above very similar to the preceding, but larger, the underside purer *princeps*. ivory-colour, only spotted with black distally, proximally traversed by black lines. — Sze-chuen; appears to be very rare.

H. carmelita *Oberth.* is as large as *princeps*, but differs in the club of the antennae not bearing a *carmelita*. white spot beneath. Upperside reddish yellow, darker towards the base; a pale reddish yellow submarginal band commences a little below the costa and extends to the distal margin, another band of the same colour is irregular, commencing with a white costal spot and running beyond the apex of the cell towards the hindmargin of the forewing. The cell of the forewing bears a reddish yellow spot and two black dots. Underside like upper, but the markings are traversed by thin yellow lines situated on the veins. — Sze-chuen; appears to be rare and to occur only in single specimens, almost all the specimens bearing dates of capture of different years. Not known to me.

4. Genus: **Polycaena** *Stgr.*

These small delicate and graceful butterflies are already similar to the Lycaenids in facies and habits, but the very thin and long antennae and the differently developed reduced palpi distinguish them at once. Since the separation of *Hyporion* there remains only one species in *Polycaena*, but one may expect that some more will be discovered, considering the inaccessibility of Tibet and West China.

P. tamerlana *Stgr.* (89b). A small form, in shape and size agreeing with *Lycaena astrarche*, above *tamerlana*. bluish grey with black dots, both wings bright brick-red before the broadly grey distal margin. Underside almost like upper, but with a stronger yellow sheen. In Tibet and Turkestan. — **timur** *Stgr.* (89b) is above *timur*. entirely reddish yellow, with a somewhat golden sheen; in the district of the Ili R. (Southern Siberia and North Turkestan). — **temir** *Gr.-Grsh.* has a similar uniformly yellowish red upperside, but the hindmargin is not *temir*. dusted with black as in *timur* and the black spots are usually smaller. Ferghana. — Nothing is known of the early stages. The butterflies are said to fly very low above the ground and to show a preference for settling on stones warmed by the sun.

5. Genus: **Zemerus** *Bsd.*

Very peculiar small butterflies, with very long and thin antennae, broad and irregularly shaped wings, which are irrorated with seriated small transparent dots, a character which we find again among the American Erycinids in the very similar forms of the Neotropic genus *Calydna*. Head broad, almost as wide as the thorax, the small eyes naked, widely separated by the very broad frons. The antennae very long, with a small but distinct club; they are usually kept straight forward when at rest. Palpi small, seen from above hardly reaching beyond the edge of the head. The thorax not broad, but hard, rather strongly resisting the pressure of the fingers. Abdomen of the ♂ very slender. In the ♂ the distal margin of the forewing is angulate at the apex, above and below the centre and at the hind angle, the hindwing bearing likewise a tooth in the centre. — Larva ovate, very flat, the segments distinctly separate. Pupa likewise very flat, anteriorly broad and rounded, quite smooth, fastened by the cremaster and a girdle on the underside of a leaf with the head towards the apex of the leaf. The butterflies occur on roads in the forest, always flying only short distances; they rest with half open wings on the upperside of leaves at roadsides and on the white flowers of a Sambucus-like shrub (MARTIN). They are easy to catch, but are so wild in the net that they cannot easily be killed, so that the majority of the specimens in collections are worn (FRUHSTORFER).

flegyas.

Z. flegyas Cr. (S9 b). Dark red-brown, reticulated with pale yellowish brown; between the yellow veins white transparent dots, which are black on their proximal side. Central and West China, plentiful. — Also in South China, and distributed over a large part of India in various local forms; in warm districts all through the year and varying according to season. Larva green, paler at both ends and at the sides, very flat, closely applied to the leaf and covered with a whitish down; in the spring adult on *Moesa montana* (DUDGEON). Pupa very smooth, with the abdominal segments distinctly marked, quite flat, the head separated in two halves by a shallow groove on the occiput; yellowish green, with thin emerald-green markings, rows of rounded spots on the back. The butterflies are found in the shade at road-sides; they are not rare and usually two specimens are met with not far from one another. Although one sees these graceful small butterflies every day on roads in woods and at the edge of shrubs, I do not remember ever having met with a larger number in the same place. The Palearctic specimens belong to the nymotypical form of *flegyas*, since the original for CRAMER's figure came from China. There occur quite a number of subspecies on the Indian islands.

6. Genus: **Abisara** Fldr.

Extremely similar to the preceding in facies and habits; the apex of the forewing less pointed, the distal margin even, the antennae somewhat stronger and shorter, the wings without transparent dots. The larvae likewise similar to those of *Zemeros*, very flat, broad in the centre, the head not retracted into the prothorax; differing from *Zemeros* in bearing sparse and minute hairs. Pupa also hairy, otherwise similar to that of the preceding genus, being so much flattened that at first sight it differs but little from the larva. The butterflies have the habits of the preceding genus; though abundant, they occur but singly in the shade, resting on leaves at road-sides and in the woods always with the wings half open.

A. echerius. Above chocolate-brown, ♂ almost entirely unicolorous, ♀ with a distinct paler outer area. In the apex of the hindwing 2—3 black ocelli, which are especially distinct beneath. The wet-season form, **echerius** Cr. (S9 c), is above very deep dark brown shaded with purplish, especially in the ♂, there being distinct dark shadowy bands in the outer area. In the dry-form, **lydda** Hew. (S9 d), the purple gloss is absent from the upperside, the shadowy band in the outer area is hardly visible and the black ocelli in the apex of the hindwing are absent or strongly reduced. The onisciform larva and the flattened chrysalis pale green. The species is one of the commonest butterflies in China; however, it occurs more in the south, approaching only here and there the Palearctic boundary. There are two broods, which are on the wing a long time. The summer-form bears on the upperside sometimes irregular but symmetrical white-scaled places, which are apparently caused by the showers of rain which are frequent every day acting upon the chrysalis. The flight of these little butterflies recalls to a certain extent *Pararge egerides*. When chased they escape in the dense shrubs where it is impossible to follow with the net on account of the thorny branches. The species is widely distributed and occurs in numerous races over a large part of India (*prunosa*, *kansambi*, *bifasciata* etc.).

fylla.

A. fylla Dbl. (S9 d). Above black-brown, forewing with a yellowish white oblique band, hindwing with black submarginal ocelli. The forewing is much more pointed in the ♂ than in the ♀. In Central and West China, not rare, besides almost everywhere in the Himalayas, abundant in certain places. — In Indian specimens the oblique band is usually broader and more even than in Palearctic ones. — *fylla* and its near relatives have been separated from the true *Abisara* as *Sospita* Hew.

7. Genus: **Dodona** Hew.

In venation very close to the preceding genera, but very peculiar in colour and pattern, especially on the underside. Easily recognized by the anal angle of the hindwing bearing a projecting lobe, which is sometimes tailed as in *Thecla*. Head broad, with a wide frons, anteriorly obtuse and appearing here flat on account of the palpi hardly projecting. Antennae thin, rather long and quite straight. Body slender. Both wings very broad, the forewing with acute apex, the hindwing with projecting anal lobe and frequently with dentate or scalloped distal margin. The larva onisciform, ovate, flat, with sparse and minute hairs; on Gramineae. The pupa also flattened, with bifid head. The butterflies are plentiful wherever they occur. The genus occurs in India and China; the species appear to be mountain insects.

*durga.**sinica.*

D. durga Koll. Above black-brown, with ochreous dots and before the apex white ones. The hindwing beneath with thin ivory-yellow streaks in the anal area; before the apex of the hindwing two ocelli, each being surrounded with a distinct pale ring beneath. Kashmir. — A larger local form, **sinica** Mengel (S9 d), has been described by LEECH from Central and West China. It differs from the nymotypical *durga* in the spots of the upperside being larger and more reddish yellow, and in the underside being so broadly and prominently streaked that the apical ocelli quite disappear. An albino of this form, which is uniformly pale yellow above, has been described from Tibet by OBERTHÜR as ab. *albescens*.

D. ouida Moore (= *erato* Bsl.) (89 d). In shape similar to the previous insect, and of at least equal *ouida*. size, but the forewing bears orange-yellow bands and the underside is much more uniform in colour, the small tail moreover is absent from the anal lobe. — West China; as a small form with narrow bands widely distributed in the Indian Himalayas.

D. egeon Dbl. This species reaches Palaearctic territory only in Kashmir, being widely distributed *egeon*. and plentiful in the Indian Himalayas. The reddish yellow bands of the forewing above are continued on to the hindwing. The ground-colour is black-brown, being shaded with ochreous basally.

D. eugenes Bat. The nymotypical form does not occur in the Palaearctic Region, the species being here represented by **maculosa** Leech (89 d), in which the spots of the forewing are much larger and brighter *maculosa*. reddish yellow. It differs also beneath rather strongly from the nymotypical form. — West and Central China, abundant. The onisciform larva is emerald-green, with short and sparse hairs and two blue dorsal lines; on mountain bamboo and grass. Pupa pale green, with coarse dark markings and bifid head. The butterflies occur on shady mountain-roads.

8. Genus: **Stiboges** Btlr.

This genus contains but one species, which is composed of only a few local races. Two of these forms are known from the Malay Archipelago, the third is widely distributed in India and extends into the Palaearctic Region in Sze-chuen, where it appears even to be common (LEECH), while in India it occurs generally more in single specimens. The wings have almost exactly the same shape as in *Zemeros*, except that the distal margin is straight and even. The antennae are moderately long (half the length of the costal margin), and the palpi very small. The sexes are identical except that the apex of the forewing is pointed in the ♂ and rounded in the ♀. Nothing is known of the early stages.

S. nymphidia Btlr. (89 d). Both wings white, transparent, the distal margin and on the forewing *nymphidia*. also the costal one broadly black, the marginal band bearing distinct or obsolescent pale spots. Underside like upper. This peculiar pattern strongly recalls certain species of the American genus *Nymphidium* (for instance, *lamis*), as the specific name implies. There is no butterfly in Asia with which this species could be confounded. — Moupin and Omei-shan, in July.

Alphabetical List

of the Palaearctic forms of Erycinidae with references to the original descriptions.

* signifies that the form is also figured in the place cited.

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egeon Dod. Dbl.-Hew. Gen. Diurn. *

flegyas Zem. Cr. Pap. Exot. 3, p. 158. *
fylla Ab. Dbl.-Hew. Gen. Diurn. 2, p. 422. *

lama Hyp. Leech, Butt. Chin., p. 294. *
lepita Lib. Moore, Cat. Lep. E. I. C. 1, p. 240.
lua Hyp. Gr.-Grsh. Hor. Ent. Ross. 25, p. 454.
lucina Nem. L. Faun. Suec., p. 280.
lydda Ab. Hew. Exot. Butt. 3. *

maculosa Dod. Leech, Entomolog. 23, p. 44.

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8. Family: *Lycaenidae*.

The Blues are almost throughout small, often even very small butterflies, which are popularly called Blues on account of the blue colour being prevalent in the majority of the species, at least in the ♂♂. The body is usually delicate, but the wings are strong, so that there are excellent fliers in this family. The blue gloss of the ♂♂ and many ♀♀ is known to be due to structure (not pigment) and has often a magnificent metallic sheen. On the whole the shape is very normal and without peculiarities, except in the hindwing, which has often thin tails in the anal region.

Head of medium size. The semiglobular eyes sometimes hairy, but usually naked, edged with silver behind. The antennae rather short, either gradually or suddenly clubbed, finely ringed with black and white, and extraordinarily brittle, easily bending and cracking or breaking even in the live specimen or freshly killed one. Palpi very variable in length, often different in the sexes; the 1. and 2. segments usually hairy or scaled, the 3. delicate and almost naked. Anterior legs of both sexes functional, in the ♀ with claws to the tarsi as in the mid and hindlegs, in the ♂ with peculiar hooks and smaller than the other legs, but not really reduced to brushes. In those *Lycaenids* which, as e. g. *Gerydus*, suck at Aphids these legs are used for stroking the Aphids (BARROW). Hindtibiae with but one pair of spurs, which are often very small.

The venation is on the whole very constant; the subcostal of the forewing has only 2 or 3 (rarely 4) branches; the cell closed in both wings, being mostly very narrow in the forewing; the hindwing with 2 submedian veins, often with 1 tail, sometimes 2 or even 3 small tails. The hindmargin of the hindwing sometimes forms a fold for the reception of the abdomen.

The eggs small, depressed, with a dense raised network, resembling cells. The larvae onisci- or limaciform, short and broad, somewhat flattened, oval, smooth or covered with small warts or hairs, the head retractile into the prothorax. On the 11. somite there is in many species a gland whose sweet secretion attracts ants, which are said to remain with the larva, protecting it against parasites (the ant-guards). Also species are known whose larvae are carried by the ants into their nest and kept as a kind of domestic animal, the larvae pupating in the nest. Of other larvae it is known that they feed on insects. Most larvae live on low plants, those of the first group however almost exclusively on deciduous trees, often at a considerable height above the ground. In Central Europe most *Lycaenids* hibernate as egg or larva. The pupa is short, broad, anteriorly obtuse, the abdomen much curved and its segments usually strongly telescoped; usually fastened by the cremaster and a girth, but sometimes, especially in myrmecophilous forms, the pupa free in the ground.

The species as a rule do not vary much as regards modification into local forms. It is indeed astonishing that, for instance, *Lampides baclica* occurs in all 4 regions of the globe without showing any constant geographical differences, and that *Lyc. icarus* is found from Scandinavia to North Africa without exhibiting any distinct geographical characters, although the individuals vary strongly in every locality. Distinct seasonal dimorphism is likewise rare, but occurs in certain species (for instance in *Chrysophanus amphidamas*, *thersamon* etc.).

The variability among the specimens from the same district, i. e. the tendency to produce aberrant individuals, is so great that it would be impossible (as well as useless) to enumerate and describe all the numerous aberrations mentioned in the various magazines. As on the whole the various aberrations recur in nearly all the species of the respective genus, CORROISIER proposed to employ the same name for the same kind of aberration in all the species. In the dark forms of the tribe *Theclini* there appears on the disc of the forewing commonly a yellow spot, which occasionally occupies the greater part of the wing. The *Lycaenini* vary particularly in the small ocelli of the underside, which may be confluent, enlarged or reduced, or even obsolete. Bright-coloured forms, especially metallic ones, have above often a broadened or a narrowed black margin, etc. We restrict our descriptions to those names which have already been in common use for some time, and shall indicate the occurrence of similar aberrations where it appears opportune. We abstain, however, from giving detailed descriptions of the whole crowd of individual forms which have been described, many names being based on extremely minute differences.

The family is very generally distributed. The butterflies are met with everywhere at the right season, even above the snow-line and beyond the border of vegetation in the desert; but the family does not extend so far north as the Nymphalids, Pierids and Satyrids. Wherever they occur, however, they fly often in abundance. In India I once observed such masses of blues that the air above the sunny roads appeared to move in consequence of the numberless specimens of *Lampides* and *Zizera* which flitted hither and thither. Almost all places have some species of *Lycaenids*. Some fly rather high in the air, as for instance *Cyaniris*, and some close to the ground, as f. i. *Zizera*. They congregate in numbers on damp places on roads, like the alpine *Lycaena pheretes* and *optilete*, or fly singly across the fields and over shrubs, like *Lyc. arion*.

Many species rush away with the velocity of the wind when pursued, as for instance *Lampides bacticus*, others, conscious of their own slowness, try to conceal themselves on the ground or in thorny bushes, as does *Lamp. theophrastus*.

Many Lycaenids of all groups have when resting the peculiar habit of moving the hindwing forward and backward as if rubbing it against the forewing. This movement has been likened to stridulation, producing a sound which our ear does not perceive. However, as many species in the place where the fore- and hindwing touch each other bear tufts of hairs and other structures similar to the scent-organs of other butterflies (*Colias*), one may safely assume that the rubbing of the wings stands in connection with the production of scent. Among other butterflies I remember to have observed the same movement in *Charaxes jasius*.

Nearly all the Lycaenids are very fond of visiting flowers, and generally also drink water very greedily. They do not care for the exuding sap of trees and are to my knowledge also not attracted by bait. On the other hand they suck at overripe or wounded fruit, and many at Aphids, as already mentioned above.

Tribe Theclini, Hair-streaks.

Always tailed: the body very stout; the wings entire, the forewing very broad, with the costal margin rounded, the hindwing with one, two or three tails, the anal angle being sometimes produced into a lobe, which is recurved in the live specimen. Upperside mostly unicolorous, brown, green or yellow, more rarely, and often in one sex only, spotted with yellow or blue or margined with black. Underside usually with curved lines which are parallel to the outer margin, and short semicircles at or below the apex of the cell. The larvae very flat, strongly onisciform, dull in colour, often with a gland (for ants), feeding mostly on deciduous trees.

This tribe has further been split up by some authors into several sections, for instance by Turrill into *Thestoridi*, *Callophryidi*, *Strymonidi* and *Kurailidi*. These divisions appear to us unnecessary for our purpose.

Most species of the *Theclini* are found in America, particularly in tropical Brazil, where they attain to a great size and magnificence. One of the Brazilian species, *Th. marsyas*, has such a wonderful light blue sheen when flying about that at some distance one might mistake it for a *Morpho*, the very considerable difference in size only becoming apparent on closer approach.

The butterflies have an irregularly flapping, but sometimes very fast flight, and settle on the leaves of the undergrowth, on projecting twigs of bushes or branches of trees, keeping the wings tightly closed. They occur all over the globe, but the finest and the greater number of forms of the genus *Thecla* are American; the group is comparatively but poorly represented in Europe.

1. Genus: **Rapala** Moore.

This genus, in which various authors include different numbers of species, contains small, graceful and swift butterflies, which partly have very conspicuous and bright colours on the upperside. Head large, the frons broad, only becoming narrower above and being conspicuously pale. Antennae minutely ringed with whitish, the strong club black with a russet-red tip, the underside of the antennae bright whitish yellow distally. Palpi short, with the end-segment small and pointed. Thorax very stout, broader than the abdomen, the latter very short in both sexes, slender and pointed in the ♂. Forewing rather broad, the apex pointed, particularly in the ♂, the distal margin from the upper median to the hind angle straight in the ♂, convex in the ♀. The forewing of the ♂ bears beneath in the middle of the hindmargin a tuft of hairs on a silky ground, the hindwing above having in the centre of the costal margin a corresponding ovate spot which has a greyish yellow sheen. Hindwing with the distal margin almost straight; at the anal angle a rounded lobe with strongly enlarged fringes, above it a thin tail. The larvae at first greenish, later often yellow or brown, with dark markings and short hair-tufts placed on seriated warts. They feed on various shrubs (*Schmiedelia*, *Antidesma*, etc.) and are protected by ants of the genus *Crematogaster*. They are difficult to see, being very inconspicuous, but are easily obtained by beating. The butterflies occur singly, but are not rare; they rest with closed wings on the tops of bushes, which they leave occasionally, only to return to them soon or to a branch close by. The anal lobes are recurved when the specimen rests, while the thin tails flutter in the air.

nissa.

R. nissa Koll. (= *subpurpurea* Leech) (72a). Above black, with a blue or slightly violet sheen, in the ♂ only the apical area of the forewing and in the ♀ also the distal margin of both wings being without the gloss. The underside paler or darker brown, with a darker shadowy band before the outer margin. About midway between cell and distal margin both wings are traversed by a dark band which is proximally edged with yellowish brown and distally with whitish; at the apex of the cell a short double band. Widely

distributed in Asia, from West and Central China throughout the Himalayas to Kashmir and North-West India, as far the country is mountainous. The species appears to be absent from the plains, but closely allied forms occur on the mountains in the Malayan subregion. The butterflies are local according to DE NICÉVILLE, but not rare, their habits being as described above. The specimens from the northern districts have sometimes no trace of yellow on the anal lobe, differing therein from Kashmir specimens. A further aberration is characterized by the appearance of a distinct orange or brick-red spot beyond the cell of the forewing: this spot may occur among specimens from all parts of the area of distribution. This form, which was already figured by HEWITSON, may be named ab. *maculata* ab. nor. (72a). In China *nissa* flies in June *maculata*. and July, but occurs apparently all the year round in the warmer districts of India.

R. reperculsa *Leech* (72a). Both sexes very similar to the preceding species, but the forewing less *reperculsa*. broad and pointed, the blue sheen less extended in the ♂ and nearly absent in the ♀. On the underside the band situated in the outer third is paler outwardly, being here almost whitish and on the hindwing of the ♂ double; the abbreviated discocellular are indistinct or absent, the anal lobe on the other hand more brightly and conspicuously coloured and marked. Also in this species there occur specimens which have a reddish yellow cloud on the forewing beyond the apex of the cell, but this patch is as a rule less large and bright than in many *nissa*, and there occur all intergradations between the spotted and non-spotted form. This aberration may be called ab. *nebulifer* ab. nor. On the upper and middle Yang-tse-kiang, on the *nebulifer*. Omei-shan and at Chang-Yang, in July.

R. micans *Brem. & Grey* (= *caerulea* *Brem. & Grey*). Both sexes similar to the preceding, with a distinct *micans*. bright blue gloss above, especially in the ♂. The underside more yellowish grey, the dark discal lines blackish; the anal lobe of the hindwing usually less produced. Common throughout China, except the south; also in the plains. — ab. *betuloides* *Leech* (72a) is the form with a large red discal patch on the forewing. *betuloides*. already mentioned by BLANCHARD; the anal area of the hindwing, moreover, bears a red halfband. Transitions from ab. *betuloides* to *micans* are plentiful.

R. melampus *Cr.* (72b). The upperside entirely red in both sexes, only the costal and distal margins *melampus*. of the forewing blackish. This form has a superficial resemblance only to *Deudorix epijarbas*, the underside, however, is uniformly brownish grey, not bearing numerous white curved lines as in *D. epijarbes*. Specimens with the veins of the forewing black are considered by BUTLER to be ab. *jarbas* *F.* According to MOORE *jarbas*. both forms occur together in the north-western Himalaya, which statement DE NICÉVILLE was apparently justified in doubting, *jarbas* being probably the eastern (Sikkimese) race. — Nymotypical *melampus* occur in Kashmir and possibly also in Afghanistan, the eastern form being widely distributed in India and extending southward to Malacca and Java. Larva flat, yellowish brown, marked with black, a subdorsal and a lateral row of small warts bearing a tuft of small black hairs. Pupa small, of the ordinary Lycaenid shape, yellowish brown, spotted with black, anteriorly rounded, abdomen pointed. The butterflies are on the wing from July until October, in India probably all through the year, being plentiful where they occur.

2. Genus: **Hysudra** *Moore*.

Close to the preceding genus, but the head smaller, the forewing less pointed, and the ♂ without the tuft of hairs at the hindmargin of the forewing beneath. — The genus contains but a single species, which appears to be restricted to Kashmir and the neighbouring districts of the western Himalayas. It was formerly considered to be the ♀ of *Rap. nissa*.

H. selira *Moore* (= *nissa* *Hew. pt.*) (72b). The upperside is dark in ♂ and ♀ with a feeble violet-*selira*. blue gloss; the forewing with a large, anteriorly straight, orange-yellow patch, above which there is often an additional spot; a halfband of the same colour at the outer margin of the hindwing. Underside brownish ash-grey, orange in the anal area of the hindwing, with a small black spot before the tail and a larger one on the anal lobe on a reddish yellow ground. On the whole resembling *Rapala micans* ab. *betuloides* above and beneath, but recognizable by the lesser size, the shape of the wings, the anteriorly straight patch on the forewing and the absence of the scent-tuft on the hindmargin of the forewing in the ♂, there being in *Hysudra* only an indistinct scent-spot in the middle of the costal margin of the hindwing. The insect can be distinguished from the specimens of *Rap. nissa* with a large reddish yellow patch (ab. *maculata*) by the hindwing being larger and having the outer margin more strongly convex. Larva presumably on wild Indigo (*Indigofera atropurpurea*), on which MACKINNON saw a ♀ lay its eggs. — In Kashmir and the adjacent Himalayan countries, in Tibet and probably extending into China. In Kashmir the species hibernates as imago, ovipositing in the spring.

3. Genus: **Deudorix** *Hew.*

Essentially the same as the preceding genera, with a large head, broad whitish frons and short palpi. But the antennae are much longer and reach in many ♂♂ beyond $\frac{2}{3}$ of the costal margin. Shape of wings as in *Hysudra*, the hindwing with a small rounded anal lobe and a rather long but hair-like tail.

The genus, in the most restricted sense, contains but the forms of the *epijarbas* group, which are bright red above and are distributed over a large part of India, being plentiful almost in every district of Southern Asia.

epijarbas. **D. epijarbas** Moore (72b). Above similar to *Rap. melampus*, but the hindwing with a broad semi-circular black costal border. The underside very characteristic, greyish brown, with several rows of numerous white comma-spots and undulate lines on the hindwing; the anal area with a bright metallic blue-green gloss, particularly in the ♂. — On Palaearctic territory only in Kashmir, more plentiful at low altitudes than at greater heights; besides, almost throughout India to the Malayan islands. Larva flat, with retractile head and distinctly separated segments, bearing rather long bristles all over the sides: on the back rows of shallow grooves: ochreous brown, spotted with leaden grey, the spots on the two anterior segments paler and more uniform in colour, the last segments are hard dorsally, forming a kind of shield with which the larva breaks the skin of the pomegranate, on which it feeds. Pupa rounded anteriorly, smooth beneath, above clothed with white bristles, carinate in front, with pointed abdomen, red-brown, irrorated with black. The butterflies occur all through the summer, being found on bushes at roadsides in the mountains: but in such situations only ♂♂ are met with, the ♀♀ occurring higher up in the neighbourhood of orchards. Both sexes have a very fast flight, but always settle on the tips of branches, where they are easily taken with the net. One of the commonest species of *Theclini*.

arata. **D. arata** Brem. (= *ichnographia* Bthr.) (72b). Above sooty black-brown, both wings of the ♂ with a feeble violet sheen, the forewing shiny metallic blue at the base below the cell. On the anal lobe of the hindwing usually an orange-yellow spot of variable size. On the underside of both wings there are wedge-shaped dark shadowy bands parallel with the distal margin, one close to the margin, the other near the cell; in the anal area black dots on a golden yellow ground. In Amurland, nearly throughout China, Corea and Japan. FINESEN mentions from Corea a form which has the red discal spot on the forewing occurring also in the other species, and may be named ab. **luniger** ab. *nov.* The smaller ab. **tyrianthina** Bthr. has the ground-colour of the underside darker and the black-brown wedge-shaped bands are partly confluent: among the nymotypical form. — The butterflies are not plentiful in most districts, occurring from May until July, particularly on road-sides and the edges of woods. This insect, hitherto placed in *Rapala*, belongs to *Deudorix* on account of the absent of the scent-tuft in the ♂ and of the facies as well as markings, as has kindly been pointed out to me by Monsieur COURVOISIER.

4. Genus: **Horaga** Moore.

This genus comprises a number of very similar and pretty, small butterflies which are distributed over India and touch the Palaearctic Region only in Kashmir. Head small, frons narrow, black. Palpi long, porrect. Antennae short, hardly reaching to the centre of the costal margin. Forewing much less elongate and pointed than in the previous genera: the hindwing with 3 tails, which are very rarely preserved, some being missing also in our figure. The wings above sky-blue, with a white discal spot on the forewings, underside brown, with a broad complete median band on both wings.

onyx. **H. onyx** Moore (72c). Forewing glossy sky-blue, the costal and outer margins black, the white discal spot large and lobate. The white median band of the underside narrow at the costa, becoming soon broader, being constricted near the apex of the cell of the hindwing; the anal area of the hindwing beneath is surrounded by magnificent blue glossy elongate spots. In our figure two of the three tails are incomplete in the ♂ and one in the ♀. In Kashmir, more in the southern plains than in the high mountains; Kulu. Also distributed over a large portion of India, where it is plentiful in many localities. The butterflies flutter with a hopping flight slowly up and down the vines hanging down from the trees and settle with tightly closed wings on the leaves of low bushes, where they are easily caught. They are on the wing from April until October, in tropical India all through the year. Whereas the thin anal tails of *Deudorix epijarbas* are nearly always intact, it is extremely difficult to obtain with the net a specimen of *Horaga* without breaking some of the six thin tails.

viola. **H. viola** Moore, which occurs likewise in the north-western Himalayas, is very similar to the preceding, but in the ♂ the white discal spot of the forewing is much smaller and the upperside more violet-brown. — Appears to be rare; I obtained this species only once in the Nilgiri Hills in South India above Metupalayan, in April.

5. Genus: **Chliaria** Moore.

Small delicate butterflies, with the upperside usually of a magnificent metallic blue and the underside white with thin markings. Head small, antennae rather long, thorax strong, relatively broad, abdomen slender and pointed. Forewing broad and rather obtuse, the hindmargin being perfectly straight; the hind-

wing with two extremely thin, long tails, which flutter in the slightest draught and break off very easily. The larvae woodlouse-shape, as far as known living on Orchideae.

C. othona Hew. (72 c). The upperside is of a beautiful metallic sky-blue, with the apex black. *othona*. Underside dull white, with very characteristic pale yellowish brown markings edged with black. The hindwing bears a black dot near the base below the costa. There occur also specimens with pale discal spots on the forewing above. — Throughout the Himalayas, from the west eastward to Sikkim and southward over a large portion of India as far as the Andamans. From March till October, the ♂♂ abundant, the ♀♀ very rare according to DE NICÉVILLE. The onisciform larva is green and has the general facies of the caterpillars of Lycaenids, found on Orchideae which grew on a balcony of a house.

6. Genus: **Camena** Hew.

Head large, the frons rounded, convex; antennae half the length of the costa; palpi large, clothed with silvery white hairs. Thorax very strong; abdomen of the ♂ slender. Upperside of the Palaearctic species metallic dark blue, very strongly glossy; underside white- or silver-grey with thin markings. The anal angle of the hindwing is pointed, not being produced into such a prominent circular lobe as in *Rapala*, *Deudorix*, etc.; two thin tails. The forewing of the ♂ bears beneath in the centre of the hindmargin a tuft of hairs, which corresponds to a silky patch situated in the middle of the costal margin on the upperside of the hindwing. The genus is widely distributed in India, but all the species appear to be rare, only the ♂♂ of *ctesia* are recorded by MARSHALL and DE NICÉVILLE as being "very common in Sikkim".

C. ctesia Hew. (72 c). Upperside of a magnificent bright blue, with black margin; the disc of the *ctesia*. forewing always bears in the ♂ a black patch, which is united with the black margin in several places and sometimes also appears in the ♀. Underside with silvery gloss, light grey; about midway between cell and distal margin there is on both wings a row of dark dots with thin pale edges; a similar spot near the base of the hindwing. — West China (Chia-kou-how), also in the Indian Himalaya. Indian specimens have the upperside yet more glossy and the underside lighter whitish grey than Palaearctic ones, the black discal spot of the forewing above being smaller (LEECH).

C. icetas Hew. (= *contractus* Leech) (72 c). Above similar to *Tajuria longinus*, deep dark blue, with *icetas*. the apical area of the forewing black. This black area reaches farther proximad and extends along the hindmargin towards the base; the blue colour is also darker and has a far less strong metallic gloss than in *T. longinus*. The underside is pale dust-grey, with a submarginal row of brownish shadowy spots, on the proximal side of which there is a black line ending in the anal area in a V; the anal area with dark spots surrounded with reddish yellow. The ♀ is more extended black above, the blue scaling being sparser and paler. — Distributed throughout the Himalayas, occurring on Palearctic territory in Kashmir as well as in West China, extending along the Yang-tse-kiang as far east as Chang-Yang.

7. Genus: **Tajuria** Moore.

This genus, which taken in its wider sense contains numerous, almost exclusively Indian species, is very close to *Camena*, but differs in the ♂♂ having no scent-organ. Moreover, the hindwing is narrower and more elongate posteriorly than in *Camena*. The caterpillars, as far as they are known, have a very peculiar shape and, when on a leaf, resemble bird-droppings or a pod fastened to the leaf. The pupa is very strongly hump-backed, being deeply concave behind the thorax with the anterior segments of the abdomen strongly raised again. According to MOORE the pupa fastened at the foodplant as in Nymphalids, without a girth.

T. longinus F. (♀ = *pseudolonginus* Dbl.) (72 c). Costal margin and apical half of the forewing *longinus*. above black, as is also the apical area of the hindwing. In the ♂ the rest of the upperside of a wonderful glossy cyaneous. Underside light dust-grey, the forewing sometimes without markings, the hindwing with a chain of obliquely placed submarginal comma-spots. Anal area with 2 black spots surrounded with yellowish red, with bluish green in between. The ♀ above rather light blue, almost whitish; the oblique submarginal spots of the underside are much stronger and larger and are present on both wings, those of the hindwing being also visible above. — Kashmir, and throughout India and Ceylon as well as the Malay Archipelago. The head of the larva flat and porrect, the thoracic segment strongly swollen, with a saddle-like depression behind the thorax, the 8. and 9. segments again enlarged and the following segments gradually tapering to a point; dark brown, with dull white dorsal patches; on Loranthaceae. Pupa thick, short, uniformly dark brown, the back with saddle-like depression, the first abdominal segments being dorsally strongly elevate. The butterfly is one of the very commonest of the whole tribe; it flies in the northern

districts in July and August, in tropical India all through the year. The ♂♂ rest on bushes at road-sides, usually with the head turned towards the road; they are also found in gardens, and show a preference for the flowers of Poinsettia.

luculentus. **T. luculentus** *Leech* (72d). Much lighter than the previous species, both sexes similar to the ♀ of *longinus*, pale blue and without strong gloss; beneath almost white, with two or three rows of thin dashes in the outer area of both wings. — I received this species from JANKOWSKI from the neighbourhood of I-chang, where it was not common. LEECH described it from Chang-Yang. It appears therefore to be restricted to Central China.

8. Genus: **Laeosopis** *Rbr.*

This genus, which resembles a large *Lycaena* in facies, contains but one species, whose systematic position is still doubtful. Following STAUDINGER and REBEL we place it with the three following genera near *Satsuma*, while other authors have either classified the only species with *Lycaena* or with *Thecla*. It differs widely from the former in several points and is distinguished by its naked eyes from *Thecla* as well as *Zephyrus*, which have hairy eyes. The genus is of very limited distribution, some former records (Bozen, Frankfurt a. M.) having been ascertained to be erroneous.

roboris. **L. roboris** *Esp.* (= *evippus* *Hbn.*) (72d). Upperside black, with ultramarine scaling in the ♂ from the base to the broad outer area, in the ♀ only in the basal area. Underside ashy grey, with a yellow margin in which stand light blue spots and before which are proximally pale-edged black dots.*) Only in *lusitanica.* South France, especially the Pyrenees, and Spain. — **lusitanica** *Stgr.* (72d) is the form from Portugal, which is more glossy yellow beneath and has a broad yellowish red marginal band bearing hardly any spots on the forewing. Whereas nymotypical *roboris* occurs in South Spain, STAUDINGER obtained a transitional form in Castilia. — Egg globular, reddish. Larva woodlouse-shaped, grey, with short black bristles, two dark yellow, interrupted dorsal lines, between which there is a black spot behind the head; venter dirty yellow, legs yellow. Sluggish, but feeds quickly (HÖFNER). From April till the end of May on ash and privet. Pupa barrel-shaped, fastened with several separate threads. The butterflies occur from June till the autumn in valleys with trees and shrubs and are plentiful in some places; they settle particularly on ash and chestnut, and when disturbed generally return to the same spot and therefore are easily obtained in good condition (ELWES).

9. Genus: **Niphanda** *Moore.*

The ♀ in facies similar to the preceding genus, but the forewing of the ♂ more pointed and the hindwing produced into a small point in the anal region. Head small, frons narrow; eyes small; antennae long; palpi very long, stretched forward horizontally; legs thin. Wings broad, above rather uniform in colour, with the markings of the underside coming through. The species occur in South and East Asia and fly singly on the banks of rivers. The ♀♀ are dimorphic to a certain extent, an albinotic form occurring more or less commonly besides the normal dark form, for instance in *N. cymbia* from Sikkim, a. o.

fusca. **N. fusca** *Brem. & Grey* (= *dispar* *Brem.*) (72e). Above dark brown, the ♂ with a dull purplish violet sheen. Underside grey, with numerous pale-edged darker ocelli, of which those in the basal area of the forewing and costal area of the hindwing are more blackish than the others. Amurland, throughout China except the south, Corea and Japan, from June until autumn, locally not rare. I found it drinking on the *lasurea.* sandy banks of the Yang-tse-kiang in June. GRAESER describes as ab. **lasurea** (72e) a light-coloured ♀ with the base of the wings shiny blue; such specimens appears to occur everywhere among the ordinary form and in company with all intergradations.

10. Genus: **Orthomiella** *Nicér.*

The small species which belongs here was formerly placed in *Chilades*, resembling indeed *Chilades laius* very closely in size, shape and colour and flying together with it in Sikkim. We place it with LEECH near *Niphanda*. Head and palpi relatively large, the antennae short, with a strong club; the wings entire, without tails. The 1. subcostal of the forewing anastomoses for some distance with the costal. The pattern of the underside resembles to some extent that of *Niphanda fusca*.

O. pontis *Elw.* The nymotypical form, from Sikkim, has not yet been found on Palaearctic territory. *sinensis.* But another race, **sinensis** *Elw.* (72e; misprinted *sinapis* on our plate), occurs along the Yang-tse-kiang to

*) By mistake on Plate 72 row d the upperside of a second ♂ and the underside of a ♀ are figured, instead of the reverse. The fourth figure, therefore, represents a ♂ and the fifth the underside of a ♀ of *roboris*.

its mouth. Above blue with purple sheen, both wings with a dark border, which reaches posteriorly on the hindwing to the middle of the wing; underside with dark spots, which partly have pale edges. The principal difference between Indian and Chinese specimens appears to be the absence from Palaearctic individuals of the green sheen in the basal area of the wings, which characterizes the Indian ♂♂.

11. Genus: **Callophrys** Billb.

This genus contains in the Old World only a single species, which occurs throughout Europe, North Asia and North Africa, and is one the butterflies which extend farthest north. There are several representatives in North America, whose specific distinctness, however, is not in every case beyond doubt. Head small, moderately broad, frons white, slightly convex, with a small tuft of hairs on the vertex. Eyes hairy, edged with silvery white in front. Antennae hardly half as long as the costal margin, rather thick, but brittle, ringed with white, beneath white before the black club, the latter with orange tip. Palpi delicate, shorter than the head. Forewing entire, with the hind angle almost 90°, already broad near the base, the costa being strongly arched close to the base; outer margin of hindwing somewhat dentate, the anal angle produced into a small lobe, which is curved outward when the wings are closed. Caterpillar of the usual woodlouse-shape, minutely and sparsely hairy, green with a bright longitudinal stripe along the back and another at the sides. Pupa very obtuse, marmorated with brown, bearing minute hairs. The butterflies have two broods in warmer localities.

T. rubi L. (72e). Above black-brown with white fringes; ♂ with a scent-patch on the forewing *rubi*. below the costa in the centre. Beneath green, with some white dots on the disc of the hindwing. In ab. **immaculata** Fuchs (72e) these white dots are absent, while they form a complete row in ab. **punctata** Tutt, *immaculata*. which is even continued on to the forewing. Numerous modifications in the degree of completeness or *punctata*. obsolescence of the row have received names (*caecus*, *incompleta*, *bipunctata*, etc.), such individual aberrations occurring all among specimens of the nymotypical race. — **borealis** Krul., from Kasan, is somewhat smaller, *borealis*. being more yellowish green and without the white dots of the nymotypical form. — **polaris** Möschl., from *polaris*. the most northern districts of the area of distribution, is a small form, with the underside duller green. — **sibirica** Rühl differs in almost the same way, the underside being less bright green than in *rubi rubi*; *sibirica*. Northern Asia. — **fervida** Stgr. (72f) is a southern form, the upperside being paler brown with a golden *fervida*. sheen (unfortunately not distinct in our figure). — **suaveola** Stgr. (72f), from Central Asia, is as large as *suaveola*. the largest European specimens, the upperside darker, the underside deeper green. From Saisan and Lepsa; as true *rubi* also occurs in these localities, *suaveola* may turn out to be the summer-brood. — There occur, moreover, a number of individual varieties; for instance, specimens with the underside brown instead of green, ♀♀ with a reddish yellow discal spot on the forewing above (BLANCHET), etc. Egg depressed, green, reticulate. Larva dark green, with a black-edged yellow dorsal line accompanied by pale spots, and with a yellowish side-line. It feeds in June and the autumn particularly on Papilionaceae, such as *Sarothamnus*, *Genista*, *Cytisus*, but also on many other plants, as oak, *Vaccinium*, *Sedum*, etc. It often bores deep into the flowers of *Genista*. Pupa short, much rounded; resembling a small bean, immovable, but nevertheless producing a feeble noise, which KLEEMANN calls creaking, SCHULDE twittering or chirping. The butterflies occur from April into July and in warmer districts of the plains again in July and August, the two broods being almost continuous, for instance at Darmstadt. They are very plentiful in most places and always rest with closed wings on shrubs and green twigs of *Genista*; they are not shy, the spring-specimens being particularly fond of the flowers of *Potentilla*.

12. Genus: **Satsuma** Murr.

This genus, containing half a dozen species which are nearly all Palaearctic, agrees closely with the preceding in all details. Head small and delicate, with very large hairy eyes. Palpi erect, with thin end-segment, the underside being long-hairy. Antennae almost half the length of the forewing, thin and brittle, ringed with white, rather suddenly incrassate to form a long black club. Forewing broad near the base, the costal margin being strongly curved close to the base and the distal margin straight; subcostal 3-branched. Hindwing without tail, the costal margin short and straight, the anal angle produced into a lobe which is bent inwards when at rest, forming a broad and deep fold which envelopes the abdomen. Otherwise neuration and scent-patch as in *Callophrys*. — Small quick butterflies, with the upperside uniformly dark, partly dusted with blue or lead-colour, and the underside cloudy. They occur in the extreme east of the Region, from the Altai, Tibet and West China to Amurland and Japan, flying early in spring. They settle on projecting twigs of isolated small trees or bushes, from which point of vantage they attack

insects that fly by, always returning to the same spot after such a flight. At rest the wings are always closed. In contrast to *Callophrys* they have apparently only one broad and have so far almost exclusively been found in the mountains, where they go up to 6000 ft. The species of the North American genus *Incisalia* Mén. are closely allied to *Satsuma*.

- frivaldszkyi*. **S. frivaldszkyi** Led. (= *coerulescens* Motsch.) (72f). Above blackish brown, dusted with bluish grey, particularly at the base. ♂ with a very small yellow scent-patch at the edge of the cell; hindwing with curved median bands which form the border of the darker basal area. Extending from the Altai through Central Asia, Siberia and Mongolia to Amurland. — *ferrea* Btlr. (= *frivaldszkyi* Pryer) (72f) is the eastern form from Corea and Japan; it is larger, the upperside being more evenly dusted with iron-grey to the margin and the orange-yellow scent-patch of the ♂ being much larger. Not rare from March into June; the butterflies belong in Japan to the very first species in the spring.
- pratti*. **S. pratti** Leech (72f). Larger, the upperside duller, dusted with pale iron-grey at the base, the scent-patch of the ♂ being dark, instead of yellow. Distal margin more distinctly dentate; the hindwing beneath darker, with conspicuous white markings. — In Central and West China, at I-chang, singly, in June and July.
- nicevillei*. **S. nicevillei** Leech (72f). This mountain form has the upperside of the forewing dusted with bright blue except for a rather narrow costal border and the outer margin, and moreover, is recognized by the very distinctly spotted fringes and the large dark scent-patch at the apex of the cell on the forewing of the ♂. The underside is very uniform in colour, the discal lines being slightly edged with white. The anal lobe more pointed than in *pratti* and the hindmargin more deeply sinuate proximally to it. — Chang-Yang in Central China, 6000 ft. This species is perhaps the same as the only non-Palaeartic one, which DE NICÉVILLE described from the Khasia Hills (LEECH).
- circe*. **S. circe** Leech (72f. g). Above dark, but the basal area of both wings entirely dusted with bright metallic blue. The scent-spot yellow, as small as in *frivaldszkyi*. Hindwing beneath rather uniform in colour, with a somewhat flexuose discal line and a crenate submarginal one, the former separating the dark brown basal area from the much paler outer area. — A small form from West China, not rare at Ta-t sien-lu in May and June.
- chalybea*. **S. chalybea** Leech (72g). Somewhat larger than *frivaldszkyi*, above more bluish grey than leaden-grey proximally, the discal lines of the underside not edged with whitish. The scent-patch of the ♂ yellow, but much smaller than in *frivaldszkyi*. The underside with 3—4 dark undulate lines parallel with the outer margin. Central China. — *pluto* Leech (72g) is almost entirely deep black above; the discal lines of the underside of the hindwing broader and darker: West-China. — In June and July.

13. Genus: **Thecla** F.

Although closer examination, especially by English authors, has shown that there is no justification for uniting all the following forms in one genus, we follow nevertheless the usual custom and deal under *Thecla* with all the small or medium-sized species with dark upperside and longer or shorter tails. The ♂ bears, as in the previous genus, an ovate scent-patch near the apex of the cell on the forewing; the upperside of the ♂ is otherwise usually quite unicolorous, bearing in the ♀ a diffuse, more or less yellow or red, discal patch on the forewing. The underside, too, is generally unicolorous, being somewhat paler than the upperside, but before the outer third there are lines composed of small spots, forming W-like markings before the anal area of the hindwing which are variegated with red, yellow or blue.

Head small, densely scaled, bearing dispersed hairs; frons flat, hardly projecting between the eyes. The latter slightly hairy, more densely in the upper third. Antennae thin and rather short, always less than half the length of the forewing. Palpi thin, moderately long, bearing bristly hairs, the third segment smoothly scaled. Forewing triangular, the outer margin usually straight in the ♂, somewhat convex in the ♀. Hindwing without teeth, the margin curved, the anal angle produced, often with 1 or 2 very thin tails above it. Egg depressed, even a little concave above, with a network of irregular channels. Larva similar to that of *Callophrys*, onisciform, green or brown, with oblique dorso-lateral spots. Pupa very smooth, all parts rounded, not dissimilar to a large scale-insect, closely applied to a branch with the anterior surface. The butterflies have an irregular but rather fast flight, occurring at the edges of woods, on road-sides and in nurseries of fruit-trees. They are usually found singly, but are more plentiful in some years. They visit flowers and rest with closed wings on the leaves of shrubs, on which they sometimes walk about. They have only one brood and hibernate as egg or larva.

T. spini Schiff. (72g). Black-brown, unicolorous above, the ♂ with a scent-patch at the end of the *spini*. cell on the forewing, the ♀ with some yellowish red spots in the anal area of the hindwing, which are sometimes enlarged and united to form a halfmoon, and sometimes also with a reddish yellow discal spot on the forewing. Underside with an almost straight line composed of white bars across both wings, and reddish, in the anal area blue, submarginal spots. In Central and South Europe, from France and Belgium to Greece and Asia Minor, almost everywhere, but singly; not in Great Britain. ab. **major** Rühl are especially large *major*. specimens which are more dark brown beneath than grey-brown, the scent-patch of the ♂ moreover being enlarged. ab. **modesta** Schultz are specimens which have no blue spots in the anal area on the hindwing *modesta*. beneath. In ab. **spinoides** Schultz the white band beneath is separated into small spots on the forewing *spinoides*. and widened into longitudinal spots on the hindwing. — **lynceus** Hbn. (= *andalusica* Led.) (72g) is a form *lynceus*. from South Europe in which both wings have yellow spots, more especially in the ♀. — In the Caucasus, Syria and Persia there occurs a long-tailed race in which the underside is more grey: **melantho** Klug (72h). — *melantho*. **laticornis** Fx. (72h) is one-third larger, with the colour darker and more intense, the scaling being so dense *laticornis*. that the scent-patch of the ♂ is hardly visible; from the Amur, Corea, and North China. — Egg depressed, the slightly concave top with a minute rosette of dark cells, the egg otherwise armed with minute points, grey-white, deposited singly or in batches on the food-plants, Rhamnus and Prunus. Caterpillar pale green, paler on the back, with a thin dorsal double line and pale dorso-lateral oblique spots; lateral line whitish. Until June, particularly on Rhamnus cathartica. Pupa resembling a small brown fruit minutely variegated and dotted with blackish. The butterflies in June and July, at Konstanz also in August according to REUTTI, singly and almost everywhere rather rare. They are partial to the flowers of Senecio, Sambucus and Sedum album and telephicum.

T. w-album Knoch (72h). Above similar to unicolorous specimens of *spini*; the white band of the *w-album*. hindwing beneath commences more proximally, about the middle of the costal margin, and runs straight to the base of the tail, forming here a W. Before the margin of the hindwing a bright red undulate band. Central, Northern and Eastern Europe and Anterior Asia. In ab. **butlerowi** Krul. the white band *butlerowi*. of the hindwing beneath is posteriorly obsolete, there being no white W. On the other hand, ab. **albovirgata** *albovirgata*. Tutt has the white band much wider, reaching on the hindwing to the red submarginal band; there occur also transitions towards this aberration (*semialbovirgata*), with the band widened in parts. — **sutschani** Tutt *sutschani*. resembles the nymotypical form, but the underside is paler grey and is variegated with small white spots at the red band; from Sutchan. — **fentoni** Btlr. is coloured above like European specimens, but agrees with *fentoni*. *spini* in size, and the submarginal spots of the hindwing beneath are orange instead of red; North Island of Japan (Hokkaido). — Egg semiglobular, red-brown, with white reticulation; as a rule deposited in pairs on Elm. Larva until June, adult light green, with thin small oblique subdorsal stripes and brownish head; it generally takes such a position on the underside of a leaf that it resembles a small fresh leaf or a fold between the ribs. Pupating on the trunk or close to the ground; often the sexes meet already as larvae and pupate near one another, the ♂ behind the ♀ (VOELSCHOW). Pupa yellowish brown, with darker wing-cases. The butterflies occur in July and August and are rather local. On certain days I have seen towards 11 o'clock some numbers come down from the tree-tops to the road where they settled in the dust, not on damp places. As they could not find a firm hold, they frequently tumbled over and remained lying sideways in the sun. Otherwise singly near woods and in avenues of elm-trees.

T. eximia Fx. (= *affinis* Stgr.) (72h). Much larger; above with a large scent-patch in the ♂ and *eximia*. a red spot on the anal lobe. The red anal band of the hindwing beneath is very distinct and its continuation forwards white, the tip of the tail also thinly white. ab. **fixseni** Leech (72i) differs, besides the *fixseni*. much more variegated underside, in the forewing above bearing the yellowish red discal spot already mentioned in the other species, and in the anal markings of the hindwing above being larger. — Both forms, *eximia* and *fixseni*, fly together in Amurland, Corea, Central and West China, Mongolia and Manchuria. They occur in August and are apparently not rare.

T. patrius Leech (72h). Above very similar to *w-album*, but the tails longer, the scent-patch of the *patrius*. ♂ elongate-ovate. The main difference consists in the different position of the white band of the hindwing beneath: the line commences much nearer the base, proximally to the middle of the costal margin, and therefore runs very obliquely towards the base of the tail. — In June and July, at Pu-tsu-fong in West China, at an altitude of 10000 ft.

T. lais Leech (72i). This species was originally described from the specimen here figured, a ♀. *lais*. Rather small, with the discal spot on the forewing and anal one of the hindwing dull red, the rather variegated underside bearing characteristic white markings. — Wa-ssu-kow, West China, in July.

T. inflammata Alph. Similar to *eximia*, which it connects with *ornata*. The upperside bears a reddish *inflammata*. yellow discal spot on the forewing, but no red anal spot on the hindwing. It is impossible to decide in

this place, whether the insect is a mere slight variety of *ornata* or distinct. — Obtained in July in the province of Kan-su.

ornata. **T. ornata** *Leech* (72i). A much larger and finer insect than *lais*; the discal patch of the ♀ large and conspicuously red. The underside has on both wings an additional submarginal row of white-edged dark spots. — In Central China, at Chang-Yang, in June and July.

grandis. **T. grandis** *Fldr.* (= *eretria* *Hew.*) (72i). Very similar to *w-album*, but beneath much more leaden-grey than brown, the white line of the forewing more evenly curved and extending to the hindmargin without a distinct angle, the red markings of the underside usually restricted to the anal area, with more distinct blue scaling between the red spots. — Particularly in North and East China, singly and not frequent.

percomis. **T. percomis** *Leech* (73a). The unique specimen on which the original description was based and which we figure here, was obtained on the Omei-shan at 4000 ft. in July. The bright orange-red spots on the upperside are not in the place where they are usually situated in aberrant ♀♀ of other species, but the spot of the forewing stands at the hind angle, as on the hindwing. The underside with its very delicate markings strongly recalls *w-album*. — It is possible that we have here only to do with an aberrant individual of another species.

v-album. **T. v-album** *Oberth.* (73a). Differs from *w-album* in the rounder wings, in both sexes bearing an orange discal spot and in the white line on the underside being more curved and almost parallel with the distal margin. — In West China; plentiful, up to 8000 ft., in June and July.

ilicis. **T. ilicis** *Esp.* (= *linceus* *F.*) (73a). Above and beneath uniformly brown; upperside of ♂ in the sun with a beautiful blackish green sheen, the orange-yellow spot so often found in other *Theclas* being mostly quite absent; this spot in the ♀ replaced by some smears or dispersed yellow scales. The white line on the underside is separated into a number of irregularly placed bars, which are often hardly recognizable, the w-mark in the anal area not being distinct on account of the frequent interruption of the line; the red submarginal spots of the hindwing beneath are also reduced. The rather short tail has a white tip. Throughout Central and South Europe and North Africa, as far as Anterior Asia, occurs also in Denmark and Scandinavia, but is absent from Great Britain. — **HOLTZ** describes als *cilicica* a larger form from the Taurus, which has an additional red spot near the second red spot (counted from behind) of the submarginal halfband on the hindwing beneath.*) — ab. **cerri** *Hbn.* is the (rarer) form with a large yellowish red discal patch and some anal spots of the same colour on the hindwing above; this form is not at all confined to South Europe, but has been found by me in the Odenwald, Westerwald, at Frankfurt a. M., and according to RÜHL has frequently been observed in Baden and Alsacia, occurring apparently among normal specimens throughout South-West Germany. Fig. 690/691 of HÜBNER (ab. *esculi*) is only *cerri* with the discal patch occupying the whole outer half of the forewing and the additional red-yellow submarginal spots of the hindwing above united to form a macular band. — ab. **esculi** *Hbn.* (73b) (Fig. 559/560) is a small form with rather long tail and unicolorous upperside (there being only a small red spot at the anal angle); on the underside the row of bars of the forewing is indistinct and the brownish yellow submarginal spots of the hindwing are but slightly prominent; Portugal, Spain and South France; according to the size of the discal patch of the forewing some transitional specimens have been provided with names (*ilicioides*, *maculata*), such as probably occur wherever *ilicis* is found. The yellow patch is apparently most strongly developed in North Africa, that colour being prevalent in ab. **fontaineae** *Aign.*, only the base and margins of the wings being brown; *caudatula*. Algeria. — In Anterior Asia occurs the form **caudatula** *Zell.* (= *bischoffi* *Gerh.*) (73b), which is characterized by the tip of the tail being more extended white, which colour does not sufficiently contrast with the back-ground in our figure of the ♂. — In **mauretanica** *Stgr.* (73a, b), whose ♂ is quite unicolorous above and beneath, the most striking character is the complete absence of the white line on the underside. The ♀♀ of this form, which I have several times caught in copula with true ♂♂ of *mauretanica*, bear very often yellow discal smears, which sometimes are so extended over the whole upperside that the latter is entirely glossy golden; such ♀♀, which I found at Lambèze in Algeria among true *mauretanica*, may be called ab. **auronitens** *ab. nov.* (73a); they correspond to ab. *fontaineae* of *ilicis*. South Algeria, Tunis, and Morocco. — The egg hibernates according to RÜHL, but according to GILLMER the larva already appears in July. The adult caterpillar pale green, marked with darker green along the back, with short oblique smears, head and thoracical legs black. Feeds until May particularly on younger oaks. Pupa yellowish when fresh, later brown, with three rows of dark dots on the abdomen. The butterflies are very plentiful throughout the southern districts of our Region, occurring in great abundance in the oak-woods in Africa, resting in numbers on a low blue thistle. In Central Europe they are met with in June and July particularly on the flowers

*) ♂♂ from Adana which I have before me do not have this spot.

of brambles and on oak-bushes. The ♀♀ are somewhat less plentiful and occur more towards the end of the season of the species, sometimes as late as August. Though WHEELER speaks of two broods, I have found everywhere but one brood, even in Africa.

T. acaciae F. (73b). Smaller than true *ilicis*, hardly so large as *esculi*. Above uniformly dark brown, the ♂ bearing 1—3, the ♀ 2—5 small red anal spots. The line of white bars on the underside is straighter, being somewhat curved outward at the anal angle of the hindwing without forming a W. ♂ without scent-spot. Particularly in Central Europe. From South France to Asia Minor and Transcaucasia; also in Spain, if not confounded with *esculi*; very local and usually rare. — **abdominalis** Gerh., from the Black Sea countries, is larger and has a grey instead of brown under surface with the white line broader and continuous, the forewing bearing 1—3 dark spots beneath before the hind angle. — **gerhardi** Stgr. (73c) is still larger and the hindwing beneath bears blue and black spots with hardly noticeable red edges, instead of a red band. These spots are separated from the edge of the wing by a usually very distinct white marginal line. At Mardin and Aintab. — **beccarii** Verity, from Florence, is a very small, dwarfed, form; almost tailless, the white line of the underside nearly obsolete. — Larva pale yellowish green or grass-green, with black head, two yellowish subdorsal lines and, further laterad, small pale oblique spots; in May adult on blackthorn, especially small bushes which grow on sunny slopes; the larva can be obtained by beating. The butterflies have very definite haunts which are widely dispersed throughout the distribution area and often of very limited extent; they occur particularly on rocky slopes, with blackthorn hedges and exposed to the full force of the sun, in June, showing a preference for resting on Umbellifers.

T. rubicundula Leech (73d, erroneously printed *rubimacula* on the plate). The ♀ of this small Central Chinese species has an inconspicuous and dull-coloured patch on the forewing, which is absent from the forms of *acaciae*. On account of the insufficient material it is not known if the spot is always present. The underside is characteristic, the red submarginal band of the hindwing being continued on to the forewing and the white W-line at the anal angle being double. — Chang-Yang, obtained in June.

T. oenone Leech (73c). Likewise from China (Ta-t sien-lu). Larger, similar to *pruni*; like this species with a row of dark spots in the red submarginal band of the hindwing beneath, but this band vestigial only. On the other hand the hindwing above bears a red anal band, which in the ♀ is even continued on to the forewing, there being moreover a whitish marginal line in the anal area of the hindwing. Found at a considerable altitude.

T. mera Leech (73c). Still larger, almost equalling in size a large *pruni*, but the ♂ above without any red in the anal area of the hindwing. The tails longer than in *pruni*, the white line of the underside distinct and very straight, double in the anal area of the hindwing. — In Japan, not plentiful, probably the eastern representative of *pruni*, which does not occur in Japan.

T. pruni L. (73d). Above in the ♂ with a few anal spots, in the ♀ an anal halfband and sometimes a discal spot brick-red. Beneath the line of white bars is very thin, and the brick-red submarginal band of the hindwing is placed between two rows of black spots, which are thinly edged with bluish white, and is sometimes continued on to the forewing. Throughout Central and South Europe, from the Atlantic coast and Great Britain throughout Europe and Asia to Amurland and Corea; but absent from North Africa and probably also from Japan, the specimens recorded from the latter country presumably belonging to *mera* or *prunoides*. In ab. **fulvior** Tutt (particularly ♀♀) the forewing bears an orange-yellow discal patch, the rest of the wing being dusted with golden brown. In ab. **ptorsas** Hfngl. both wings have a reddish yellow submarginal band above; transitional specimens have an incomplete band (ab. *progressa*, *excessa*). ab. **obsoleta** Tutt has no reddish yellow anal spots above, while these spots are pale yellow instead of red in ab. **lutea** Tutt. A specimen in which the underside is dull and has no black spots on the proximal side of the band on the hindwing has received the name ab. **paupera** Tutt, and individuals with a broad white macular band on the underside parallel to the outer margin are ab. **albofasciata** Tutt. — Egg quite flatt, chagreened, greyish brown, with the top concave; deposited singly or in pairs. Larva woodlouse-shaped, green, with a darker dorsal stripe, at the sides of which there are small brown warts or tubercles; from April till the end of May on Blackthorn and Plumtrees. It has been observed to attack other *pruni*-larvae which had fastened themselves before moulting (FROHAWK). Pupa anteriorly somewhat angular, black-brown, with darker markings and a pale saddle-patch, the abdomen being tuberculate and strongly raised, the whole resembling a small bud or bird-droppings. The butterflies appear in June, usually flying singly, being so abundant however in certain years that one can easily obtain several dozen within an hour. At such occasions they fly about the twigs of the food-trees and the undergrowth beneath them; they are very partial to flowering privet.

T. prunoides Stgr. (73d). Smaller than *pruni*, the ♂ above usually quite unicolorous, without any anal red. The white line on the hindwing beneath more distinct, straighter and at the costa a little nearer the base. ♂ without scent-spot. — From the Altai eastward, in Amurland, Corea and probably also Japan.

- herzi*. **T. herzi** Fics. (= *phellodendri* Stgr. i. l.) (73d). Hindwing tailless, two teeth above the anal angle. Upperside unicolorous, the ♂ with a pale scent-spot. Underside traversed by two rows of black-centred ocelli, there being a similar spot at the apex of the cell. Hindwing beneath with small red anal band.
- fulva*. Fixsen has proposed the names ab. **fulva** and ab. **fulvofenestrata** for specimens with a more or less large yellow discal patch on the forewing. — Amurland, Corea. Larva velvety, uniformly dark green, beneath more bluish green, with the head glossy black. In June adult on *Pyrus*. Pupa light green, with a brownish violet saddle-spot (GRAESER). The butterfly appears in July, flying particularly about the twigs of *Phellodendrum amurense*.
- thalia*. **T. thalia** Leech (73e). Very similar to the preceding, but tailed, the ocelli somewhat differently arranged and the red anal band of the underside more strongly developed. — In Central China at Chang-Yang, at an altitude of 6000 ft., in June and July.
- ledereri*. **T. ledereri** Bsd. (73e). Tailed or tailless, with long fringes and the anal angle of the hindwing somewhat pointed. Upperside blackish brown, the basal area glossy grey on both wings; in the anal area of the hindwing an obsolescent russet-brown macular halfband. Underside light grey, the base dusted with light blue; both wings with a row of exteriorly white-edged black ocelli, outside which there are black sub-marginal spots on the forewing and a double row of dots on the hindwing with red spots between the two rows. — In Asia Minor, Transcaucasia, Transcaspia and Armenia, in May.
- lunulata*. **T. lunulata** Ersch. (73e). Above similar to the preceding species; but underneath the blue basal dusting is absent or vestigial and the row of ocelli is replaced by a white curved band composed of contiguous lunules. Above the anal angle a long thin tail, which is unfortunately not present in the figure, as it was missing in the specimen figured. Anterior Asia, North Persia, the Pamirs and Hissar Mts., in desert localities, in May. — There occurs also a tailless form, in which moreover the underside is more prominently marked, bearing a black dot at the concave side of each white halfmoon; this is **acaudata** Stgr., from Ferghana.
- sassanides*. **T. sassanides** Koll. (= *deria* Moore, *mirabilis* Ersch., *lunulata* Rom.) (73e). Tailed, above dark brown without markings. Beneath grey, with a prominent, somewhat irregular, proximally dark-edged band of white bars, outside which there are dark spots and dots and before the base of the tail sometimes traces of red. — From Turkestan and Persia to Afghanistan, Baluchistan and Kashmir, on dry slopes and steppes. According to LANG it occurs up to 11000 ft., and on hot days flutters in numbers about a grey-leaved thorn-bush (DE NICÉVILLE).
- myrtale*. **T. myrtale** Klug. A small and very little known butterfly, not larger than *rhymnus*, above uniformly dark grey with a black margin and a small, indistinct, yellow spot at the anal angle. The underside likewise dark grey, paler distally, with quite obsolescent traces of a white transverse line and of some yellowish red spots in the anal area of the hindwing. The tail is absent or vestigial. — So far only known from the Lebanon, where it is said by MARY DE LA BECHE to be locally plentiful in May and June at a height of 4—6000 ft.
- rhymnus*. **T. rhymnus** Er. (73f). Tailless, the wings brown above and beneath. The underside irrorated with numerous white short dashes, which are partly placed in rows and partly irregularly dispersed. — In South Russia, South Siberia to the Altai, in May and June, on steppes.
- sinensis*. **T. sinensis** Alph. (73e, f). Above black-brown, unicolorous. Beneath grey-brown, with strongly spotted fringes, and before the outer margin a row of whitish-edged black ocelli, at the proximal side of which there is a curved line composed of white lunules, some additional whitish dashes and dots being dispersed over both wings, particularly the hindwing. In the Sinin Mts. — The form **pretiosa** Stgr. (73f), from the Tian-shan in Turkestan, has the fringes more uniformly chequered on both sides, and the white markings of the underside more seriate. At Margelan and in the Namangan Mts., not rare.
- tengstroemi*. **T. tengstroemi** Ersch. (73f). Above uniformly black-brown, the base of both wings somewhat paler. The underside similar to that of *ledereri*, bearing as in that species a row of reddish yellow sub-marginal spots, each accompanied on the in- and outside by a black dot. Easily distinguished by the rounded anal portion of the hindwing bearing a hardly visible tuft of hairs instead of a tail. Moreover, the white discal halfmoons on the hindwing beneath do not form a continuous row, but are more irregularly placed. In the plains of Anterior and Central Asia; Ferghana; Saisan. — **carbonaria** Gr.-Grsh. (73f), from the Pamirs, is deeper black above with the base but little paler, the underside being more unicolorous. This is the Central Asiatic mountain-form, which flies at altitudes of from 3 to 9000 ft., while the nymotypical form *davidi* is more restricted to the steppes of the plains. — **davidi** Oberth. (73f) has on the underside broader and

more dispersed white spots, which are not accompanied by distinct dark dots as in nymotypical *tengstroemi*; North China and Mongolia. — **tangutica** Gr.-Grsh. (73 f. erroneously spelt **torgutica**) differs from the previous *tangutica*. form hardly in anything else but the darker ground-colour, the white spots of the underside therefore being more prominent: from Amdo. — **iliensis** Gr.-Grsh., from western Tibet. has the hindwing beneath paler, *iliensis*. with a greenish tint and strongly reduced markings. — Larva with the ground-colour greenish white, the back being almost entirely brownish: the dorsal line as well as the lateral one reddish brown, between them small yellowish white oblique smears: head black. In April adult on a shrubby species of *Astragalus* (CHRISTOPH). The butterflies occur in May on steppes and in meadows.

14. Genus: **Zephyrus** Dalm.

On the whole larger than the species of *Thecla*, brighter and the ♂ often magnificently metallic. The ♂ nearly always without distinct scent-patch. Both wings broad, with convex distal margin, the hindwing with rather long tails, which are entirely absent only in rare cases (*Z. flumen*). The anal lobe on the contrary is less developed than in *Thecla*. The ♀ have on the disc of the forewing above nearly always a pale patch, which appears in *Thecla* only in exceptional individuals. While the upperside is often very different in the various species, the underside is very uniform in the genus. Nearly all the species have, beneath in the outer third, a broad wedge-shaped costal band edged with pale on both sides and ending in a point before the lower median vein; often an additional similarly coloured band or a hooked double line on the cross-veins. Sexual dimorphism is strongly marked and obtains in all the species.

Egg more rounded, less flattened, and as a rule more coarsely chiseled than in *Thecla*. The larva is already developed in the summer, but does not leave the egg before the next spring in the species whose life-history is known. The larvae, as far as they are known, feed on shrubs and trees. They are somewhat more strongly flattened on the mesothorax than in *Thecla*, in which the thoracical segments often project hood-like when the head is retracted. The larvae of *Zephyrus* are more densely hairy when young; before pupation the colour, if not already brown, changes to a pale yellowish brown. The pupa very smooth, rounded everywhere, without a distinctly projecting cremaster.

Zephyrus has been split up into a number of genera (*Dipsas*, *Bithys*, *Ruralis*, etc.). We abstain here from this generic separation and adopt instead a division into easily recognized groups characterized by colour and facies, which will simplify the determination of the species. These butterflies partly belong to the most beautiful forms among Lepidoptera and even among all insects. On the wing they glitter like jewels, after which some of them are named. They occur singly throughout, although they are not rare, only *Zeph. betulae* have I met with in numbers, though only ♂♂. They rest on Umbellifers or more often on the tips of branches of shrubs, chasing insects which fly by; their flight is sometimes rather fast.

a. ♂ green or bluish green with metallic gloss; only in East Asia and the Himalaya.

Z. orientalis Murr. (= *diamantina* Oberth., *cognata* Styr.) (73 g). ♂ above metallic blue-green with *orientalis*. silvery reflections, without a black marginal band, only the extreme edge being black, with white fringes. ♀ above brown, paler beyond the cell, where there is often a yellow or brown smear. The underside identical in the large number of specimens before me caught by myself: of the wedge-shaped band situated before the outer margin only the inner line is distinct, the outer one being visible only on account of its pale outer edge; in the anal area of both wings small darker spots. The markings and colouration of the underside is particularly well developed in the ♀. LEECH mentions specimens in which the discocellular band of the underside is completely absent. ab. **suffusa** Leech (73 h) are ♂♂ in which the blue-green *suffusa*. gloss is restricted to some places in the outer third of the forewing, the whole disc and the base of the wings being black-brown as in the ♀. In connection herewith we mention that in most golden green *Zephyrus* there occur sometimes ♀♀ which show some metallic scaling like that of the ♂. — This species, which is easily recognized by the silvery blue-green upperside of the ♂, is distributed over East Asia, occurring in Amurland, Corea, Central and North China and Japan. The larva lives until June on oak; it is ashy grey, with darker markings, the segments projecting laterally. The butterfly is found on road-sides and shrubs from the end of June until August; local, but not rare.

Z. syla Koll. (= *sila* Oberth.). This form has a similar metallic blue-green upperside as the preceding, *syla*. but differs above in the black edge being a little broader, though remaining still so narrow that one can hardly call it a marginal band as in the following forms. The underside, however, approaches that of *Z. smaragdina*, being as in the latter more brownish, with the wedge-bands proximally more broadly shaded with blackish. Kashmir. This species extends apparently farthest west of all the golden green *Zephyrus*,

being distributed in the Himalayas and occurring as a rarity even as far east as Sikkim. It is found in woods, where the ♂♂ fly up and down the river-beds. They sometimes settle in the middle of a brook on wet stones (LANG), but rest usually on oak-bushes.

Z. taxila. The forms generally united under this name are so different that it is hardly possible to believe that they belong to one species only. But the elucidation of this point and, if necessary, the separation into several species may be left to a future monograph, and therefore we merely enumerate *taxila*. shortly the forms hitherto described. The nymotypical *taxila* Brem. (73 g) is a rather small and not very brilliantly coloured insect (considered by OBERTHÜR to be even nearly related to *quercus*), with very narrow dark margin to the forewing above and almost grey-brown underside. The golden green of the upperside of the ♂ is somewhat darker on account of an intermixture of dark scales (STAUDINGER); Amurland. In *aurorina*. ab. **aurorina** Oberth., those places at the cell on the upperside which are somewhat lighter in colour in the nymotypical form than the rest of the forewing are bright saffron-yellow, as in *quercus* ab. *bellus*; from *ultramarina*. Askold. — **ultramarina** Fx., from Corea, has more bluish golden gloss above. — **japonica** Murr. is the largest form and has the strongest golden gloss of all; Japan. In ab. **fasciata** Jans. the hindmargin of the forewing above is coppery. — **regina** Bth. has a light cobalt-blue sheen: from Toshima and Iburi. — The larva, which, according to GRAESER, is still (or already) found in July, feeds on *Alnus incana*, the butterfly also flying about bushes of this shrub. According to PRYER the butterfly is very pugnacious. A symmetrically divided gynandromorphous specimen obtained in Amurland proves that the golden green ♂♂ and the dark and dull coloured ♀♀ belong together.

brillantina. **Z. brilliantina** Stgr. (= *smaragdina* Leech) (73 g). At once recognized by the extremely strong golden green gloss of the upperside, which is only present to the same degree in *smaragdina*, whose upperside is identical with that of *brillantina*. The black border to the upperside is considerably broader than in the preceding forms. This species differs from *smaragdina* in the underside being much darker, so that the markings are less prominent. The ♀♀ have, as in *taxila* and the other golden green species, sometimes pale yellow spots on the forewing or some metallic sealing similar to that of the ♂♂. — Amur and Ussuri, Vladivostok, Askold and Corea. Larva coppery brown, with a dark dorsal line and on each segment a pale oblique spot, the joints between the segments also being pale; on oak.

smaragdina. **Z. smaragdina** Brem. As said above, hardly different from *brillantina* on the upperside, at least no reliable differences have ever been mentioned. Therefore a figure of the upper surface would have been the same as that of *brillantina*, whose golden gloss does not nearly come up to that of the actual specimens. But the pale, more dust-grey, underside distinguishes it from the preceding species, as also does a transverse line on the hindwing which is placed far proximally from the usual band. However, the main difference lies in the larva, which is yellow instead of brown, with distinctly contrasting black stigma-dots on segments 1 and 4 to 11; on cherry, according to GRAESER also on *Quercus mongolica*, very plentiful in certain years, but a large proportion (90%) infested by *Tachina*. The butterflies are consequently much rarer than the caterpillars; they fly in July and August and settle on twigs of shrubs at road-sides. — With certainty only known from Amurland and North China; the records from other countries are doubtful, as the insect may possibly have been confounded with other green species.

coruscans. **Z. coruscans** Leech (73 h). Larger than most other golden green *Zephyrus*; ♂ with a very strong golden gloss, but with broad black margin, which is especially wide at the apex of the forewing. The tail very long, the tooth above it larger and more prominent than in other *Zephyrus*. The ♀ above always with a distal patch on the forewing consisting of 3 orange-yellow spots; its underside as in the ♂, the white lines being very distinct and the black anal spots of the hindwing shaded with blue. West China, in July and August. — JANKOWSKI gave me in China two ♂♂ which appear to lead over to *smaragdina*. Above almost exactly as in nymotypical *coruscans*, but the border somewhat narrower, the white line of the underside thinner, there being also a small and hardly visible discocellular hook; on the whole all the characteristics of *coruscans* present but less pronounced. JANKOWSKI did not remember the exact locality, but stated that they were without doubt obtained between Chang-Yang and Hankow, from which district nymotypical *coruscans* is not known. If this form is not a new species, it must be regarded as the representative of *jankowskii*. *coruscans* on the middle Yang-tse-kiang. I name it **jankowskii** form. nov. (73 g) after its discoverer. It also forms a transition towards the next species.

scintillans. **Z. scintillans** Leech (73 h). This species is easily distinguished by its paler underside, lesser size and narrower black border to the upperside, the double line on the cross-veins beneath being very distinct and the forewing beneath bearing a row of distinct submarginal ocelli instead of the chain of indistinct shadowy spots of *coruscans*. — Central China (Chang-Yang). This species appears only to be a more pronounced form of *jankowskii*, the latter connecting it with the West Chinese *coruscans*. Obtained in July.

Z. desgodinsi Oberth. (74a). Of this insect only the ♀ is known, which is perhaps nothing but a *desgodinsi*. ♀-form of one of the other species with golden green ♂♂. The presence of only 2, separate, discal spots on the forewing above is doubtless not a constant character. Also the somewhat different underside is not sufficient evidence of the specific distinctness of *desgodinsi*. — The single specimen on which the species was based and whose figure we have copied, came from Ta-t sien-lu.

Z. ataxus Dbl. & Hew. (♀ = *katura* Hew.) (74a, misspelt *artarus* on the plate). This large species, *ataxus*, with the upperside rather pale golden green in the ♂ and spotted with red and blue in the ♀, is at once recognized by the underside, which is figured and need not be described. — Widely distributed but rare: in Kashmir, the North-Western Himalayas, Tibet and the adjacent districts of West China; in July. As far as one is able to judge from the scanty material the black border of the forewing above is broader in specimens from Kashmir and India than in the Chinese ♂ here figured.

Z. pedius Leech (74a). The single ♀, which I know only from LEECH's book, was obtained at *pedius*. Wa-ssu-kow (West China) in July. The whitish silvery grey underside is as pale as in *ataxus*-♂, but without its numerous discal spots. The forewing with an almost ivory yellow smear.

Z. saphirina Stgr. Much smaller than all the previous forms, the tail very short. The upperside *saphirina*. of the ♂ with the golden gloss duller, much darker blue-green, the black border being very thin. ♀ above either uniformly dark black-grey, darker at the outer margin, or with pale smear beyond the cell. The underside pale silvery grey, with a mother-of-pearl gloss, the markings being almost the same as in *quercus*. — Amurland, Corea, North Japan and Askold, not rare, but local, in July. The larva beaten in June from *Quercus mongolica* (GRAESER).

Z. hecale Leech (74b, misprinted *hecate* on the plate). ♂ above dark blue-green, with a strong *hecale*. metallic gloss; the black border so broad as to occupy almost the whole outer third of the forewing and the entire outer half of the hindwing. ♀ above deep black-brown, with 2 brick-red discal spots. Underside dark brownish grey, with distinct white lines. — West China, in July, 5—8000 ft. high.

Z. tsangkie Oberth. (74b). Very close to *hecale*, but the border of the ♂ above not quite so broad. *tsangkie*. Moreover, there are above spots of a blue-violet gloss in the anal area of the hindwing in the ♂ and on the disc of the forewing in the ♀. — West China, apparently rather plentiful, up to 10000 ft.

b. ♂ with feebler blue gloss. Widely distributed.

Z. dohertyi Nicér. While the ♀ of this species is very similar to that of *tsangkie*, differing only in *dohertyi*. the dark coppery brown underside and the smaller and more yellow than red discal spots of the forewing, the ♂ is quite different, as the golden metallic gloss is entirely absent, being replaced by a dull blue sheen similar to that of *quercus*-♂. — In Kashmir and the North-Western Himalayas.

Z. icana Moore (74c). On the upperside, especially in the ♂, very similar to *quercus*, but both *icana*. sexes at once recognized by the underside being dark brown instead of pale grey. There is on the underside a black-brown band which stands nearer to the centre of the wings than to the outer edge, the hindwing being bright orange-red in the anal area. — In Kashmir and West China, also in the Himalaya at Simla and in Kumaon, not plentiful, in June and July, up to 10000 ft.

Z. signata Bthr. (74c). Wings above with lilac gloss and broad black border. Underside earth *signata*. grey, with numerous white lines and hooks, which vary individually in number and distinctness. From Hokkaido. — **quercivora** Stgr. (74c) is the mainland form from Central and West China and Amurland; *quercivora*. the black border is narrower, particularly on the hindwing, the purplish metallic sheen therefore being more extended, and the anal area of the hindwing beneath is orange-red instead of greyish yellow. — Larva green, with dark spots on the back and sides, anteriorly darker spotted and more densely hairy; on segment 11 there is a short process; until July on oak. The butterfly in August, not rare.

Z. coelistis Leech (74b). This rather large form is above bright blue, the black border of the fore- *coelistis*. wing broad, of the hindwing narrow. In the ♀ this black border is broader than in the ♂ figured and contains an orange-yellow spot, which is traversed by the 2. median vein. The upperside of the ♂ is remarkably similar to that of *Tajuria luculentus*, which insect however has a more western range. In ab. **nigricans** Leech the whole upperside is shaded with dark, the black borders being widened, extending along *nigricans*. the veins into the wing. — In Sze-chuen, up to 8000 ft., in July.

Z. bieti Oberth. (74e). Above as in *quercus*, but the black border much broader in the ♂, and *bieti*. the ♀ bearing some orange spots like *quercus* ab. *bellus*. The underside of both sexes quite different from that of *quercus*, being dark brown and bearing a proximally dark-edged pale curved band and a discocellular bar of the same colour. — In Sze-chuen and the adjacent Tibet, very abundant from May until August, up to 10000 ft.

quercus. **Z. quercus** L. (74 c, d). ♂ above with a blue gloss and narrow black distal border, the ♀ with the basal area of the forewing blue and often the cell of the hindwing bluish. Underside leaden-grey, with a proximally dark-edged white line before the outer third and in the anal area of the hindwing weak yellow spots. ab. **obsoleta** Tutt are ♀♀ without any blue gloss; there occur also transitional specimens with the blue reduced (*semiobsoleta*). ab. **pallescent** Tutt are ♂♂ with a pale grey greenish instead of blue gloss. In ab. **excessus** Tutt the hindmargin of the forewing bears a coppery streak. COURVOISIER proposes the name ab. **latefasciata** for specimens with broader white line on the underside. ab. **bellus** Gerh. (74 d) are ♀♀ with 3 small orange spots at the apex of the cell of the forewing, which are reduced to two spots in ab. **bipunctatus** Tutt and to one in ab. **unipunctus** Tutt. Widely distributed, occurring throughout Europe and Asia Minor from England and the Atlantic coast to Armenia and from North Europe to the Mediterranean. — Beyond the Mediterranean Sea and on the Iberian Peninsula there occurs **iberica** Stgr. (74 d). Larger, above very dark, the blue area of the ♀ very sharply defined but not very extended. Underside paler silvery grey, the whitish line therefore being less prominent. — Egg semiglobular, whitish grey, granulose. The larva, which is already developed in the summer, does not leave the egg before April; it bores into the young shoots and later lies on the young leaves, especially on those of the lower twigs of old oak-trees. It is a dreadful cannibal and is evidently avoided by insect-eating birds, as it has been found unmolested in the nest of the blue tit containing young birds (BINGHAM-NEWLAND). On the other hand it is much infested with ichneumons, as well as a species of Tachina, which develops after the pupation of the caterpillar (STEINERT). Adult yellowish brown with a reddish tint, on the back a row of triangles connected by a dark line, the sides greenish. On various species of oak, and said to occur also on other plants (*Myrica*, etc.); adult in July. The pupa rounded, brown, irregularly spotted with blackish, on the back three rows of dark spots. The butterflies occur from June till August everywhere in the plains and hills, but usually singly, in certain years more plentifully. They rest on the outer twigs of oak-bushes with the wings always closed, but sometimes flutter high up about the crowns of old oaks.

c. Above without gloss, sooty black-brown; beneath more brightly spotted.
Exclusively in Eastern Asia.

enthea. **Z. enthea** Jans. (74 e). Above dark black-brown, beyond the cell two pale spots in Japanese specimens, and two white ones in Chinese individuals. Underside whitish, with smaller and larger, partly seriated, dark spots, the anal area of the hindwing being orange. — Widely distributed, from West China to Amurland and Japan. Larva according to GRAESER uniformly pale green, until July on *Juglans mandschurica*. The butterfly in July and August, plentiful in certain places.

attilia. **Z. attilia** Brem. (74 d). Above black-brown; ♂ unicolorous, ♀ with pale submarginal spots on the hindwing, forming sometimes two rows. Underside whitish, with rows of pale, submarginal, partly dark-centred spots and a pale-edged heavy dark discal band on both wings. — Central and North China, southern Amurland and Japan. Larva pale green with yellow dorsal dashes, until the end of May on *Quercus mongolica*, frequently infested with Tachina. The butterfly from the beginning of July, in many districts plentiful, the commonest Hairstreak at Yokohama, where I obtained even some specimens in the gardens of the town.

butleri. **Z. butleri** Fent. (= *oberthueri* Stgr.). Above like *attilia*, but the pale spots on the hindwing, which in *attilia* are only found in the ♀, occur in the present species in both sexes, although they are duller in the ♂ than in the ♀. The characteristic markings of the underside are slightly visible above and are more irregularly arranged beneath, especially on the hindwing, the dark discal band moreover being separated into an irregular row of spots; thus *butleri* forms a kind of link between *enthea* and *attilia*. — Amurland and North Japan, apparently rare everywhere.

orsedice. **Z. orsedice** Bthr. In this rare species, which is unknown to me in nature, the ♂ above is dull whitish mother-of-pearl, the black outer border becoming broader towards the apex of the forewing; the ♀ pale leaden-grey with the apex and outer margin of the forewing very broadly black. Costal margin brown with a feeble violet sheen; hindwing sooty brown, pale grey in the cell and at the hindmargin. Underside grey-brown, with irregular white-edged dark spots and a discal line of the same colour. — North and Central Japan.

ibara. Here belong, further, two Japanese forms described by BUTLER. Of the one, **ibara** Bthr., only a few ♀♀ are known and it is possible that these are merely aberrant specimens of one of the other species. *stygiانا.* Of the other, described as **Thecla stygiانا** Bthr., only the type-specimen in the British Museum is known. PRYER does not mention this "*Thecla*" in his *Rhopalocera Nihonica* and therefore also this specimen may be only an individual aberration.

d. Principally yellow forms; all the species except one from Eastern Asia.

lutea. **Z. lutea** Hew. (74 f). The outer margin of the wings strongly rounded, particularly in the ♀; hindwing with a long tail. Honey-yellow, the forewing with a broad black distal border. Underside with a

white submarginal line, which separates the disc from the orange-red distal margin; on the disc white-edged bands, a short similar band on the cross-veins of the forewing. In Amurland and Japan. — Larva on *Quercus mongolica*, very frequently infested with the larvae of Diptera. The butterflies occur in August on wide roads in forests of high trees and also in bush-woods; they are rather plentiful in many places. The Continental specimens do not differ from Japanese ones; the black border of the forewing varies rather strongly in width among the individuals from the same locality.

Z. saepestriata Hew. (74 e, f). Above bright orange-yellow, with a very narrow black border to *saepestriata* the forewing. The underside is characteristic, being honey-yellow and bearing a great number of small black spots arranged in rows. — In Amurland (Vladivostock), on Askold and everywhere in Japan, locally plentiful, for instance near Yokohama, in August.

Z. jonasi Jans. Above uniformly orange-yellow, only the extreme apex and the tail black. Beneath *jonasi*. similar to *lutea*, but the white discal line not double, but single, being proximally shaded with dark; the discocellular line likewise dark and single. — In the north of China and Japan; apparently not plentiful, flying about young trees in August.

Z. melpomene Leech (74 e). Very similar to *jonasi*, differing only in the black scaling at the apex *melpomene*. of the forewing being somewhat extended along the costa, and in the discal line of the forewing beneath not forming an obtuse angle on the median vein as in *jonasi*. — At Chang-Yang, obtained in August.

Z. comes Leech (74 f). The apex much more extended black than in the two previous forms. On *comes*. the underside the proximally dark-edged white single line stands much nearer to the distal margin and is exactly parallel with it, the hindwing bearing a row of red ocelli between this line and the outer margin; the ground-colour beneath is a deep yellow-brown. — In Central and West China, up to 6000 ft. in July, rare.

Z. minerva Leech (74 f). Very similar to the preceding, but the black apical area above more *minerva*. extended, the upperside much lighter yellow, not being so deep orange. Above all, the underside paler yellow, and the row of ocelli between the white line and the margin continued on to the forewing. — I-chang, in June.

Z. seraphim Oberth. Much smaller than the preceding forms, greyish yellow, the apex of the fore- *seraphim*. wing being dull black; beneath the same colour as above, the row of red ocelli hardly contrasting with the ground. — Widely distributed and plentiful in West China, in June and July, up to 10000 ft.

Z. thespis Leech (74 e). Likewise small, hardly as large as *seraphim*, above without the greyish *thespis*. apical shadow, the white line of the underside double. — I-chang, in August.

Z. michaelis Oberth. (75 a). Beneath rather similar to the preceding forms, but the upperside is *michaelis*. strongly darkened in the nymotypical form. The hindwing mostly entirely deep black-brown, the forewing the same colour, but with an orange discal spot. In the ♀ the black margin of the forewing is less broad and the hindwing bears same larger orange spots before the outer margin. Amurland and Askold. — **gabrielis** Leech (74 g) closely resembles the previous species, as the upperside of both sexes is orange- *gabrielis*. yellow with black shadows at the apex of both wings. This West Chinese insect, which LEECH treats as a form of *michaelis*, might be better kept as a separate species.

Z. raphaelis Oberth. (75 a). Above and beneath similar to the preceding forms; above orange with *raphaelis*. black distal border, which widens at the apex, the hindwing without tail, which is present in all the previous species. Amurland, Askold and Corea, in August. — **flamen** Leech (75 a), which the author *flamen*. considers as a variety (seasonal?) of *raphaelis*, is much larger.

Z. betulae L. Black-brown; ♂ with a pale diffuse patch, ♀ with a broad orange band beyond the *betulae*. crossveins. Underside ochreous, with dark-edged white lines. In North and Central Europe und Northern Asia eastward to the Pacific. Tutt names ♂♂ without the pale diffuse patch beyond the crossveins ab. **unicolor**, while this patch is nearly white in ab. **pallida** Tutt. In ab. **spinosa** Gerh. there appear beyond *unicolor*. the apex of the cell small orange-spots, which may be paler yellow than the discal spots of the ♀. The *pallida*. orange discal band of the ♀ is sometimes narrow; ab. **restricta** ^{Tutt}, and sometimes broad (= ab. *lata*). *spinosa*. ♀♀ in which the band is pale ochreous instead of orange are ab. **fisoni** Wheeler, while the band is separated *restricta*. into several spots by the heavily black veins in ab. **lineata** Tutt. A very remarkable form is ab. **cuneata** *fisoni*. *lineata*. Tutt, which bears a broad orange submarginal band on the hindwing. On the underside the white lines *cuneata*. are sometimes more or less obsolete, or distorted (= ab. *uncilinea*). Or they may be strongly developed and modified into a kind of white-edged dark band in consequence of the interspace between the white lines being dark; this is ab. **virgata** Tutt. — Of the geographical races **ongodai** Tutt is the one nearest *virgata*. to the European form. The ♂ has distinct discal lunules at the apex of the cell on the forewing but no *ongodai*. pale patch beyond the same, the orange spots on the anal lobe of the hindwing and near the base of the tail being larger and more distinct. The orange spot of the ♀ is very narrow, being traversed by the black

crassa. veins. Ongodai. **crassa** *Leech* (74 g) is much larger even than large European specimens (*ab. major* Tutt), the tail being longer, and sometimes (not always) the colour of the underside darker. West China. — *elwesi*. **elwesi** *Leech* (74 g) has the upperside of the ♀ (here figured) entirely orange except for the distal margin of the forewing and the sooty base of the hindwing, the ♂ bearing brownish orange spots beyond the cell of the forewing. Central and West China. — Egg white, depressed, rough. Larva adult in June, clothed with short thin hairs, green with a yellow line on back and sides, yellow subdorsal oblique spots and a brown retractile head: on certain *Prunus* and *Amygdalus*, more rarely on birch, hazel and cherry. Pupa very smooth, rounded everywhere, pale brown, with thin lighter and darker markings; although fastened only by the cremaster, not by a girth, it is closely applied with its underside to its support. The butterflies occur from July until late in October near woods, in avenues and gardens. They rest concealed among the foliage, and can fly rather fast and without interruption. They visit flowers, particularly umbellifers, and have also been observed at bait. They are plentiful wherever they occur, being very abundant in some years. In opposition to other observers I have sometimes seen 3 or 4 ♂♂ resting together on a leaf.

betulina. **Z. betulina** *Stgr.* Similar to *betulae*, more thinly scaled, so that the bands of the underside shine through above. The ♂ has an inconspicuous pale patch beyond the discocellular halfmoon and the ♀ a greyish diffuse band. The underside is more grey-brown in the ♂, red-brown in the ♀. There are no traces of orange spots in the anal area of the hindwing above. — Amurland. Larva without markings, light green, until July on *Pyrus*.

15. Genus: **Arhopala** *Bsd.*

This genus, which includes some of the most beautiful *Lycaenids*, is widely distributed in the Indo-Australian Region, there being hardly any place in tropical India and Australia where the intensely blue species of *Arhopala*, which sometimes appear as if glazed with metal or mother-of-pearl, do not arrest the attention of the visitor of these countries.

Head rather small, narrower than the thorax; frons broad. Eyes naked. Antennae short, almost less than half the length of the forewing, gradually incrassate, without an abrupt club. Palpi of medium size, porrect. Thorax broad, strong; the scales and hairs of the whole body above often glossy metallic. Wings broad. The apex of the forewing often produced in the ♂, the outer margin being always convex and often undulate, the hindmargin always very long and slightly incurved, the rounded hind angle therefore being far distant from the base. Hindwing sometimes with a short tail, sometimes with a hardly visible tooth in the anal region, its distal margin even or feebly undulate. Larva onisciform, flat, with short bristles, the anterior segments shield-like, on the back longitudinal lines, laterally to which there are transverse and oblique spots. Pupa with long wing-cases and short, strongly arched abdomen.

More than 100 *Arhopala* are known, which are confined to India and the neighbouring countries and are partly very closely related to each other. Moore, in order to facilitate a survey, has divided *Arhopala* into 7 genera. We need not follow him, since only 6 forms extend into the Palaearctic territory at its extreme southern boundary. Some of the species appear here in abundance, for instance *Arh. japonica* at Nagasaki, where I caught sometimes more than a dozen in one day. But that is an exception. Many species are even very rare, being so difficult to obtain as they keep high above the ground out of reach. They are easiest to get on hot days, when they gather on the banks of brooks and on damp places on roads to drink. In such weather also the amorous plays may be observed, sometimes 3—4 ♂♂ sitting close together on a bush holding the wings half open in the sun, while they are generally kept closed when at rest, as in *Thecla*. Occasionally such a bush appears as if covered with flowers of a magnificent bright blue. The *Arhopala* are not shy as a rule and are apparently no persistent fliers. When settling on projecting twigs of bushes or on branches, they face downward; on dry branches they generally take such a position that the closed wings are directed towards the ground, not upwards.

japonica. **A. japonica** *Murr.* (75 b). Above deep blue with black border, which is broader in the ♀ than in the ♂. Beneath dark earth-brown, almost without markings, there only being a band before the outer third which is more distinct on account of its thin blackish borders than for its darker colour. — In Central and South Japan and Corea, common, in the spring and again from August. I caught even in November numerous fresh ♂♂ on flowering fields, and PRYER states that the species hibernates in Japan.

rama. **A. rama** *Koll.* (= *querceti* Moore). Somewhat resembling the previous species, but easily distinguished by the tailed hindwing. The underside, moreover, has a more variegated pattern, the band before the outer third being darker, more prominent and straighter, and there being on the hindwing more rings and spots between the band and the base than in *japonica*. The ♂ is larger than the ♀ and has narrower black borders to the upperside. — In May and again from July onward, in oak-woods, in Kashmir, on the northern slopes of the Himalayas, eastwards to Central China. Also in India (Sikkim), where this species appears to rare, though it is common on Palaearctic territory. It goes up to 9000 ft. in the mountains, and

DOHERTY found it on the wing at a considerable altitude as late as December, when the ground was already covered by a thin layer of snow.

A. dodonaea Moore (75 b). Both sexes similar to the ♀ of the preceding species, with a short tail *dodonaea*. and prominent pointed anal angle. Easily distinguished from *rama* by the blue gloss being lilac blue, while it is purplish blue in *rama*. The markings of the underside are still more prominent and brighter than in *rama*, and the ground-colour beneath is more earth-brown instead of brownish lilac as in *rama*. Both species fly side by side in certain localities, so that DE NICÉVILLE sometimes caught them both with one stroke of the net. — *dodonaea* flies in oak-forests in Kashmir and the adjacent districts of India, being much rarer than the two previous species. It was formerly mistaken for the ♀ of *rama*.

A. turbata Btlr. (= *teesta* Nicér.). Quite different from the preceding species. The apex of the *turbata*. forewing obliquely truncate, the outer margin almost straight, with the hind angle sharp and almost right-angled. The anal lobe of the hindwing rounded and strongly produced and the tail rather long. Upperside deep blue, with a broad black border. Underside brown, with lilac clouds, the bands, rings and spots olive and much more numerous than in the previous species. ♀ bright ultramarine, with a broad black border. — South Japan and Corea, rare. LEECH found the species in May and I obtained it myself in September at Nagasaki. Besides the Palaearctic Region, the species also inhabits North India and Tenasserim.

A. ganesa Moore (75 c). This Kashmir-insect is one of the smallest of the whole genus. The ♂♂, *ganesa*. like all the Palaearctic *Arhopala* above blue with a narrow black margin, are distinguished by a white patch beyond the apex of the cell, which to my knowledge is not present in any other species of the genus which might be confounded with *ganesa*. The light dust-grey underside bears bands which are filled in with dark scaling on the forewing and are only indicated by their border-lines on the hindwing, which is exaggerated in our figure, copied from STAUDINGER. — **loomisi** Pryer (= *seminigra* Leech) (75 c) *loomisi*. has the blue reduced above, there is no white on the upperside, and the underside is evenly banded with brown. Japan, Central and West China, in the oak-forests of the mountains, not rare, in June and July.

16. Genus: **Iraota** Moore.

Rather large butterflies, with pointed wings, extremely brilliant glossy upperside in the ♂, and characteristic underside. Head small as compared with the disproportionately robust thorax, particularly much depressed, with the frons broad, but quite flat. The eyes, still coppery in dry specimens, anteriorly edged with ivory yellow. The antennae short and thick, very similar to those of the preceding genus, gradually incrassate as in *Arhopala*, without an abrupt club. The medium-sized palpi projecting obliquely upward. The wings pointed in the ♂, especially the hindwing strongly produced at the anal angle, with a large round prominent anal lobe bearing a distinct tail, above which there is occasionally a second shorter tail. ♀ much more broad-winged, in shape much more similar to *Arhopala* than the ♂. On the underside of the forewing between base and middle there is a small tuft of hairs in the ♂. About 6 forms are known, only one of them is Palaearctic. In facies they recall the much smaller *Camena*.

I. maecenas. The ♂ above of a magnificent cyaneous blue, with a strong metallic gloss, the costal and distal margins of the forewing very broadly black, the hindwing with a narrow black distal border. Widely distributed, from Kashmir throughout the Himalayan countries far into China and southwards to Ceylon and South India. The species is dimorphic: **maecenas** F. (75 c) with the underside of the hindwing *maecenas*. almost uniformly chestnut-brown, and **timoleon** Stoll (= *nila* Koll.) with the hindwing beneath abundantly *timoleon*. spotted and banded with white. DE NICÉVILLE was right in regarding them as seasonal forms, although the wet-season form (*timoleon*) does not apparently fly everywhere. There occur all transitions between the two extremes *maecenas* and *timoleon*, an abundant material shewing an uninterrupted series from one extreme to the other. — Larva very evenly convex, ovate, smooth, greyish ochreous, greenish towards the sides, with red-brown longitudinal stripes, between which there are rows of small ring-spots; on *Ficus religiosa*. Pupa yellowish brown, with blackish markings, the anterior part being darker. The butterflies are very abundant in many places; the ♂♂ fly up and down the roads with a very fast, almost buzzing, flight and settle with half open wings on the naked ground or in the grass on clearings in the woods, more rarely I caught them off the tips of twigs. They show a preference for certain spots, which are soon occupied by other specimens, if the original occupants are caught. As the species is very wild in the net, good specimens are not easily obtained.

B. Tribe Polyommataini, Coppers.

Tailless or with one or two small tails to the hindwing. The wings entire, generally of normal shape, the forewing triangular. The prevalent colour of the upperside is golden red, at least in the ♂♂, but the colour is occasionally also metallic blue or green.

In contrast to the Hairstreaks the majority of Coppers occur in the Old World, where they are among the most characteristic butterflies. The caterpillars, as far as they are known, have no gland for ants, but often bear on the 12th ring two stylet-like cones from which processes covered with hairs can be protruded in defense. The butterflies often rest with the wings half open, so that the reddish golden upper surface glitters when the sun shines upon it.

17. Genus: **Curetis** Hbn.

Medium-sized to moderately small butterflies, recognizable by the underside being uniformly silver-white without markings. The ♂♂ are all golden red above, either the whole surface being of this colour except for a black margin, which is about as narrow as in *Chrysophanus virgaureae*, or only the disc is golden red, the margin and apex being broadly black. The ♀♀ of some forms (particularly Palaearctic ones) have the disc whitish instead of red.

Head small, with broad low frons. Eyes hairy. Palpi rather long, straight porrect, scaled silvery white like the whole body and the underside of the wings. Antennae thick, hardly half the length of the forewing, quite gradually incrassate to the apex, without a distinctly marked club. Thorax very thick, at the widest point about double the width of the head. Legs thick but very short. Abdomen slender in both sexes, in the ♂ hardly one-third the width of the heavy thorax. Wings very diverse in shape, either normal in outline, or angulate and dentate, sometimes considerably variable within a species. The larvae differ strongly from those of the other Lycaenids. They are less flat; although segment 5 is the thickest, as in other Lycaenids, rings 6 to 11 resemble each other rather closely. On the 12th segment there are 2 fleshy cones from which the insect is able to thrust out processes bearing belts of hair at the apex. When alarmed these tentacles are shaken extremely fast and violently, the hairs standing at the tip being spread out. Pupa "resembling a small lump of jelly" (DE NICÉVILLE); the underside broad, flat and smooth, being closely applied to the support, the convex dorsal side minutely punctured and therefore rough, the segments indistinctly separated from each other. The butterflies are very lively and agile. During the fast flight the golden red upper- and the silvery white underside become alternately visible, which has a very peculiar effect, and I do not remember ever having seen anything similar in other butterflies. The ♂♂ come down to the roads, where they can easily be caught, as they are not shy. The ♀♀ are far less often seen. The genus is Indo-Australian, only in the east of the Palaearctic Region occur some forms. FRUHSTORFER, who has lately monographed the genus, reduces the numerous forms to subspecies and seasonal varieties of but 5 species.

C. acuta. Forewing with the pointed apex strongly projecting, the outer margin convex and the anal angle almost exactly right-angled. The anal angle of the hindwing pointed and produced. Upperside black with a bronze-brown gloss, there being reddish golden spots on the disc of the both wings. Underside silvery white, as in all *Curetis*. — The darkest form, **acuta** Moore (♀ = *truncata* Moore*) occurs in *japonica*. China: the black border is so much enlarged that the discal spots are quite small. — In *japonica* Fruhst. (75 c) the red discal spots are larger than in Chinese specimens. — **tsushimana** Fruhst., from Tsushima, has smaller but brighter red discal spots in the ♂, the ♀ being quite black above except for traces of bluish white scaling on the disc. — A fourth form, from I-chang, which has above a broad black border and very light yellowish red discal spots, the hindwing being strongly angulate, is considered by LEECH to be a form of *angulata* Moore, while FRUHSTORFER treats it together with *angulata* as a form of *bulis* Doubl. & Hew. But as I have found in Japan as well as China at the same place and hour specimens with sharply angulated outer margin to the hindwing and individuals with the hindwing completely rounded, the distinctions in the shape of the wings appear to me to be of doubtful value. The specimens from I-chang differ in bearing a light orange-red horseshoe-shaped halfband replacing the diffuse red patch in the outer area of the hindwing above. — The larva of the very closely allied (and perhaps not specifically distinct) *Cur. malayica* is velvety green with a brown head and a dark red oblique lateral stripe on the 3. and 4. segments, posteriorly with a yellow dorsal stripe and on the 9. segment a white quadrangular spot. The projections of the 12th segment yellowish green, the reversible tentacles reddish yellow with black and white hairs at the apex, the tentacles being moved very fast and at once retracted. The head of the larva is always kept retracted, being hardly visible even when the larva is feeding. On *Pongamia glabra*. Pupa semiglobular, transparent greenish, with a yellowish ovate spot on the anterior portion. The butterflies occur in the autumn (2 broods?). The ♂♂ suck at dung on roads, the ♀♀ being so much rarer that I caught one morning 16 ♂♂ and only 1 ♀.

*) As Plate 75 was already printed before FRUHSTORFER's monograph came out, the figure in row c is still named *acuta*.

About a dozen small species, whose ♀♀ are very similar to each other. Characterized by the underside being uniformly yellow, with an usually bright red band at the outer margin. The ♂♂ are always metallic above, the disc having often a brilliant gloss; the ♀♀ dark brown above, with abbreviated red discal band and before the outer margin of the hindwing a row of red lunules. The wings do not show any such peculiarities as in *Curetis*; they have the ordinary shape of *Thecla*, the hindwing bearing a thin tail. It is quite probable that the number of distinct species will be much reduced, when the forms are more closely studied. The genus already approaches *Chrysophanus* in every respect, the larvae and pupae also being similar. The butterflies are mostly rare, being met with singly on bushes, where they rest with the wings half open. In spite of the delicate body the flight is fairly strong, though not sustained.

Our knowledge of these insects is not advanced enough to enable us to separate the forms correctly and give a final classification. No doubt, some of these so-called species intergrade, and only a monograph based on a very large material can clear up the doubtful points. We are far from maintaining that the usual classification, which we adopt here, is correct.

I. moorei Hew. (= saphir Blanch.) (75 f). ♂ above of a brilliant metallic blue with the margins *moorei*. black, the hindwing with thin bright red submarginal lunules which are united to form an undulate band. Beneath only the hindwing with a red distal border. In the ♀ the red patch of the forewing extends to the costal margin. Tibet, West and Central China, and North India. — **marica** Leech (75 f) has the *marica*. discal spot of the ♀ narrower, the submarginal band on the hindwing of both sexes being considerably thinner. LEECH considers it possible that *marica*, which flies in the same countries as *moorei*, is a seasonal form of it. In China *marica* is the prevalent form.

I. tamu Koll. (= oda Hew.) (75 g). Similar to *marica*, but the ♂ with the forewing more pointed *tamu*. and the submarginal band of the hindwing quite obsolescent. In the ♀ this band is also narrower than in *marica* and the fringes are much more distinctly spotted. The blue colour on the upperside of the ♂ is somewhat darker than in *marica*, being more ultramarine, and therefore does not contrast so strongly with the black margin, especially on the hindwing, as is the case in our figure, in which the blue gloss is excessive; the distal band of the hindwing beneath is less pale red, having a brownish tint. — STAUDINGER considers ab. **androcles** Dbl. & Hew. (= langii Moore) a variety of *tamu*. As it is not possible for us to *androcles*. ascertain if the specimen figured by STAUDINGER was true *androcles*, we bring (75 g) an exact copy of his figure in „Exotische Tagfalter“; this figure, however, agrees best with **coruscans** Moore, the true *androcles* *coruscans*. according to Herr COURVOISIER being a distinct species, which is identical with *langii* Moore ¹⁾ and is green in the ♂ instead of blue. — **viridipunctata** Nicév. (= tamu Hew. nec Koll.) (75 g) has a darker ♂ than the preceding forms, the metallic discal area being smaller and more green than blue; a red oblique band on the forewing of the ♀. Certainly only a dark form of *androcles*, with which it agrees on the underside. In West China and the northern Himalayas. In Palaearctic ♂♂ the metallic patch is sometimes reduced to a few scales. — Not uncommon (LEECH). *viridipunctata*.

I. brahma Moore (75 g). ♂ with a coppery golden gloss, not so dark as in our figure, the metallic area strongly varying in extent individually. ♀ very similar to that of *viridipunctata*, but smaller. — West China, also widely distributed in the Himalayas, where it is locally not rare, flying together with other Ilerdas and occurring throughout the year according to DE NICÉVILLE; on forest-paths in sunny places (ELWES). *brahma*.

I. epicles Godt. (75 g). The metallic area of the same size as in the two preceding subspecies, blue, *epicles*. with a purplish sheen in certain lights. The red distal band of the hindwing beneath very broad, continued on to the forewing in many specimens, somewhat variable in width and intensity. The discal band on the upperside of the forewing of the ♀ also varies in size and intensity. — In some localities in Western China the commonest species of the genus in June and July; in India everywhere in the mountains, extending southward to Java, locally plentiful.

I. sena Koll. (= cadma Dbl.). The commonest species in Kashmir. Smaller than the previous *sena*. forms, the ♂ with a violet glitter on the upperside. Easily recognized by the underside bearing a narrow white band which is dentate on both sides and situated proximally to the broad red distal band, both being continued over the fore- and hindwing. — Larva adult woodlouse-shaped, broader than high, dirty pale green, irrorated with red-brown, the narrow dorsal line likewise red-brown, the surface minutely dotted with white and clothed with small brownish bristles, which are longer on the sides; head greenish, retracted into the thorax; on *Rumex hastatus*. Pupa rounded at both ends, somewhat constricted behind the thorax, rough, pale green, irrorated with blackish. The butterfly in drier and more open localities than the other species.

¹⁾ STAUDINGER himself, in his corrections (p. 333, Exot. Tagfalter), admits his error as regards the specimen figured as *androcles*, but states it to be *tamu* Koll., which is likewise erroneous.

19. Genus: **Aphnaeus** Hbn.

Small, delicate and very graceful butterflies with less glitter; recognizable by the light yellow or pale brown underside being traversed by parallel chain-like bands which contain silvery lines. The hindwing bears two thin and rather long tails which project from the bright-coloured anal area. The sexes are not so different as in *Ilerda*. Larva cylindrical, minutely hairy, with the segments very indistinctly separated, head large, segment 12 with two processes from which tentacles can be projected. Pupa rounded everywhere, with a shallow depression behind the thorax. The butterflies fly very fast and settle with the wings half open on the twigs of bushes. They occur quite singly, and although some species are not exactly rare, I do not recall any excursion on which I have obtained more than one specimen of *Aphnaeus*; often I did not see a specimen for weeks. Besides South Asia the genus also occurs in the Ethiopian Region.

- syama*. **A. syama** Horsf. (= *syama* Westw., *orissanus* Moore) (75 h). One of the larger species. ♂ above strongly glittering violet-blue. Underside dull sulphur-yellow, the bands but little curved, straight, usually uninterrupted, almost as broad as the interspaces; the anal area of the hindwing beneath not occupied by a large red patch. Otherwise not dissimilar to *lohita*, which is much lighter beneath. In ab. *peguanus* Moore the dull reddish yellow underside has the bands bright red. — West and Central China; also distributed over a large part of India and extending to Malacca, Java and the Philippines; singly, but not rare.
- lohita*. **A. lohita** Horsf. (75 h). Above almost identical with the preceding species; beneath very pale yellow, with a large bright red anal patch on the hindwing. The species is distributed throughout the Himalayas eastwards to the Philippines and southwards to Ceylon and the Malayan islands, numerous races having been described (*lazularia*, *himalayanus*, *zebrinus*, etc.). In ab. *zoilus* Moore (75 h), first described from the Andamans, but according to LEECH the prevalent form in West China, differs in being larger and in the bands of the underside, instead of dark brown, being black ornamented with broader silver dashes; the upperside more extended and paler blue. — Larva longer and narrower than most other larvae of Lycaenids, being less short woodlouse-shaped, the head porrect, the back minutely hairy, colour grey-brown minutely irrorated with whitish, each segment with a black transverse dorsal shadow, at each side of which there is a thin white oblique line; on Convolvulaceae. Pupa red-brown, the anterior part with dark markings and the abdomen minutely dotted with white. The butterflies occur singly about thorn-bushes; they fly very fast, but soon settle again.
- ictis*. **A. ictis** Hew. (75 h). A smaller form. The upperside of the forewing bears a discal ochreous spot, which is broken up and is larger in the ♀ than in the ♂. Underside yellowish brown or reddish brown, sometimes so dark that only the silvery centres of the bands contrast with the ground, such specimens being ab. *elima* *trifurcata* Moore. In ab. *trifurcata* Moore the discal patch of the forewing is a regular triangle. — All three forms occur in Kashmir from July until October, extending over South India to Ceylon; in the southern districts *ictis* appears to be seasonally dimorphic.
- zaffra*. **A. zaffra** Nicév. A large form, almost as large as *lohita*. Above with a rich blue glitter, the forewing usually bearing a reddish yellow discal spot. Underside yellowish flesh-colour, the bands of exactly the same colour as the ground, only their silvery centres and thin black edges being visible. — Kashmir, but particularly in the non-Palearctic southern districts, Kulu, in May and June.

20. Genus: **Cigaritis** Luc.

Very close to *Aphnaeus*, with which it is united by many authors. Differs in the underside being bright yellowish red and bearing, particularly near the margins, seriated dark dots and shadows, the dark bands of *Aphnaeus* with their silver-lines being replaced by chains of pearls, which are usually pupilled with silver and stand widely separate in many species. The head is small, the palpi being rather long, thin and porrect, the frons broad and the eyes pale-edged. Antennae about half the length of the costal margin, gradually incrassate to a moderate club. The hindwing always with two tails, but the usually long tails reduced to short points in a few forms. — The butterflies are small and fly low, apparently occurring particularly in dry, almost desert-like, localities. They rest with closed wings on the bare ground and are not disturbed even when covered with the net. They fly about in sun-shine, always for short distances only, but very fast, abandoning themselves to the wind. Their haunts are very restricted, being usually nearly bare hills or slopes with corn-fields. As they do not appear to venture very far from their flight-places, they are very local. Not one of the species appears to occur in such numbers as some *Chrysophanus* and *Thestor*. One species (*siphax*) I found to be double-brooded.

The genus as nowadays restricted is almost exclusively Palearctic, only one species extending into North-Western India. However, a number of Ethiopian forms and some Indian species of *Aphnaeus* come very close to *Cigaritis*.

C. acamas *Klug* (= *epargyros* *Ev.*) (75 i). The wings pointed, particularly in the ♂, above red-yellow, traversed by rows of more or less deep black spots. The underside is chalky white in places, bearing continuous rows of beads. Very widely distributed in Asia, occurring from the Kirghiz steppes through Turkestan to the Gobi desert and southward to Arabia, Persia, Afghanistan and North-West India. — The form from the last country has been separated by BUTLER as **hypargyrus**, the following differences being mentioned: *hypargyrus* is larger, the hindwing longer, the costal area of the forewing lighter in the ♂, the black macular half-band before the margin of the hindwing not curved. However, all these details are so very variable that a form based on them is hardly maintainable. — Further, the specimens from the neighbourhood of Nuchur in Turkestan, which are darkened above and beneath, having a brown upperside and broad black markings, have been described as **transcaspica** *Stgr.*, and those from Hadjin with the upperside almost black as **obscurata** *Stgr.* — The larva is not known to me, but probably feeds on *Astragalus*. The butterflies are plentiful, flying on dry slopes and steppes in May and June and again in September, presumably all through the year in hot districts. *acamas.*
hypargyrus.
trans-caspica.
obscurata.

C. cilissa *Led.* (75 i). Smaller, the hindwing of the ♂ anally less pointed; all the spots separated. Also on the underside, which is red-yellow in the ♂ and dull isabella-colour in the ♀, the spots except a few in the centre of the hindwing are isolated, bearing very large metallic pupils. — In Syria; according to LEDERER the specimens from Mersina are more abundantly dusted with black than those from Antiochia. The individuals from Kurdistan and Mesopotamia are especially large according to STAUDINGER, while those from Hadjin are only half the size of normal Syrian ones, the latter being called by him *maxima*, and the Hadjin ones *minima*. *cilissa.*

C. zohra *Donz.* (♀ = *massinissa* *Luc.*) (75 i). Above darker red-yellow than the preceding forms, especially the ♂; the hindwing has only short conical projections instead of long thin tails. The chalky white underside of the hindwing abundantly ornamented with bluish silvery beads. In Algeria, sporadically. — **jugurtha** *Oberth.* (75 h, i), likewise from Algeria, but occurring in other localities (Saida), has the upperside less spotted with black and the ocelli of the underside are so large and confluent that the ground-colour is more strongly restricted. — In May and again in July on stony slopes with scanty vegetation, plentiful. *zohra.*
jugurtha.

C. siphax *Luc.* (76 a). The smallest species; the wings above traversed by heavy black veins, the ground-colour of the underside dull ochreous and the pupils of the ocelli only very feebly metallic. In Tunis and eastern Algeria. ab. **erythraea** *Stgr.* has the hindwing beneath washed with violet, among the ordinary form. — The species flies in spring (March to May) and again from the end of June onward. It is very local, but not rare on the flight-places, which are often but the size of a few square yards. The specimens fly low and fast, but not for long stretches. I found the insect near Philippeville on hills in places widely separate from one another. *siphax.*
erythraea.

21. Genus: **Thestor** *Hbn.*

A few more than a dozen small tailless species of Coppers are united in this genus. They inhabit hot countries with a long dry season and scanty vegetation. Although the genus is purely Palearctic, only three of the forms are found in Europe.

Small, but of strong build, the body in comparison with the wings much larger than in the previous genera. Head narrower than the thorax, but appearing broad on account of the dense and long hairs. The frons of medium width, with a dense brush of rather long bristles, in which the palpi are entirely concealed. The latter small and like the eyes densely covered with long hairs. Thorax of medium size, shaggy. Abdomen of many species reaching beyond the anal angle of the hindwing. Wings regular in shape, the forewing sometimes with acute apex, the hindwing always without tails, both entire, rather thick, with long fringes. The forewing of many species is very broad close to the base, so that there is a wide interspace between costal and subcostal, the edge forming sometimes a basal lobe which curves somewhat downward in the specimen at rest. The upperside is yellow-red; this colour occupying the whole surface except the black margin; the latter however is sometimes so enlarged that the wings are black-brown except some very small vestiges of yellow-red. The underside already closely resembles that of *Chrysophanus*, the hindwing and the apex of the forewing agree in colour and are often of a neutral tint, while the disc of the forewing, which is concealed at rest, mostly shews the bright colour of the upperside. In other species the underside bears small bright spots. The insects fly in spring, often already before the snow and the cold wintery weather have entirely gone. They occur on stony hills with scanty vegetation and appear to avoid a long flight. At rest they keep the wings usually half open and settle on the bare ground or on boulders. The larvae are onisciform, bearing thin short hairs and being often brightly coloured. As far as known they feed on Papilionaceae, of which they eat the pods, and pupate

on the ground. Being thus dependant on fructifying plants, they have mostly only one brood and remain in the pupal state for an extremely long time.

ballus. **T. ballus** F. (75 d, e). ♂ above dark brown, with traces of small red spots in the anal area of the hindwing. In the (larger) ♀ the forewing red-yellow except the costal and distal margins, there being a similarly coloured ovate band-like spot before the distal margin of the hindmargin. The underside of both sexes recalls that of *Chrysophanus phlaeus*, but the basal area of the hindwing is dusted with verdigris. French Riviera, Spain, North Africa. — The egg green, somewhat flat, with a network of polygonals, laid singly on the upperside of leaves of *Boujeania hispida*. Larva rather thick, not so flat as in many other *Lycaenids*, the segments swollen, separated from each other by deep incisions; greenish yellow, with bluish dorsal stripe and a red-brown lateral one, there being thin oblique streaks between them; until the end of May in the pods of the food-plant. Pupa ovate, rounded everywhere, with shallow minute puncturation; as far as known the larva pupates free on the ground. The butterflies from February till April in places where the food-plant grows, often exceedingly plentiful. The specimen, when covered with the net, often drops to the ground and conceals itself in the grass.

mauritanicus. **T. mauritanicus** Luc. (= *ballus* v. *undulatus* Gerh.) (75 d). Similar to the preceding species, larger. The red-yellow patch of the hindwing of the ♀ occupies the whole wing except the base and margins. The underside of the hindwing not dusted with green, but is brown, with two bands composed of black-edged yellowish brown spots. Varies considerably; the ♂ shews sometimes vestiges of a discal spot on the forewing above, the black dots of the underside may be numerous, or sparser, or confluent, etc. — In Algeria and Morocco, in stony places, especially on the southern slopes of the Atlas, here sometimes in thousands, from February until April.

romanovi. **T. romanovi** Christ. (75 d). Above both sexes similar to the ♀ of *ballus*; a spot each in the disc of the forewing and before the distal margin of the hindwing red-yellow. Beneath the hindwing and the apex of the forewing of a delicate silky bluish grey. Armenia. — In the form *maculifera* Stgr., from Mardin in Mesopotamia, the upperside is more extended red-yellow, and the underside bears seriated reddish spots of variable size. — Larva similar to that of *Zeph. quercus* in shape and size, but less flat, more cylindrical, reddish yellow-grey, with black-brown head, the single segments darker above, the dorsal line dark brown-red, at its sides heavy dark oblique stripes; until June in the inflorescences of *Astragalus scharuhdensis*. The pupa rounded everywhere, red-brown, in the ground. The butterflies are on the wing in April and May in Armenia, in stony ravines in the mountains.

fedtschenkoi. **T. fedtschenkoi** Ersch. (75 d). The largest species. Forewing with red-yellow disc; hindwing black-brown, in the ♂ often with small yellowish red spots. On the underside of the hindwing and the apex of the forewing magnificently blue-green. In Turkestan (Samarkand), Ferghana, etc. — The form *alpina* Gr.-Grsh., from the Pamir, has the base of the wings more strongly dusted with black and the disc more ochreous. — In April and May in luxuriant meadows.

callimachus. **T. callimachus** Er. (= *epiphania* Boisd., *hafis* Koll.) (75 e). Above bright fiery cinnabar-red, margins and base of wings black, fringes chequered with brown. Hindwing beneath earth-brown, fasciated with dark brown and minutely dotted with black. Coasts of the Black Sea, Persia and Ferghana. — In the form *dentata* Stgr., from northern Mesopotamia and Asia Minor, the black distal margin of the wings is very strongly dentate and the hindwing beneath is grey-brown. — Larva reddish yellow-brown, with dark dorsal line and pale lateral one, between which there is a dark stripe composed of small oblique spots; on *Astragalus physodes*. The butterflies in April and May on hills, not rare.

nogelii. **T. nogelii** H.-Schäff. (= *nogellii* Lang) (75 e). The smallest species, recognizable by the hindwing beneath bluish grey ornamented with red macular bands, which are dotted with black at their edges. In the typical form, from Asia Minor and Turkey, the forewing bears a red discal patch and the hindwing a red transverse spot before the anal area. — In the larger *obscura* Rühl (75 e) the upperside is uniformly black-brown, except for some vestiges of red-yellow before the distal margin of the hindwing; from the Taurus and Armenia. Transitions to this form occur almost everywhere among the name-typical race. — *aurantiaca*. **aurantiaca** Stgr. (75 e) has the red-yellow of the upperside so enlarged that the forewing is orange-red with black margins. Asia Minor, especially in the district of Angora; Syria. — *nesimachus*. **nesimachus** Oberth. has even more red-yellow on the forewing, the black margin being interrupted by the fiery ground-colour or even reduced to marginal dots. Syria. — *dobrogensis*. **dobrogensis** Car. (75 e) is a very large form from Roumania, which considerably surpasses in size even the otherwise similar *obscura*; found on *Astragalus ponticus*, on which probably the larva feeds. — In May and June, not rare, but flying so low that it is difficult to follow the small insect with the eyes (STAUDINGER).

22. Genus: *Chrysophanus* Hbn.

Rather small butterflies, in which the ♂♂ have nearly always and the ♀♀ sometimes the whole or part of the upperside of the wings golden red.

Head relatively small, with flat frons, densely scaled and clothed with bristly hairs, which form tufts behind the base of the antennae. Eyes rather widely separated, not very large, naked. Antenna a little over half the length of the costal margin, delicately ringed, rather suddenly enlarged to a strong, elongate, flattened club. Palpi small, pointed, porrect for about the width of the head, densely clothed with bristly hairs. Wings regular, entire, forewing triangular, hindwing obtusely ovate, sometimes nearly circular, occasionally with vestiges of tails at and above the anal angle, rarely with one very short tail. In the forewing the costal ends above the apex of the cell, subcostal with 3 branches; the cross-vein but little prominent; the cell half the length of the wing and about four times as long as broad. The legs somewhat longer than in the previous genera, densely scaled bluish white or yellowish white, the coxae and femora sometimes covered with thin soft hairs in the ♂♂. Thorax and abdomen moderately strong, of normal proportion, in contradistinction to *Curetis*, in which the disproportionately strong thorax is three times as large as the slender abdomen of the ♂♂. Sometimes the whole upperside of the body clothed with soft golden glossy hairs, the under surface being scaled bluish grey or pale ochre. — Larvae strongly convex, but not so markedly flattened and onisciform as in most larvae of *Theclini*; the head small, smooth and rounded; the single segment strongly swollen, above often brightly marked and with a distinct stripe on the sides; upperside with short soft hairs. Thoracical legs strong, prolegs short and clumsy. On low herbage and shrubs. Pupa without projections, similar to the bean-like seed of a leguminous plant, quite immobile, rounded everywhere, smooth, usually brownish with darker markings, fastened to the stalks of plants.

The butterflies are lively but not shy insects, which are found on flowers — especially Umbelliferae —, in the North during the summer, in the South all the year round. In contrast to *Thecla* they keep near the ground, flying rarely higher than 1 or 2 m. They do not easily leave their flight-places, occurring especially on meadows in woods and on hillsides. They frequent localities without any woods just as much as larger open places in wooded districts, and rarely travel a longer distance on the wing; even when flushed they settle again after having traversed a distance of but 10 to 20 m. The flight, however, is often very fast. The wings are closed at rest, but nearly always kept open when the butterfly sucks at a flower. Many species have only one brood, others a succession of irregular and overlapping broods all through the season from March to October.

The true *Chrysophanus* are Holarctic. By far the greater number is Palearctic and a considerably smaller portion North American. Some few forms from South America and — curiously enough — *New Zealand* are better kept generically separate. The genus goes far northward and is most abundantly developed between 40 and 50° n. L., the number of species decreasing so rapidly towards the tropics that only a few forms cross from Palearctic Kashmir into the northern districts of India, which otherwise are so rich in Lepidoptera. The butterflies are generally not rare in their flight-places, but sometimes very local, the only butterfly which is known to be exterminated belonging indeed to this group. Also this genus is here dealt with in the usually accepted extent, although it has been split up by various authors into a whole number of genera, as *Heodes*, *Epidemia*, *Chalceria*, etc. It may conveniently be left to a monographer to decide, if the separation of these genera is justified.

C. virgaureae L. (76 a). ♂ above red-golden, with a narrow black margin, at the proximal side of which there are dark dots on the hindwing; ♀ cinnabar-red, spotted with black, the hindwing partly dusted with black. Underside leather-yellow, more sparsely spotted with black, before the outer third of the hindwing pale dots, which are occasionally united in a white chain. The anal area dusted with red. The species occurs from the Atlantic coasts throughout Europe to East-Siberia and from the coast of the North Sea to the Mediterranean, but is absent from Great Britain and Japan. — In Lapland flies a small form, **oranula** Err. (76 b), which is otherwise very similar to the name-typical form. — **estonica** Huene (76 b), from the Baltic provinces and eastern Russia, exactly resembles the preceding in size and shape, but has a broader black margin. — **virgaureola** Stgr. (76 b) is in size like *virgaureae*, but the upperside of the ♂ is as in *estonica*; beneath the more reddish disc of the forewing contrasts with the more yellow hindwing and the white discal stripe of the latter is absent or reduced; from northern Central Asia, Dauria, Mongolia, and as similar aberration in the Swiss Alps. — ♂♂ from the Apennines, in which the upperside is deeper red-golden and the base of the hindwing more densely dusted with dark, are **apennina** Calb. The ♀♀ on the contrary have the ground-colour paler and are less dusted with dark than many Central European specimens, the underside being lighter. According to Falloù the ♂♂ from the Pyrenees are also deeper red. — On the other hand the specimens from Mersina and the neighbouring Taurus Mts. have a bright light golden-red upperside in both sexes, the black margin being narrowed in the ♂. This is **aureomicans** Heyne. — Specimens with the underside of the hindwing strongly dusted with grey, the upperside of the ♀ moreover having a brown-grey tint on account of the dark dusting on the golden ground, occur in many alpine districts with the ordinary form, being especially plentiful and well marked in the Alps of Valais; all

oranula.
estonica.

virgaureola.

apennina.

aureo-
micans.

- zermattensis*. such individuals are united as ab. **zermattensis** Fall. (76 a). It is hardly possible to decide from FALLOU's very long description of this form which are the real characteristics of his aberration, so that strictly speaking not all the specimens standing in collections under this name belong here, particularly not all the specimens from the Valais; in fact only those individuals are true ab. *zermattensis* which, like *phlaeas caeruleopunctata*, have a chain of white dots before the outer third of the hindwing, as shown in the figure given in Ann. Soc. Ent. Fr. vol. V. pl. 2. Besides the modification of the colour of the upperside into sepia-brown, both sexes differ on the underside in the forewing bearing a broad dark margin and the hindwing being washed with fuscous. ab. **seriata** Fruhst. are *zermattensis*-♀♀ which have a discal row of white dots on the hindwing proximally to the row of black spots. ab. **fredegunda** Fruhst. bears, besides those dots, a row of submarginal spots on the forewing beneath. — Of more strictly individual aberrations we mention first ab. **miegii** Vogel (76 b, c), with stronger black spots above and beneath, the spots even appearing on the upperside of the forewing in the ♂, and with broad black margin. Transitions to this aberration occur everywhere and have partly received names, for instance ab. **guttata** Schultz with strongly developed black spots and narrow marginal band; especially well marked specimens are found in the south of the area, in Spain, Portugal and Armenia. ab. **montana** Meissn., from the Rhône glacier, is the name for smaller specimens, which approach *oranula*, but are not of constant occurrence like the latter. Sometimes the hindwing above bears small bluish white spots arranged in a submarginal row; this is ab. **albopunctata** Huene (= *caeruleopunctata* Gillm.). ♀♀ with the ground-colour of the upperside dirty yellowish brown are ab. **voelschowi** Gillm. (= *milena* Schultz). In ab. **sincera** Schultz the black marginal dots are absent from the hindwing of the ♂. According to COURVOISIER's proposition to give the same name to the same kind of aberration in the various species, the specimens with the black spots of the underside forming streaks may be named ab. **elongata** Courv.; in certain ♀♀ — ab. **lateradiata** Schultz — these longitudinal streaks appear also on the upperside, being united with the marginal spots. — FRUHSTORFER distinguishes, moreover, according to locality a number of separate races, calling the specimens from the Engadine **athanagild**; these are smaller than *zermattensis*, darkened beneath, with more extended pale red anal lunate spots; ♀ as light as *juvara*. *galsninth*, but smaller. — Bavarian specimens are named by him **juvara**. They are said to be smaller than typical northern *virgaureae*; in the ♀ the hindwing is nearly quite black with broad yellow submarginal band. Beneath darker, the red in the anal area of the hindwing broader, more compact, the black spots reduced. ab. **galsninth** Fruhst. are the specimens with yellow instead of black hindwing. ab. **onka** Fruhst. is the name for individuals in which the upperside is very pale, yellowish white, strongly glossy, corresponding to ab. *schmidtii* of *phlaeas*. — The egg semiglobular, grey-green, with a network of polygons, laid singly or several together on the stalk of the foot-plant. Larva green with a yellow stripe on back and at the sides, brownish head and brownish legs; at first glassy, transparent, later yellow on the back. Emerges in April and feeds until June on Rumex and Solidago. Pupa rounded, smooth, similar to a small bean, brownish, with dark markings; on the thorax a dark dorsal longitudinal stripe, which is continued on the abdomen by a row of impressed dots. The butterflies are on the wing from the end of June into August on meadows, clearings in woods, mountain-sides and flowery slopes; they are abundant almost everywhere in the area and ascend in the high mountains above 10,000 ft.
- ottomanus*. **C. ottomanus** Lef. (= *legeri* Frr.) (76 c). Above very similar to *virgaureae*; the hindwing of the ♂ with very short but distinct tails. The underside quite different, the hindwing bearing a row of cinnamon-red spots before the margin. In spring-specimens the ground-colour of the underside of the hindwing is plumbeous grey, being more yellowish in the individuals of the second brood. The former, moreover, bear frequently black dots on the upperside of the forewing. — On the Balkan Peninsula and in Asia Minor, in May and June, locally so common that, e. g., MANN obtained near Brussa over 100 specimens in two hours.
- thetis*. **C. thetis** Klug (= *ignitus* H.-Schäff.) (76 c). At once recognized by the black apex of the forewing of the ♂ being continued along the costal margin for some distance and by the markings of the underside of the hindwing being almost entirely suppressed by light scaling. In the southern districts of the Balkan Peninsula, Asia Minor and Transcaucasia. — **caudatus** Stgr. (76 c, d, on the plate *caudata*) is a form (spring-brood?) with thin but rather long tail. — The name-typical form flies in July and is plentiful on flowering thyme, occasionally being found together with *virgaureae*.
- ochimus*. **C. ochimus** H.-Schäff. (= *phaeton* Frr., *kefersteinii* Gerh.) (76 d). Above light golden red, the ground-colour almost the same in the sexes, except that the ♀ is dusted with dark on the upperside at the base of both wings. Underside with rather large round spots. — A specimen from North Persia with black marginal spots on the forewing and enlarged dots on the hindwing above as well as with a bright orange band before the distal margin of the hindwing beneath has been named **hyrcana** by NEUBURGER. — The form **alpherakii** Gr.-Grsh., from the Pamir, likewise based on a single ♂, has the black distal margin of the forewing dentate on the discal side and widened at the apex, the spots of the underside being reduced.

ELWES believes this form to be identical with *aditya* Moore, in which case it would belong to *solskyi*. — As in all *Chrysophanus*, the dark spots of the underside are occasionally prolonged towards the outer margin, forming streaks; this is ab. *strigifera* Schultz.

strigifera.

C. solskeyi Ersch. (76 d). The black apical margin of the forewing is continued along the costa as in *solskyi*. *thetis*, but the underside is profusely spotted with black, as in *ochimus*; from the Kissat Mts., said to come also from Samarkand. — **fulminans** Gr.-Grsh. (76 e) has, especially in the ♀, the upper surface brighter on *fulminans*. account of the sparser black dusting, and particularly the underside much more vividly coloured, the reddish yellow disc of the forewing contrasting strongly with the leaden grey of the hindwing; this form, moreover, is tailed. From Ferghana. — **aditya** Moore is larger and the black distal margin is very narrow, *aditya*. being almost a mere line, which, however, is continued along the costal margin and bears a row of well developed marginal dots. Kashmir. — This species flies as late as the end of July and August and appears to be a mountain insect, the occurrence in the plains being doubtful.

C. lampon Led. (76 e). More glossy golden cinnabar-red, *i. e.* paler than the previous forms; both *lampon*. sexes with a rather long tail; underside leaden grey, reddish yellow on the disc of the forewing, with small black spots nearly as in *omphale*, but the black margin of the forewing is in both sexes continued along the costa for 3 or 4 mm. In May in various mountains of Persia. — Represented in the plains by the tailless form **lamponides** Stgr.; larger, similar to *ochimus*, with thinner black margin on the upperside; *lamponides*. in July.

C. thersamon Esp. (= *xanthe* Hbn.) (76 e). Bright golden red; but the hindwing, also in the ♂, so *thersamon*. much dusted with dark scaling that a light submarginal band contrasts distinctly with the ground. On the underside the disc of the forewing and the submarginal band of the hindwing both cinnabar-red, contrasting with the grey ground. South-east Europe, the eastern districts of Italy opposite the Balkan Peninsula, Asia Minor and Turkestan, extending north-westwards to Hungary, Bohemia and Saxony. — **omphale** Klug *omphale*. (76 e) is the short-tailed summer-form, which flies from July until September. — In **persica** Bien. the *persica*. upperside is very fiery and the dots of the median row on the hindwing beneath are larger; in the sub-alpine region of the mountains north-west of El Meshed (Persia). — **alaica** Gr.-Grsh. is washed with dark on *alaica*. the upperside, and has the underside more yellowish with larger dots. Ferghana. — Larva green, with swollen segments, the dorsal line yellow, thinly divided, the side-line likewise yellow, between the two lines darker oblique smears; head and legs brown; adult in June and again in the autumn on *Sarothamnus* and *Rumex*. The pupa evenly rounded, dark brown. The butterflies occur as tailless form in April and May, and again as *omphale* from July onward, flying on dry sunny hillsides, not being rare at their flight-places,

C. asabinus H.-Schäff. (= *helius* H.-Schäff.) (76 f). Above reddish golden with little gloss, both *asabinus*. sexes spotted with black; the underside more uniform in colour, leather-yellow. Much smaller than most preceding species, only comparable to very small specimens of *thersamon*. Asia Minor, Armenia. — In **tauricus** Rühl-Heyne the upper surface is more distinctly and more strongly dotted and the hindwing bears *tauricus*. in the ♂ a shorter, in the ♀ a longer tail. From the Taurus, Syria, Kurdistan and Mesopotamia. — **satraps** Stgr. has the underside of the hindwing dark grey and more densely and strongly spotted. Near *satraps*. Amasia in Asia Minor and in Lydia, also in the Caucasus, in spring.

C. dispar Haw. (76 f). Very variable in size, many specimens being smaller than large *rutilus*; differs *dispar*. from the latter in the larger spots of the underside, especially in the ♀. In the ♂ an additional black spot appears frequently, but not always, in the centre of the cell on the upperside, this spot being in the ♀ usually more than twice as large as in *rutilus*. The butterfly occurred formerly in England, but is now extinct. The eggs were laid on *Rumex hydrolapathum*, the larva was green like the leaves of *Rumex*, with dark dorsal line. Pupa at first green, later grey with a dark dorsal line and two abbreviated pale stripes. — Early last century the species was still plentiful in several swampy districts of England, for instance at Whittlesea-Mere and other places, but did not occur in Ireland. On account of the intense cultivation of the soil in England these swamps were drained and the land employed for agriculture. In 1820 fifty or even more specimens of *dispar* could still be obtained in a short time. At that period 3 to 4 shillings the dozen were paid in England. In 1845 a rapid decrease was noticed in Cambridgeshire. In 1847 five specimens were caught in Huntingdonshire, since when no further captures have been recorded. In the seventies the commercial value had already increased to 20 shilling. In 1893, in the auction-room in London 31 specimens were sold which realized about £ 139, *i. e.* nearly 90 shillings the specimens. At another sale, in 1902, an average price of £ 5. was paid for *dispar*, a specially fine ♀ realizing as much as £ 7. ¹⁾ — ab. **cuneigera** Tutt are individuals in which the spot in *cuneigera*. the cell of the forewing is enlarged to a streak which occupies the greater part of the cell. ab. **alba** Tutt *alba*.

¹⁾ cf. Charniel, The Field Entomologist's Quaterly, vol. I.; W. Leonhardt, Insekten-Börse 1904, p. 235.

are albinotic specimens, such as occur in all species of coppers, bearing usually asymmetrical and irregular light patches on the wings in variable position. — **rutilus** Wernb. (= *hippotoë* Hbn.) (76 f, g) is the continental form of *dispar*; the forewing always without cell-spot, the discocellular spot smaller, or absent, the ocelli considerably smaller on the underside of both sexes and in the ♀ also on the upperside. The spring-form of *rutilus*, **vernalis** Hormuz., rather closely resembles *dispar* in certain districts (e. g. Bordeaux, etc.), while the summer-form is considerably smaller. The dark spots are sometimes enlarged to streaks, which happens especially often on the underside; this is ab. **sagittifera** Hormuz. (76 g). In ab. **radiata** Oberth. these streaks are also present on the hindwing, which is likewise the case in ab. **nigrolineata** Verity, whose red-golden upperside is said to be densely dusted with red. — In the east of the Region two forms are known: a reddish golden one in which the discal spots on the hindwing beneath are absent or obsolescent, while the row of submarginal spots on the forewing is very evenly developed and regular, **dahurica** Graes. (76 g), from Amurland. — The second form is more yellowish golden — **auratus** Leech (76 g) —, the upperside of the ♂ does never bear a discocellular spot, while the underside is distinctly spotted; the ♀ of this form is recognized by the underside being ashy grey instead of blue-grey; from Corea, North China and Tibet. Both these East-Asiatic forms have been united by LEECH as well as STAUDINGER and REBEL, but some specimens agree better with GRAESER'S description and others with LEECH'S. As ALPHÉRAKY records *auratus* from June and GRAESER his *dahurica* from the middle of July to August, the two insects may possibly be seasonal forms. — **borodowskyi** Gr.-Grsh. is a further form, from Manchuria; it is large, brilliantly coloured and prominently spotted. — The larva of the *rutilus*-forms is dark green with paler lateral stripe. It hibernates young and feeds in May on various species of *Rumex* and on *Polygonum bistorta*. There are one or two broods according to the district, the butterflies being found in swampy meadows which are occasionally flooded. The species, though plentiful in some places, occurs in most localities in single specimens only and also not every year. By the application of low temperatures STANDFUSS obtained females in which the black markings of the upperside were modified.

C. splendens Stgr. (76 g, h). In this magnificent, very intensely glossy golden butterfly the upperside is very similar in the sexes. The wings are golden red, dusted with black at the base, the forewing being traversed by one row of submarginal dots and the hindwing by two. The underside is similar to that of *dispar rutilus*, the ground-colour of the hindwing being yellowish grey. From Central Asia. — Specimens with the hindwing beneath dark bluish grey and the upperside slightly glossy violet are **violaceus** Stgr., from East Asia (Amurland, Mongolia).

C. hippotoë L. (= *eurydice* Rott., *chryseis* Bkh.) (76 h). Darker coppery golden with bluish sheen, both wings of the ♂ broadly edged with black, inclusive of the costal margin of the forewing and the anal one of the hindwing; the ♀ shaded with very dark. Underside almost uniformly grey, with numerous ocelli, the disc of the forewing being slightly yellowish. In North, Central and South Europe, sporadic, but common in many localities. Appears to be nowadays absent from England. Albinotic specimens have a whitish upperside with a sky-blue instead of violet-blue sheen in the ♂♂; this is ab. **argenteola** Schultz. The ocelli of the underside are sometimes reduced, the central ones (ab. *decurtata* Schultz) or the marginal ones (ab. *orba* Schultz), or all, especially often in *eurybia* (ab. *extincta* Gillm.). The spots also may be prolonged and united with one another (ab. *confluens* Gerh.) in every conceivable degree. — In the alpine form, **eurybia** O. (= *eurydice* Hbn.) (76 h) the ♀ is often entirely dark brown above with the markings hardly perceivable, being on the wing hardly recognizable as a *Chrysophanus*; only occasionally is the disc of the forewing above yellowish and glossy golden. The ♂ has above a quite different, more red gloss. In the mountains of Switzerland and Scandinavia, also in the Altai and other Asiatic mountains. — The form **italica** Calb., from the central and northern Apennines, is a transition from the typical form towards *eurybia*. The ♀ is not quite dark brown above, the disc of the forewing having a stronger golden brown gloss. The discocellular spot is visible in the ♂ but small. — An exaggerated form of *eurybia* with the upperside of the ♀ deep dark brown is ab. **nigra** Favre. — **amurensis** Stgr. (76 i) is a very large form from North China and Amurland; the ♀ is very dark, bearing only in the anal area of the hindwing a narrow yellowish red half-band; the ocelli of the underside are strongly developed. — **stieberi** Gerh. (76 i) is the smaller form from North Europe with bright golden red ground-colour on the upperside of the ♀, the underside bearing usually a very distinct yellowish red submarginal band, which in the ♂♂ is also very prominent on the upperside, whereas it is entirely absent from the ♂♂ of *hippotoë* and *eurybia*. — **candens** H.-Schäff. is the form inhabiting the Balkan Peninsula and Anterior Asia. The ♂♂ have no blue sheen and the forewing above is entirely golden brown in the ♀♀; the black margin of the upperside is narrower in both sexes. — TER HAAR describes some specimens obtained by him at Groningen in Holland which he says have the blue sheen peculiarly modified, being condensed in violet-blue streaks and dots; he calls this form from its habitat ab. **groningana**. — Larva velvety dark green with brown head, dark dorsal line and yellow lateral one; until the middle of May on *Rumex*.

Pupa yellowish brown like leather, spotted with black; it lies free on the ground (FRYER). The butterflies appear at the end of May, in the northern districts a little later (early in June) and are found until late in July in luxuriant meadows, where they settle on umbellifers or in the grass, the ♂♂ always with the wings half open. The localities are often of very small extent, sometimes being only a certain part of a meadow, where the species, however, is nearly always very plentiful. The ♀♀ appear about 2—3 weeks after the ♂♂ have commenced to fly. The form *eurybia* of the high Alps does not begin to fly before the very end of July and is on the wing into September; the northern *stieberi* also does not appear before July.

C. phoebus Blach. Besides *phlaeas* the only North African *Chrysophanus*; from Morocco. Very close to *thersamon*; above fiery golden red with a narrow black margin which is enlarged to a triangle at the apex of the forewing; on the disc prominent small black spots. Hindwing strongly shaded with black at the anal margin, spotted with black on the disc. Forewing beneath on the reddish yellow disc with 3 large black spots which have pale borders. Hindwing beneath with small black dots edged with light grey; a thin white line before the fringes of both wings. Is best placed between *thersamon* and *asabinus*; only recently discovered. *phoebus*.

C. alciphron Rott. (= *lampetie* Schiff., *virgaureae* Hufn., *hiere* F., *helle* Bkh., *hipponoë* Esp.) (77 a). *alciphron*. Lighter yellow and less golden; the upperside of the ♂ in the name-typical form quite unlike that of any other *Chrysophanus*, being so dusted with dark scales which have a bluish gloss that the ground-colour is almost suppressed. This dark scaling of the ♂ is only interrupted by the black discal spots and a reddish yellow distal band of the hindwing. The underside is rather uniform in colour, on the disc of the forewing somewhat brighter reddish yellow, with numerous, rather large, round ocelli strongly edged with whitish. In Central Europe and the southern districts of North Europe, from the shores of the North Sea and the Baltic provinces to the chain of the Alps, and from North France to the Altai and Mongolia. — In the South the species is represented by the much larger *gordius* Sulz. (77 a), of which both sexes are bright yellow-red above, with very prominent and heavy black spots above and yellow instead of blue-grey underside to the hindwing. — There exist nearly all intergradations between *gordius* and the typical form, for instance *meliboeus* Stgr. (77 a), in whose ♂♂, which are larger than *alciphron*, but smaller than *gordius*, the yellowish red ground-colour breaks through the dark scaling, though it is less pure than in true *gordius*: in Greece, Asia Minor and North Persia; Greek specimens differ a little from those from Anterior Asia, but the differences are not sufficient to justify a separate name. — *granadensis* Ribbe (77 b) has at the most the size of *alciphron*, being often even smaller, but the spots of the upperside are larger than even in *gordius*, with which it agrees in the bright yellowish red colour of the upperside; in Spain. — Among *gordius* there occur also aberrant specimens which are transitions to the name-typical form. STEFFANELLI described them as ab. *intermedia* from Boscolungo in Italy; the hindwing of the ♀ is dark except for a yellowish red submarginal band. Also the black spots may vary in a similar way, as is the case in the preceding species of *Chrysophanus*: In ab. *subfasciata* Schultz (77 b), of which the type has been kindly lent to me for figuring, all the spots of the upperside are so large that those of the submarginal row are united to a band which is hardly interrupted by the veins. In ab. *mutilata* Schultz the ocelli situated in the cells on the underside are strongly developed, while the distal ones are nearly all absent. An aberration of *gordius* with the ocelli of the underside similarly reduced has received the name ab. *evanescens* Gillm. In ab. *viduata* Schultz, an aberration of *alciphron*, the ocelli of the underside are so weakly represented above that the upperside appears almost without spots. ab. *infulvata* Schultz is the name for ♀♀ which are quite uniformly black-brown above, being even devoid of the reddish yellow submarginal band on the hindwing and corresponding to, ab. *nigra* of *hippothoë*. The phenomenon often observed in *hippothoë* that the ocelli are modified into streaks is according to SCHULTZ considerably rarer in *alciphron*; SCHULTZ names such specimens ab. *constricta*. — Egg, as most *Chrysophanus*-eggs, flattened, green-yellow, with the surface reticulate. Larva from August to early May, green, almost unicolorous, along the back and also on each side a whitish green longitudinal stripe shaded with dark; the head, which is only visible when feeding, black-brown; on *Rumex*. Pupa fastened near the ground by means of very thin threads, olive-green, with darker shadowy stripes. The butterflies are on the wing in June and July; they are less confined to definite restricted flight-places than the preceding species, but occur much more singly and like drier localities. They are busy visiting flowers, especially those of brambles at sunny waysides; *gordius* is especially fond of clusters of thyme and *Sedum album* according to COURVOISIER, and ascends in the Alps up to 10000 ft. *gordius*.

C. phlaeas L. (77 b). The sexes alike. Forewing golden red with black margin and black discal dots; hindwing blackish, with red submarginal band. Underside of forewing similar to upper, but the margin earth-brown like the whole underside of the hindwing, the latter usually bearing some small dispersed dots, which are generally less numerous than in the specimen figured. Distributed over the whole Palearctic Region into the far north: from the Atlantic islands to the east-coast of Japan, southward to the oases of the Sahara and the north of the Indian territory, also in North America; seasonally and geographically variable. In the whole of southern Europe there occur among the summer broods larger, darker and tailed specimens, but not everywhere and not constantly; this is the form *eleus* F. (77 c). *phlaeas*.

There occur all intergradations from *eleus* to the normal *phlaeas* of the second and third broods, which are only remarkable for their somewhat larger size. These transitions have partly received names (*stygianus*, *phlaeoides*, *turcius*, etc.). — In the most western form, *phlaeoides* Stgr. from Madeira, the black colour of the hindwing is so extended that the red submarginal band is hidden. But I found such melanotic specimens also on the Continent, the specimen figured as „*eleus*” and obtained by me near Lisbon is more extended black than all the specimens I caught at Funchal on Madeira. — In the high north the specimens come near the American form, in which the forewing is of a lighter, more fiery, and more golden yellow-red; this is *hypophlaeas* Bdr. (= *americana* d'Urb.). This light golden form appears to replace typical *phlaeas* also in the north of Asia, since STAUDINGER mentions *hypophlaeas* from the Amur. — South of the Amur there occurs *chinensis* Feld. (77 b), recognizable the bright red submarginal band on the underside of the hindwing, the colour of red lead, this band being only occasionally indicated in European specimens. — A gigantic form is found in Japan, but only in the summer and autumn, which, in addition to the large and prominent black markings and the red band on the underside of the hindwing, may bear a row of bluish white dots before the outer third of the upperside of the hindwing. This form I caught myself in Japan, whence I obtained it also from collectors under the name of ab. *daimio* (77 b), which may be accepted for it. — Throughout South and East Asia *phlaeas* appears to be excessively variable seasonally and locally, and the first describers, receiving accidentally larger or smaller individuals, gave a variety of names, such as *timeus* Cr. (Smyrna), *stygianus* Butl. (Kandahar), *baralacha* Moore (Kashmir), *turcius* Gerh. (Orient). There occur, however, among these forms at the same place and season specimens which are hardly different from European *phlaeas* or *eleus*. An enormous number of individual aberrations is known. Of the numerous names which have been given to such individuals, ab. *alba*, *intermedia*, *purpureotincta*, *obliterata*, *extensa*, *conjuncta*, *parvipuncta*, *remota*, *juncta*, *cuneifera*, *infusata*, etc., only those may be mentioned to which collectors have become accustomed or which are more specially dealt with in literature. As regards the ground-colour the upperside may be blackened by dark dusting, this being especially the case along the costa: ab. *suffusa* Tutt. On the other hand, the ground-colour may be completely white; this is ab. *alba* *schmidtii* Tutt (= *schmidtii* Snell.) (77 c, erroneously called *albicans* on the plate). ab. *schmidtii* Gerh. is a form in which the golden yellow colour is replaced by straw-yellow. If the golden colour is particularly fiery, more red than orange, we have ab. *ignita* Tutt, while ab. *cuprinus* Peyer, which is unknown to me, appears to be intermediate between *schmidtii* and ordinary *phlaeas*. In ab. *webbi* Tutt the golden red ground is normal, but the dark spots of the forewing are grey instead of deep black. In the otherwise normal ab. *huebneri* *huebneri* Tutt these spots are even whitish. The spots of the forewing vary very much in number and intensity, being sometimes quite absent (*obliterata*). Very peculiar in aspect are specimens in which only the two cell-dots and the outer margin of the forewing are distinctly black; this is ab. *bipunctata* Tutt (further reduction leads to *unipunctata*, *impunctata*, *remota* Tutt). In ab. *magnipuncta* Tutt the discal dots of the forewing above are enlarged; in ab. *kochi* Strand they are so enlarged that those of the submarginal row touch each other, while in ab. *fasciata* Streck. they are united to a discal band, only the cell-spot remaining isolated. But when the discal spots are modified into streaks even this cell-spot may be united with the outer spots, ab. *conjuncta* Tutt. The hindwing has occasionally thin radiating streaks instead of the yellowish red submarginal band; this is ab. *radiata* Tutt. Moreover, there may appear new markings in the shape of blue-white dots before the outer third of the hindwing above, this being ab. *caeruleopunctata* Stgr. All these various aberrations in pattern may be combined in various ways; the blue submarginal dots for instance may appear in true *eleus*, the forewing may vary in connection with the hindwing, a specimen may be abnormally tailed and at the same time have the ground-colour very pale, etc. To give expression to this variability double names have been adopted, for instance ab. *schmidtii-caudata*, ab. *extensa-conjuncta*, ab. *eleus-caeruleopunctata*, etc. A further number of names were given to transitional geographical forms, as for instance: *turanica* Rühl from Turkestan, with feebly darkened upperside; *oxiana* Gr.-Grsh. from Pamir, above very dark, beneath pale; *comedarum* Gr.-Grsh., upperside pale, underside still paler, from the Beik pass; further *pseudophlaeas* Luc. for African specimens, and *fulliolus* Hulst and *feildenii* Mc-Lech. for American forms. — Egg semiglobular, coarsely punctured, whitish grey. Larva green, sometimes with a red or yellow dorsal line, on species of *Rumex*, when young on the underside of a leaf. The individuals from the same cluster of eggs are very different in their rate of growth, so that some hibernate as larva, while others already appear as butterfly in the autumn. Pupa yellowish brown, often with a reddish tint; dorsal line dark, the veins of the wing-cases pale. The butterfly is on the wing all through the year, with the exception of the cold winter-months. In South Europe and North Africa as well as in the warm districts of Asia the butterfly appears even on fine winter days; I found it, for instance, at Hiogo (Japan) in December, in northern Italy in January, on the Canary Islands in February. The butterflies visit flowers, especially the clusters of thyme, and love to settle with half open wings on the bare ground, on mole-hills, clods of earth, or in the middle of the road. The species is plentiful, but flies singly as a rule. In North Africa, however, near Lambessa in July, I observed swarms of numerous specimens which congregated about a small thistle with blue leaves. In the high mountains *phlaeas* goes to a considerable altitude, but is here not particularly plentiful.

C. pavana Koll. (77 c). On the upperside almost exactly like a gigantic *phlaeas*, for instance ab. *pavana*. *daimio*; but at the apex of the cell of the hindwing there is a light spot surrounded by dark dots; the red submarginal band is much narrower than in *phlaeas* and composed of thin red halfmoons. On the underside, however, *pavana* differs much from *phlaeas* in the hindwing bearing proximally to the red submarginal band a bright whitish blue band, which extends from the apex to the abdominal margin and has rows of black dots both proximally and distally. — In Kashmir and the adjacent districts of the Himalayas from 4 to 13 000 ft., common throughout the summer.

C. dorilis Hufn. (= circe Schiff., garbas F., phocas Rott., dorylas Kirby) (77 c). ♂ above black-brown, with a magnificent metallic green gloss when alive, with black spots corresponding to those of the underside and with a very thin reddish lunate line before the margin of the hindwing. ♀ above similar to *phlaeas*, but paler yellow, and with a very thin black edge instead of a broad black marginal band. Beneath yellowish grey, with very numerous black ocelli and small russet-red spots before the margin. Throughout Europe, from the North Sea to the Mediterranean, with the exception of Great Britain; also in Asia Minor. — In the much larger *subalpina* Spr. (= xanthe F., montana M.-Dürr) (77 d) the underside is more plumbeous grey than yellowish grey, and the red submarginal spots are reduced; from the Alps. — On the other hand the underside of *orientalis* Stgr. (77 d) is more yellowish and the upperside of the ♀ is entirely blackish; from Anterior Asia to the Altai. — *bleusei* Oberth. (77 d) is much brighter above, with stronger yellow variegation, and the hindwing has a short triangular tail; from Castilia. — Also in this species specimens with abnormally dark upperside have been found: ♂♂ which are devoid of the red submarginal band to the hindwing above — ab. *obscurior* S. L. (= fusca Gillm.) — and whose ♀♀ are dark like the ♂♂, also specimens with more extended light yellow area on the forewing — ab. *albicans* Fuchs (= nyeni Ter Haar) —, both forms being quite inconstant. Other occasionally observed pale forms are a yellow one (ab. *fulvior* Stef.) and a white one (ab. *upoleuca* Verity). In ab. *strandi* Schultz the submarginal dots of the underside are modified to stripes. ab. *brunnea* Wheel. is an aberration of *subalpina* in which the dark upperside is devoid of the coppery sheen found in fresh *subalpina*. The ab. *caeruleopunctata* of *phlaeas* is represented among *dorilis* by ab. *brantsi* Ter Haar (= purpureopunctata Wheel.), in which the hindwing above bears a row of whitish dots before the outer third. ab. *nana* Wheel. is only a dwarfed form. In ab. *fulvomarginalis* Schultz the narrow red-yellow band of the hindwing above is continued on to the forewing also in the ♂. — Egg semiglobular, dull green, somewhat darker at the top, coarsely punctured. Larva light green, minutely dotted with whitish, on the back occasionally with violet sheen, some specimens bear minute red markings. It hibernates and feeds until April and again in the summer, on Rumex. Pupa greenish or brown, with dark dorsal line and lighter sides, with minute dark dots. The butterflies occur all through the summer, in the south in three overlapping broods, on roads among fields and on broad sunny forest-roads; they visit according to season particularly Potentilla, Ranunculus, Chrysanthemum, Thymus and Leontodon, and, though not confined to certain flight-places, occur sometimes in large numbers together. In the Alps *subalpina* ascends to a considerable height (Seiser Alp). In some localities *dorilis* flies together with *alciphron*, so that MACKER considers certain intermediate specimens to be hybrids (ab. *xanthoides*).

C. amphidamas Esp. (= xanthe Lang, helle Schiff.) (77 d). Smaller than the preceding forms, at the most as large as small *phlaeas*. Upperside dark brown, in the ♀♀ of the spring brood the disc of the forewing reddish yellow, both wings with a sky-blue gloss, which is especially strong in the sun in live specimens. On the underside there is before the red submarginal band of the hindwing an always distinct bluish white lunate band, which in the ♀ is usually continued on to the forewing and is accompanied by black dots. The summer-form *obscura* Rühl (77 e) is darker above and more yellow beneath. Otherwise the variability is less than in other *Chrysophanus*. Specimens from the high North have been separated as *lapponica* Backhaus, and WHEELER mentions that the gloss is more blue in some districts and more violet in others. — In Central and North Europe, from Belgium, Baden, and Switzerland eastward to Amurland and northward to Scandinavia and Lapland, sporadic and absent from large districts. Egg flattened, white with darker top. Larva rather long, light green with a pale-edged dark dorsal line and light yellow side-stripe, in June and autumn on Polygonum bistorta (said to occur also on Rumex). Pupa yellowish brown, with irregular blackish markings, dirty white on the back of the abdomen. The butterflies are on the wing in May and again in July and August in damp meadows, very plentiful at their flight-places. The spring-form is particularly fond of the flowers of Cardamine pratensis. At night the butterflies rest on the underside of the leaves of Alnus and Salix, where sometimes several are found together asleep and can be obtained by beating. In the north the species is found especially in the plains, while in the south of its area it is more plentiful in the mountains, where it occurs up to 6000 ft.

C. standfussi Gr.-Grsh. (77 e). Similar to the preceding species on the upperside, having the same sheen; beneath uniformly earth-grey, the forewing with but few dark ocelli; the hindwing with some rows of brownish spots. The red marginal band and the blue-white lunate line found before it in *amphidamas* are quite absent. — From the Kuku-Nor throughout Tibet to West China. The specimens from West China

are somewhat larger and the spots of the hindwing beneath are a little less distinct (LEECH). Nothing is known about the time of appearance and the habits.

- pang.* **C. pang** Oberth. (77 f). This small but pretty butterfly has a much deeper blue gloss above, beneath which the black spots however are quite distinct. The hindwing has a red spot on a tooth-like projection of the anal angle and traces of such spots are found at the distal margin of the forewing. The underside of the hindwing is very characteristic, bearing on a red-brown ground between disc and outer third a white band which is externally dentate. ♂ and ♀ alike, but ♀ sometimes somewhat paler on the disc of the forewing. — In Sze-chuen, the ♂ very common, the ♀ considerably rarer.
- tseng.* **C. tseng** Oberth. (77 e). Similar to the preceding, but larger, the hindwing with the anal angle less pointed and the white band replaced by a pale brown double line which is edged with dark on the outer side. The ♀ has a distinct reddish yellow spot in the outer half of the forewing above, and the hindwing bears usually a well developed marginal band, which is only interrupted by the veins. — In West China, widely distributed, but rarer than *pang*.
- li.* **C. li** Oberth. (77 e). ♂ above recalling *Zephyrus quercus*, black, with a dull blue-violet gloss; anal angle of both wings with reddish yellow spots. Hindwing with a rather long tail. ♀ with large red-yellow spot in the outer half of the forewing and red-yellow lunate band on the hindwing. Beneath the forewing red-yellow, the hindwing red-brown; a heavy white submarginal line across both wings. The disc of the wings has numerous black spots, which are edged with blue on the forewing, with white on the hindwing. Our figures represent the ♀ (from above) and the ♂ (from below) of the more strongly spotted summer-brood, while the specimens figured by OBERTHÜR (Ét. d'Ent., 11, pl. V, fig. 34, 38) belong to the spring-brood, which is less strongly spotted on both sides. The former will perhaps receive a separate name in future. — In West China, very common.
- ouang.* **C. ouang** Oberth. On both sides very similar to the preceding, but the more pointed wings of the ♂, the brown upperside without gloss and the longer and more acute tail recall yet more strongly a *Thecla* than do *li* and *tseng*. Underside much more abundantly marked with white, as the discal spots of the hindwing within the very broad white submarginal band are united to form heavy white lines. — According to OBERTHÜR at Tse-kou. This form is unknown to me in nature; the description is based on OBERTHÜR's figure and text.
- sultan.* **C. sultan** Stgr. (= *sultani* Stgr.) (77 f). At most as large as *amphidamas*; above black-brown, the base of wings with a blue gloss and the whole surface with a weak golden gloss. Beneath white-grey with abundant spots, which form 3 parallel rows in the outer third of both wings; between the two outer rows a red band, and between the two inner rows a white one; hindwing with a thin tail. — Turkestan (Hazret Sultan Mts.).
- caspicus.* **C. caspius** Led. (77 f). Very similar to the preceding but the wings more rounded, the tail longer, the 3 parallel rows of spots in the outer third of the hindwing beneath closer together. The gloss of the upperside rather more coppery than in *sultan*. From North Persia. — In the form **transiens** Stgr., which occurs in the Pamir and Turkestan, therefore in certain places together with *sultan*, the underside is more yellowish, with the spots less prominent, the black spots not being so sharply edged with white; the anal area with more distinct red-yellow colour, which appears usually also on the upperside (in the specimen figured the red-yellow is exceptionally not distinct in the anal area above). In July, especially in the mountains south of Samarkand, not rare.
- sarthus.* **C. sarthus** Stgr. Above like *caspicus*, differing at the most in the reddish spot of the anal area of the fore- and hindwing being more distinct; the fringes of the hindwing are distinctly spotted. Beneath the base of the hindwing, however, is shaded with green; the dots of the 3 rows are much more different in size than in the otherwise similar *transiens*, the spots of the central (submarginal) row being usually very heavy and black, while those of the other rows are very small. A non-tailed form is known and a tailed one (*caudatus* Stgr., 77 g), the latter occurring particularly in the eastern districts. — Turkestan, especially in the Pamir and Bockhara. The butterfly is on the wing in June and July; it is not rare and occurs in the mountains up to 8000 ft. (e. g. near Samarkand).
- phoenicurus.* **C. phoenicurus** Led. Larger, the wings more elongate, upperside with a much lighter purple gloss, so that the abundant black markings of the underside are better marked above. The base of the wings strongly shaded with blue. The underside strongly spotted, with distinct red distal marginal band, which is the colour of red lead and in the ♀ very broad. From Persia. — **margelanica** Stgr. (77 f), from Ferghana, is the most usual form sold by the dealers. The gloss of the upperside is more violet; the form is considerably larger than Persian specimens; the underside more yellowish grey, not so pure ivory-white as in true *phoenicurus*. — **scintillans** Christ., from some mountains of Turkestan (Germob), has above distinct black veins on the upperside. — **dimorphus** Stgr. are ♂♂ which are devoid of the blue-violet gloss

of the upperside, but which occur together with ordinary ♂♂ (e. g. in the Pamir). STAUDINGER, for the latter reason, considers them to be a distinct species, as he is not inclined to believe in dimorphism among ♂♂. GRUM-GRSHIMAILO, however, says that the ♀♀ are all alike where the two forms of the ♂ occur. ab. *dilutior* Stgr., from the mountains of southern Ferghana are specimens in which the underside is paler and its spots less prominent. — True *dimorphus*-♂♂ occur at the banks of the Lepsa and its sources in the Ala-Tau. June and July are mentioned as time of appearance, the butterflies being plentiful in places where *Mentha* grows; but the season probably varies considerably according to the altitude of the flight-places.

C. athamanthis Er. Like the preceding, black-brown above, with black distal spots corresponding to those of the underside, but the whole outer margin broadly red-yellow with a thin black edge and before it black dots. Underside, which is whitish grey and bears many though not heavy black spots, also with a bright red-yellow submarginal band. The ♀ larger, with weaker violet gloss on the darks parts of the wings than the ♂. In the steppes around the Aral Sea, on the Syr-Darja. — **alexandra** Püng. is a larger and darker form, with the disc of the forewing not paler, from the Alexander Mts.; the underside is yellowish grey, with heavy black spots. — **iliensis** Stgr., from Kuldja, has a red gloss above, and bears, especially in the ♀, a distinct, broad, reddish yellow submarginal band also on the upperside.

C. Group of *Lycaenini*, *Blues*.

In this section the blue colour is as much prevalent as the red colour is in the previous group. However, there occur among the *Lycaenids* also forms intermediate in colour, as well as transitions towards the two preceding sections. The *Lycaenidae* are a very natural and homogeneous group as regards both their systematics and biology, and the separation into minor groups, such as we have adopted for the sake of convenience, has only a practical value, and is of no scientific importance. The general characteristics given in the description of the whole family apply in the main also to the Blues. They are less exclusively forms of the temperate zone as are the *Chrysophanus*, since a few genera, such as *Zizera* and *Polyommatus*, occur in the tropics generally in enormous numbers, which are far larger than in any species of the essentially Palearctic and Nearctic genus *Lycaena*. Even the swarms of alpine Blues, which congregate sometimes in small clouds composed of several species, cannot be compared with the enormous multitudes in which *Polyomm. baeticus* and its relatives sometimes occur. In South China I found certain hills absolutely alive with *Catochrysops strabo*, and in India the roads were covered for miles with *Pol. baeticus* in such numbers as one often observes of *Zizera minima* and *Lycaena orbitulus* congregated at rills and road-side puddles in the Alps. On the other hand, the *Lycaenini* are very remarkably less plentiful in tropical America than the *Theclini*, and with the exception of *Lycaena cassius* I hardly found any Blue in America to be abundant.

The true Blues are on the whole of much more delicate build than the previous forms, many groups being so weak (*Gerydus*) that they belong to the most feeble butterflies. The Palearctic forms, especially the East Asiatic ones, are as a rule the most robust, attaining occasionally also to a more considerable size, while most of the tropical *Lycaenids* are rather small, *Zizera* containing the smallest butterflies of the globe. The head is never very thick. The antenna has nearly always a very thin shaft ringed light and dark, and is suddenly enlarged to a distinct club. The eyes are relatively large, bordered with silvery white. The frons is narrow. The palpi are of variable length, often projecting straight forward. The legs are moderately long, clothed with blue-grey scaling and hairs, often with stout spines. The wings are usually quite normal in size and shape; the forewing nearly exactly triangular, the hindwing almost circular. Long, sword-like appendages as they are found for instance at the hindwing of *Lorura* and many other *Theclini*, do not occur among the *Lycaenini*, on the other hand there are sometimes very delicate, thin, almost hair-like tails above the anal angle. The larvae as a rule are strongly flattened, onisciform, sluggish, in colour adapted to the food-plant, and feed on plants of very different families, some being even insectivorous. The pupae are similar to those of the preceding groups, without special distinctions, resembling small seeds or splinters of flint. The butterflies are decided day-insects, but some (e. g. *Talicauda*) avoid the glaring sunshine and live exclusively in the shade of the woods. Many species are very local, being either restricted to the locality of the food-plant or confined to certain mountain-ranges. Some, however, have an extraordinarily wide distribution and are strong fliers, e. g. *Polyomm. baeticus*, some such species occurring in 4 continents.

23. Genus: **Virachola** Moore.

The only Palaearctic species which belongs here is placed in the Catalogue of STAUDINGER-REBEL with *Hypolycaena*, which genus does not occur in the Palearctic Region. *V. livia* has 4 subcostals in the forewing, while *Hypolycaena* has only 3. Moreover, this genus is devoid of the small scent-brush at the

hindmargin of the forewing. It might perhaps be better to place *V. livia* as well as the following genus *Jolaus* among the *Theclini* in the neighbourhood of *Deudorix* and *Rapala*; they are also related to *Myrina*, which is strongly represented in Africa, but we wish to avoid as much as possible great alterations in the arrangement to which collectors are accustomed.

Head proportionately thick, with broad frons and flat eyes. Palpi of medium length, obliquely erect. Antennae short, with thin shaft and strong pyriform club. Thorax robust. Abdomen of both sexes very short, especially in the ♂. Forewing triangular, with pointed apex and almost exactly rectangular hind angle; hindwing with small rounded anal lobe and above it a thin tail. Subcostal of forewing 4-branched.

livia. **V. livia** Klug (77 g). ♂ above bright orange-red, the forewing with black-brown outer margin. ♀ above very much like *Pol. baeticus*, black-brown with blue gloss. Underside ashy-grey in Egyptian specimens, more yellowish grey to clay-colour in specimens from South Arabia and East Africa; across both wings darker shadowy lines; the anal area of the hindwing glossy blue, slightly metallic. — The butterflies are not plentiful. I found the ♂♂ especially often on the twigs of tamarisk, while I met with the ♀♀ generally in the neighbourhood of Acacias, so that it appears probable that the larva feeds on this tree. In Egypt, Arabia, East Africa, only in hot, arid, stony districts, apparently on the wing all the year round.

24. Genus: **Jolaus** Hbn.

Also this genus is allied to the *Theclini*, the hindwing bearing very long tails: in facies much resembling *Tajuria*, with which it also agrees closely in structure and with which it is united by some authors; however, in *Tajuria* the second tail of the hindwing is not so much longer and broader than the than the upper, often the inverse being the case. Moreover, the body of *Jolaus* is weaker, although they are good fliers. They recall in habits *Deudorix*, resting like these at the tip of twigs of bushes and facing always towards the clearing. Rather strongly represented in the tropics, but only one species touches the Palearctic Region.

jordanus. **J. jordanus** Stgr. (77 g). Beneath similar to *helius*, which is typical for *Jolaus*; like many allied African forms white, with dark lines recalling *Thecla*. Above similar to *Tajuria luteiventris*, blue, with darker apical area and outer margin on both wings. — In the Jordan valley, in August and September.

25. Genus: **Jamides** Hbn.

This genus agrees already closely with the next; it is the first of the true *Lycaenini* and contains only one very widely distributed species. The bright blue upperside, which is more intensely blue than in any other allied genus, easily distinguishes it from *Lampides*, with which it agrees in the shape of the wings, the markings of the underside and above all in habits. Head small, body delicate, abdomen long and slender. Antenna long, thin, with the club elongate and somewhat bean-shaped. Wings broad, with the distal margin rounded; hind angle of forewing almost rectangular. Hindwing with a long hair-like tail. The larva on Papilionaceae, on which GREEN saw the ♀♀ deposit the eggs.

bochus. **J. bochus** Cr. (77 g, h). Above of a magnificent bright steel-blue, the forewing with the costal margin and apex black. Underside brown, with numerous thin pale comma-streaks. Widely distributed; from Kashmir throughout the Himalayas to Central China, and from India south- and eastward to Formosa and Australia. — Larva almost exactly like that of *Catachrysops pandava* (see p. 292), olivaceous, minutely hairy, without the russet tint which is usually present in the larvae of *C. pandava*; on *Nylia dolabriformis* and *Butea frondosa*, especially at the flowers. Pupa exactly like that of *Cat. pandava*. The butterflies occur in places with a rich vegetation all through the year, flying on sunny road-sides, where the glitter of the metallic blue can be perceived from afar. They settle on the tips of twigs always with the wings tightly closed and visit flowers of all kinds. They are common in localities with abundant rain. ♂♂ and ♀♀ have the same habits, both sexes being easy and swift fliers.

26. Genus: **Polyommatus** Latr.

Differs from the preceding genus in the much duller blue gloss of the upperside, in the brighter and more abundant markings of the underside, the shorter antennae, stronger and harder wings, more robust body and in the more pointed anal angle of the hindwing. Head small, with narrow frons. Palpi rather long, porrect, scaled bluish white. Thorax robust. Abdomen slender. Forewing more pointed than in *Jamides*, with the hind angle much more obtuse. Some species are excellent fliers, which rush about in a whizzing flight and occasionally congregate in swarms. They are very fond of flowers and damp places on roads and in warm districts are on the wing all through the year. The larvae have the usual shape of *Lycaenid* larvae; on Papilionaceae. The pupa smooth, yellowish brown, marmorated with dark. The butterflies exhibit sometimes seasonal dimorphism.

While many authors unite this genus with the altogether heterogeneous *Tarucus* and *Lampides*, others split it up so much that each of its species is placed in a separate genus.

P. baeticus L. (= *boetica* Horsf., *pisorum* Fourc., *coluteae* Rossi) (77 h). ♂ above rather uniformly violet blue, in the anal area of the hindwing two round black spots at each side of the point of origin of the tail. ♀ dark iron-grey, with a vivid sky-blue gloss on the disc of both wings. Underside brown-grey, with numerous white lines, which form before the outer margin a pale irregular band; in the anal area black spots edged with metallic scales and placed on a brownish red ground. In Europe from the Baltic provinces to the Mediterranean and from England and Portugal to the eastern boundary of the Region; North Africa from the Canaries to the Red Sea; throughout Central and South Asia, also in a large part of Australia and Ethiopic Africa; in the South of the area common throughout the year, in Central and North Europe only an accidental visitor and very sporadic. Sometimes the species appears in certain localities unexpectedly and after 1—2 years disappears again for decades. The species evidently wanders northwards temporarily, but cannot maintain itself there for any length of time. — *armeniensis* is the name given by GERHARD to Asiatic ♀♀ which have a paler grey ground-colour, less blue dusting and a double instead of simple row of small pale spots before the outer margin of the hindwing. The ♀ from China figured 77 h belongs to this form, which is not worth a name. — According to the blue scaling being more glossy or duller, we have a grey form — ab. *grisescens* Tutt — or a very bright one, which is nearly as glossy as *bellargus* — ab. *coerulea* Tutt. In ab. *clara* Tutt the very glossy blue scaling has a greenish tint, while the blue scaling is entirely absent from ab. *fusca* Tutt. According to the position of the more strongly metallic scaling a number of further aberrations have been named, ab. *fusca-marginata*, *clara-fasciata*, etc. Also some exotic specimens have received names, e. g. a small Australian specimen with the tails broken off was named *damoetas* F., etc. — Larva green or brownish, with brown head and a broad red-brown dorsal line accompanied by white oblique side-stripes; on the anal ring papilli from which can be thrust out small, conical organs bearing thin hairs; in the pods of Leguminosae, in South Europe usually in the pods of *Colutea arborescens*. Pupa rounded everywhere, yellowish brown, with darker punctures, paler on the back. According to BROMILOW on the stalks of plants, according to RÜHL in the interior of the pod of which the contents have been eaten by the caterpillar. The butterflies are extremely agile fliers, which sometimes congregate in swarms and wander long distances. The ♂♂ are usually observed pendulating very quickly in front of shrubs, especially in plantations of Leguminosae. The specimens caught in localities north of 50° Lat. are accidental accessions, the spring-brood (February to June) always sending single wanderers northwards, where they may establish a colony, which soon disappears again as a rule. In South Algeria I found the species still plentiful south of Biskra, when the vegetation had already completely disappeared in consequence of the advanced arid summer.

P. webbianus Brullé (= *fortunata* Stgr.) (77 k). Both sexes quite dark brown above with dull blue gloss. At once recognized by the variegated underside; disc of forewing beneath yellowish brown, with white spots before the apex; the hindwing dark grey-brown with light striation and an irregular white band; fringes spotted. — Only on the Canary Islands. Larva said to feed on the flowers of *Cytisus canariensis* and *C. nubigenus*. The butterflies fly at a considerable altitude on the Pic of Teneriffe, locally very plentiful, but also in the plains, where they are met with more singly. SIMONY still found them high up in a locality without vegetation where they were sitting on the blocks of lava. They are apparently on the wing throughout the year, being especially common in August, flying about the branches of Tamarisk and visiting the flowers of *Adenocarpus viscosus*. I obtained a specimen at Orotava in the immediate neighbourhood of the old dragon-tree, which was then still standing.

27. Genus: **Nacaduba** Moore.

This genus of Blues contains species which, nearly as much as the *Lampides*, belong to the characteristic forms of their countries. It may be difficult in the warmer districts of Asia to find a place or season where and when *Nacaduba* is not daily met with. Their sombre upperside with but a very dull blue-violet gloss renders them quite inconspicuous; but they have the habit of settling on the tips of branches hanging over the roads, so that they are as much in evidence to the passer-by as any other butterflies. They are of a more delicate build than the *Polyommatus*, have a slenderer body and their hindwing is smaller as compared with the forewing. In colour and pattern they are very similar to *Lampides*; but there are also *Nacaduba* which are tailless and curiously enough also species in which one of the broods is without tail. Very characteristic of all the species is a large round black spot in the anal area of the hindwing beneath. There exists still some uncertainty about the relationship between two forms of the Palearctic species.

N. ardates Moore. (? = *nora* Fldr., *caudata* Moore). Above almost like a small *P. baeticus*, the ♀ with a very strong metallic gloss on the inner portion of the forewing. ♂ above uniformly dark violet-blue. Underside quite different from that of *P. baeticus*, dirty brown-grey, with darker bands and rows of darker spots. Besides a tailless form there occurs a tailed one which is already for a long time suspected to be the same species as *ardates*. This is presumably FELDER's *noreia* (77 i). However, it has often been denied that the two insects belong to one species, as they occur at the same place and time and are said

to differ much in habits. According to GREEN the non-tailed form swarms in India sometimes in cloud-like multitudes around thorn-trees, whereas the other form is solitary and has a weaker flight. The life-history, which would clear away the uncertainty about the relation ship of the two forms, is not yet known. We add that the underside figured 77 i belongs likewise to the tailed form *noreia*, not to true *ardates*. Kashmir and the North-West Himalaya; also widely distributed in India, the dry districts with scanty vegetation excepted.

parana. **N. pavana** Horsf. (78 a). Similar to the preceding, larger, always tailed; the transverse bands of the underside thinner and more regular and numerous. — Especially in Bhutan and the adjacent parts of Tibet; also widely distributed in India, particularly in the eastern districts, southward to the Andamans and the Sunda Islands.

28. Genus: **Catachrysops** Bdv.

The name has been taken from the anal ocellus on the hindwing beneath; this ocellus is black on a red-yellow ground and is externally bordered with glittering blue-green scaling, which is still more intensely metallic than in *Lampides*. Otherwise close to the preceding genera, the outer margin rounded, the hindwing tailed, the underside with far fewer markings, on the disc dispersed black dots with pale borders. Larva onisciform, brown or green, with dark dorsal line, head small, concealed under the anterior thoracic segments; the markings so variable in the specimens of the same species that one can hardly obtain two individuals alike. On ring 12 a tubercle with reversible but small organ. On *Cycas*, *Phaseolus*, etc. The larva is found in the company of ants of the genera *Camponotus*, *Prenolepis*, *Monomorium* and *Crematogaster*. Although the larva is so common that it does considerable damage to the Leguminosae in gardens, DE NICÉVILLE never succeeded in finding the pupa and therefore suggests that the full-grown larva is led by the ants into their nests for pupation, as it has been observed of allied *Lycenids* (e. g. *Azanus ubaldus*). Larvae kept in captivity changed into a smooth, yellowish brown, dark-marked pupa without special distinctions. The butterflies are good fliers; they belong to the commonest Blues and settle with closed wings on the stalks of twigs projecting from bushes. They fly rather fast, but mostly only short distances.

cnejus. **C. cnejus** F. (= *patala* Koll.) (77 i). Above almost like *baeticus* in both sexes; the distal margin of the forewing more rounded, the tail shorter. The ground of the hindwing beneath purer light leaden grey, with characteristic markings, which are much sparser but sharper. Throughout the Himalayas, as far as Kashmir and West China, southward beyond India to Australia and eastward to the South Sea Island. —

contracta. **contracta** Btlr. is a dwarf-form with the ground-colour lighter and the markings of the underside paler; from Afghanistan. *hapalina*, *theseus* and *ella* are local or seasonal forms of the Indian fauna. — Larva pale green, with black head and dark green longitudinal lines, which are posteriorly united to form a broad band; the whole surface with minute pale striation. On *Phaseolus* and *Dolichos catjang* (TAYLOR), in company of the ant *Camponotus rubripes compressus*. Pupa pale green, darker on the abdomen, surface quite smooth. The butterflies occur in the Western Himalayas during the summer, in the tropics throughout the year, singly but everywhere; rare only at higher altitudes and at the boundaries of our Region, elsewhere common.

pandana. **C. pandana** Horsf., likewise flying in the Western Himalayas, differs from the (larger) *cnejus* in the two black dots situated in the anal area of the hindwing not being equal in size as in *cnejus*, but unequal. One distinguishes a paler wet form from a darker dry form; a transitional form is *nicola* Swinh. The dry-season form has the ground-colour duller and the markings in the anal area of the hindwing less sharply developed. — Larva adult brown or green, with black head, minutely chagreened with whitish, mostly with dark dorsal and lateral lines and sometimes with a darker oblique stripe on each segment. On *Cycas revoluta*, in the company of several species of ants. Pupa dark brown, with blackish dorsal line and slightly angular head, otherwise smooth. Probably in the nests of ants. The butterflies, in the warm countries, are on the wing throughout the year.

29. Genus: **Tarucus** Moore.

In this genus two very heterogeneous forms are united: on the one side the forms of the *telicanus*-group (Gen. *Langia*), with hairy eyes and related to *Lampides*, and on the other the very slender and delicate small Blues of the *theophrastus*-group with naked eyes. As there are but few forms in the Palearctic fauna, we abstain from splitting up the genus. The butterflies are above either dark brown with feeble gloss (*telicanus*-group) or brilliant violet-blue (♂ of the *theophrastus*-group). Head small; frons narrow; palpi long and porrect; antennae thin, but very variable in length, with ringed shaft and a flat pyriform club. Wings large in proportion to the body, the apex of the forewing acute, but the outer margin convex, the hindwing either with or without tail. The underside always with very strongly developed markings.

The genus is nearly related to the Indian genus *Castalius*. Larva very flat, chagreened, hairy at the sides and apex; the reversible organ on the 12th ring small; on Papilionaceae. Pupa smooth, shaped as in the preceding genera. The butterflies inhabit only the south of our Region and fly in the hot sunshine, usually near the ground.

T. telicanus Lang (? = *pirithous* L., *baeticus* Esp.) (77 h; the figure marked ♂ represents a small ♀). *telicanus*. ♂ violet-blue, ♀ smoky grey with the disc of the forewing bluish white, the intricate markings of the underside appear also above. The underside has on a smoky grey ground a confusion of white lines and rings and around the anal spots of the hindwing very thin blue rings which glitter intensely. South Europe and North Africa, as well as Asia Minor. The form **bellieri** Ragusa, from Sicily, has the underside *bellieri*. more unicolorous, washed out. — Larva dark red, with black-brown dorsal line and dark oblique stripes; in June and the autumn on Melilotus and Medicago, said to be found also on Calluna vulgaris. Pupa yellowish brown, with dark markings. The butterflies in the early spring and again late in summer, singly and usually not plentiful. They like to rest on clusters of Thymus and fly rather fast; they also appear to migrate in certain years, since the butterflies, as rare exceptions, have been observed here and there in localities lying far north, for instance at Bâle, Stuttgart, Augsburg, Bozen, etc. etc.

T. plinius F. (? = *pulchra* Murr.) (77 i). Above similar to the preceding, the spots of the underside *plinus*. appearing also here well marked on the upper. The underside quite different: on a whitish ground there are several smoky grey smears, lines and dots. The anal spots of the hindwing below greyish brown, without metallic borders. — Larva pale green, yellowish above, violet on the sides with darker oblique stripes and 6 brown-red spots; on the flowers of Plumbago. Pupa dull ochreous, with dark irrorations. In South and East Asia and in a large portion of Africa. On Palearctic territory in Kashmir, Arabia and Southern Egypt. The butterflies fly close above the ground and visit particularly low-growing flowers, like Sedum, Thyme, etc.

T. theophrastus F. (= *nara* Koll.) (77 i). The smallest *Tarucus*, which in tropical countries like Nubia *theo-* and Abyssinia is even but half the size of our figures. ♂ above violet-blue, ♀ smoky grey with the *phrastus*. dark-spotted disc to the forewing whitish. Underside very characteristic, pure cream-colour with black seriated dots and black comma-spots; before the outer margin of the hindwing a row of brilliant glittering blue-green spots. In South-East Europe, North Africa and Anterior Asia to Kashmir and western India; also in the Ethiopian Region and probably in the Sahara wherever the food-plant grows. — **balkanicus**. *balkanicus*. **cus** Frr. (= *psittacus* H.-Schäff.) (77 i, k) has the dots of the underside larger, less sharply defined, and united to chains and stripes, and is often considered as a distinct species: from the Balkan Peninsula, Asia Minor and Persia. — **venosus** Moore, from the Western Himalaya, was likewise described as a distinct *venosus*. species; differs in the upperside being darker blue in the ♂ and having a vivid purple sheen, while the disc of the ♀ is but very little paler than the rest of the wing. — Also Moroccan ♂♂ have a rose-purple sheen; this is ab. **rosacea** Aust., which occurs in Algeria together with ordinary specimens. — **alteratus** *rosacca,* *alteratus,* *extricatus*. **Moore**, from the North-West Himalayas, is a dwarfed (spring?) form. — **extricatus** Btlr. appears to be its summer-form; the markings of the underside are still more confluent and often more russetted than black-brown. — **callinara** Btlr. is an Indian form from Upper Burma. — Larva pale green, *callinara*. chagreened with white, the head ochreous; from the 3rd segment a broad greenish yellow dorsal stripe; the reversible organ small. In May, summer and autumn on species of Zizyphus; in India on Zizyphus jujuba, in North Africa on Ziz. lotus. The butterflies in April and again in the summer and autumn, in hot countries all the year round, in sandy deserts and on bare stony hills, where they can be beaten from the thorny bushes of Zizyphus. The specimens thus disturbed fly around the bush with a hopping flight and soon shelter themselves again among the branches, which bear extremely sharp and disagreeable thorns. It requires continued beating in order to dislodge the butterflies from the bushes, and they usually settle on the loose stones near the bush. There is generally only a single pair in smaller bushes, while one encounters 4 or more specimens in larger bushes, nearly every Zizyphus-bush harbouring specimens. Where thorny shrubs are wanting I observed the species conceal itself in a blue-leaved thistle with disagreeable spines.

30. Genus: **Azanus** Moore.

Without tail. Head small; palpi projecting for about the length of the head; antennae very thin, half the length of the costa, with a thin flat club. Thorax robust; abdomen long and slender; legs delicate. Wings broad; forewing rather pointed, its costal margin curved, the hind angle rather obtuse; hindwing with a very long costal margin, the outer margin being flattened, anal angle slightly pointed with a minute, hardly visible brush, a last vestige of a tail. The upperside differs but little from that of the preceding genus, being in the ♂ transparent blue with reddish or bluish violet sheen, the markings shining through from beneath in good light; the ♀ dark iron-grey, dusted with blue at the base. The

underside is almost intermediate between those of *Tarucus* and *Catochrysops*; the outer area bears always remnants, often faint, of the striation found in *Tarucus* all over the wing; the disc and base, however, have on a lighter ground dispersed black dots, often placed in pale rings, 1—2 corresponding to the anal ocelli which are ornamented with metallic scales in *Catochrysops*. Detailed descriptions of the larvae are not known to me; but it was just in this genus that DOHERTY observed symbiosis between the larvae and ants. The species of *Azanus*, in spite of their delicate build, are adroit fliers, which hurry with great swiftness around the dispersed bushes that form part of the scanty vegetation of the countries they inhabit. Like *Tarucus*, they are fond of settling in thorn-bushes, and it is therefore difficult and tiring to catch them. Most of the species occur in Africa, Arabia and Anterior Asia; no species is found in Europe; they also are absent from East Asia.

ubaldus. **A. ubaldus** Cr. (= *zena* Moore). This butterfly, which is common in India and Ceylon, can hardly be considered Palearctic. Although occurring in Kashmir, it is as far as we know confined to the southern, lower districts which belong faunistically already to the large plain of Lahore and are thoroughly Indian in character; it may also cross the Palearctic boundary in Arabia, where it is known from the south. Both sexes above dark blue with a purple gloss, unicolorous; beneath the dark spots on the disc of the hindwing are partly surrounded partly covered by dark brown smudge-like clouds, only the distal chain of pale-edged spots is clearly marked, being separated from the spotted fringes by a thin dark line. — The larva is said to feed on *Acacia leucophlaea* (TAYLOR) and to have no reversible organ on the 12th ring (DOHERTY). As soon as the larva is full-grown, a guard of ants surrounds it and by touching it with the antennae induced it to leave the tree; the ants then accompany it to their nest, where it pupates. During this procedure the larvae often show resistance, which the ants overcome with great patience. DOHERTY found as many as 13 pupae of *Azanus ubaldus* in one nest of ants; they were taken from the nest and gave faultless specimens, which proves that the pupae were intact. — *ubaldus* occurs only in dry and hot districts, especially in the Punjab, Rajputana, Baluchistan, and Arabia; in more luxuriant localities its occurrence is exceptional.

jesous. **A. jesous**. Upperside rose-violet in both sexes; in the anal area of the hindwing there are two black spots close together as in the allied genera. In the African form, **jesous** Guér. (77 k), the heavy and prominent black markings of the underside shine through above, the discocellular spot especially contrasting with the ground. — *gamra*. The Asiatic form, **gamra** Led. (78 c), which is more constant in size, is more densely scaled and the markings of the underside are less prominent as a rule, so that the upperside appears purer blue. It is also said to differ in size; but as the species varies a good deal in Africa as well as Asia according to season and individuals, and as further in LEDERER'S description, based on Syrian examples, the form *jesous* described from Abyssinia was not mentioned at all, later authors had abundant reason for abandoning the separation into an African and an Asiatic race. A third equally doubtful race of *jesous* is described by MOORE from Ceylon as *cramerii*. — The species is distributed over Syria, the adjacent countries, Cyprus, the whole of Arabia to its south-coast, Egypt, Nubia, Abyssinia to South Africa. The butterflies occur singly; the ♂♂ pendulate with an extremely rapid movement in front of the tips of branches of naked thorn-bushes. The species is on the wing all through the year (being most plentiful, however, during the hot months) in several broods, which differ especially in size.

thebana. **A. thebana** Stgr. Very similar to small specimens of *jesous*, but the markings of the underside are much thinner, not shining through above according to the figure (in Iris VII. t. 9. fig. 3). The two dark anal spots of the hindwing, moreover, seem to be absent from this insect. — Described from Cairo in Egypt.

eleusis. **A. eleusis** Demaison (= *podorina* Mab., *pharaonis* Stgr.). Larger, quite similar to the preceding above and beneath, but with tail and before it with black anal spots, which however are not dusted with metallic scales as in many otherwise similar species. — Egypt.

31. Genus: **Zizera** Moore.

The forewing long and quite gradually widened, the hind margin little longer than the costa, the outer margin strongly rounded; the hindwing much more elongate-ovate than in the preceding genus, always without tail. Costal and subcostal veins of forewing separate from one another. Small species throughout; here belongs the smallest European butterfly and the smallest butterflies of the globe. The species are mostly plentiful, congregating sometimes in crowds at damp places on roads. They fly very low, preferring grassy localities, some species having the habit of crawling away in between the halms, so that one can hardly get them out of the tufts of grass. The genus is distributed almost over the whole of the Old World and goes up to 10 000 ft.

galba. **Z. galba** Led. (77 k). Above almost exactly like *lysimon* in both sexes, beneath strongly recalling species of *Azanus*, especially in the arrangement and development of the black spots; the forewing beneath

bears also some similarity to *Chilades trochilus*, with which *galba* moreover agrees in size. It is very easily separated from *trochilus* by the absence of red and blue submarginal dots. — Syria, said to occur also in Egypt, being mentioned, e. g., from Ismailia on the canal of Suez.

Z. lysimon Hbn. (79 c). ♂ above a beautiful dark blue with a very broad dark margin, ♀ uni-*lysimon*. formerly dark brown-grey. Beneath so similar in markings to the preceding that *galba* has been considered a mere form of *lysimon* (DE NICÉVILLE); but the markings are thinner, less prominent and usually also less numerous, only the row of dots placed at two-thirds being very conspicuous. Moreover, *lysimon* is generally smaller than *galba*, more violet-blue, the wings narrower with much shorter fringes. In the ♀ the submarginal row of spots and dots on the hindwing beneath is usually obsolete, often hardly or not at all recognizable. The broader distal marginal band of both wings of *lysimon* distinguishes it from the very similar Abyssinian *Z. knysna*. In worn specimens the blue scaling has often disappeared, and Hübner's specimen seems to have been such an individual, the name „ab. *caeruleosuffusa*“ being later on proposed for better preserved specimens. The species is also seasonally dimorphic. ab. **karsandra** Moore is a pale *karsandra*. ♀-form (described from a single specimen). In ab. **mora** Swinh. the ocelli of the underside are partly *mora*. enlarged to small streaks. — Larva small and narrow, densely covered with minute white hairs, grass-green, with paler dorsal line; found on *Zornia diphylla*, not observed in company of ants. Pupa small, somewhat slenderer, light green, with darker dorsal line and brown edge to the wing-cases. The species is exceedingly abundant; in the warmer districts it is found all through the year on open grassy places and on sunny roads, sometimes in such abundance that the air appears to glither. Even in the towns they are found in the gardens on the lawn, and one always encounters some *lysimon* where in public places there are artificial lawns or flower-beds. It is distributed over the whole of Asia except the North and East, also over a large part of Africa, and extends even to Australia, although the forms found there have received special names. In the Palearctic Region it flies in South Europe and West Asia, according to several authors also in Mauretania; it is locally not rare on the Canary Islands.

Z. minima Fuessl. (= *alsus* F., *minutus* Esp.) (82 d). ♂ and ♀ above dark brown, the former dusted *minima*. with blue at the base. Beneath pure dust-grey, only with a submarginal row of small ocelli, so that the species resembles a small ♀ of *semiargus*. Throughout Europe and Northern Asia as far as Amurland. ab. **alsoides** Gerh. has the blue scaling at the base of the wings stronger developed and more bluish green, *alsoides*. and is larger. — **magna** Rühl on the other hand is less dusted with blue, but always very large; it is *magna*. the Central Asiatic form. — Egg pale green, flat, the top concave; deposited in the flowers of *Anthyllis*, *Astragalus*, *Trifolium*, etc. Larva green, often with a brownish tint, on the back yellow or red lines; in June and the autumn. Pupa yellowish green, with longitudinal rows of dark dots. The butterflies are on the wing in April and May and again in August, but in the High Alps almost without interruption during the whole summer; they are restricted to certain localities, where they occur often in enormous numbers, e. g. in the Alps, but are also absent from large districts.

Z. lorquinii H.-Schäff. (82 d) resembles *minima* very much and has been considered a form of *lorquinii*. it. But BUTLER draws attention to the differences between them, *lorquinii* having the wing-bases above dusted with purplish violet instead of blue-green. The ocelli of the underside are differently arranged, the submarginal row being much more regular and more evenly curved in *lorquinii*. In South France, Spain and the opposite districts of North Africa. — A very large form of this species, as large as or larger than *Lyc. sebrus*, is described from Central Asia; this is **buddhista** Alph. from the Tian-shan. *buddhista*.

Z. gaika Trim. (= *pygmaea* Snell.) (79 c). Hardly larger than *lysimon*; ♂ above violet-blue, *gaika*. ♀ brown without any metallic scaling. Underside pale dust-grey, with several rows of ocelli along the outer margin, the submarginal ocelli being the largest and most conspicuous. On the discocellulars a transverse spot, but no spot in the cell itself. — In Arabia, Persia, Afghanistan to Kashmir, locally not rare, but not easily caught on account of its small size and low flight. I often met with pairs of this species on road-sides. Besides the countries mentioned, *gaika* is widely distributed in Asia and Africa.

Z. otis F. This is the very smallest, Indian, species, of which the typical form does not *otis*. enter the Palearctic Region. — The form **indica** Moore (= *sangra* Moore) (79 c) is distinguished from *indica*. true *otis* by the very distinct discocellular spot on the forewing beneath; all over India, north-eastwards beyond Shanghai, on the Loo Choo Islands and Formosa. — **thibetensis** Poujade is pale brown beneath, *thibetensis*. the spots being black and hardly like ocelli. ♂ and ♀ above with metallic scaling at the base, which is more restricted in the ♀; from Tibet.

Z. maha. If all the forms here enumerated really belong to one species, the area of distribution is immense, reaching from the coast of the Pacific westwards to Kashmir and the Persian gulf. The blue of the upperside is always very light and uniform in the ♂, except that it is of a deeper gloss and mostly somewhat opalescent in the form *argia*. The margin is blackish, being broad in some forms, narrow and opalescent in others. The underside, too, is very variable; the ground-colour is either almost white,

- or grey or yellowish brown, and the number of ocelli may decrease from several parallel rows to feeble traces (in the South-Chinese dry-season form). The species, however, is above all recognized by its large size: it is by far the largest *Zizera*, attaining almost to the size of a medium-sized *Lyc. icarus*. — The most western form is **maha** Koll. (79 c): the ocelli on its grey-brown underside are obsolete, only those of the submarginal row of the forewing are large and distinctly developed. This is the rainy-season form in Baluchistan, South Persia, the Punjab and Kashmir. The corresponding dry-season form is according to BUTLER **ossa** Swinh., in which the wings are pale blue-grey above. **chandala** Moore, from Kashmir, is a transition to *ossa*. — **diluta** Fldr. (♀ = *squalida* Btlr.) is the more eastern form from India, which, if at all occurring on Palearctic territory, may fly in south-eastern Tibet. It consists likewise of a larger, broad-margined wet form **argia** and a smaller, narrowly dark-edged dry form. — **argia** Mén. (= *alope* Fent.) (79 d) is the usual Japanese form, recognizable by the large number of ocelli on the underside and a conspicuous pale colouring before the outer margin. The name **japonica** Murr. (79 d) may be applied to the form which is paler above, has no distinct marginal dots on the underside, and flies during the late summer. The black margin of the upperside, moreover, is considerably narrower. — The Continental form, **opalina** Pouj., corresponds to *japonica*: its ♂♂ are above almost whitish violet and have a quite narrow dark margin. This form, which flies in Tibet, China and southward to Burma, has **marginata** Pouj. as wet form; the latter is likewise pale violet above, but has a broad black margin; an especially pale specimen was described by RÖBER as **albocacerulea**. — Larva bright green with dark green ground-colour, bearing extremely small whitish warts and small, short, colourless hairs: found on *Oxalis corniculata*. Pupa very pale green, minutely hairy, without markings, fastened to the underside of a leaf of the food-plant. The butterflies are on the wing all through the year, with the exception of the cold season, in not only two broods, but a whole series. An observation I have made on several occasions speaks against all these forms which LEECH united under *maha* being one species. Whereas I saw the ♂♂ of the *maha*-forms generally flying restlessly on grassy places, I found the *argia*-forms mostly quietly resting, flying only a few yards even when disturbed. This may have been due, however, to a difference in the seasons and the solution of the question must be left to a critical monograph, of which BUTLER already gave a short sketch in 1890.
- prosecusa**. **Z. prosecusa** Ersch. (82 h). Above similar to the preceding, the ♂♂ like the dry-forms of the preceding above purple-blue, with a narrow black border, recognizable by all the ocelli of the uniformly pale grey underside being reduced to very feeble vestiges. The ♀♀ have a dark upperside, being almost black-brown, nearly like the ♀♀ of *minima*. Turkestan. — In the form **korlana** Stgr. (82 g, h), which is darker beneath, the ocelli are nearly entirely effaced, and also the upperside is darker: from the Tian-shan. — **duplex** Alph. is larger than true *prosecusa*, and is perhaps a seasonal form; between Ak-su and the Lob-Nor, at a height of about 3000 ft.
- gisela**. **Z. gisela** Püng. In size varying between *minima* and its ab. *magna*: the ♂ above blue, without gloss, before the outer margin of the hindwing obsolescent dots; fringes dark brown-grey. ♀ above black-brown, the distal marginal dots of the hindwing recognizable by their feeble pale borders. Underside dull brown, with the ocelli but weakly developed; forewing with a bar-like discocellular spot; between this and the outer margin a nearly straight row of dots, behind this row two further rows of feeble shadowy dots; on the hindwing the ocelli, dots and discocellular spot but weakly contrasting with the ground. Very similar to the form *duplex* of *prosecusa*, smaller, duller blue, with weaker markings, recognizable by the darker fringes. — Turkestan, not known to me in nature.

32. Genus: **Chilades** Moore.

Very close to *Lycuena*, with which it agrees essentially in structure. Much less robust, the wings as strongly rounded as in *Zizera*, some species moreover not larger than the smallest *Zizera*. The costal of the forewing ends about the centre of the foremargin: subcostal not connected with it; cell of forewing long, reaching beyond the centre of the wing, that of the hindwing short and broad. Body slender; abdomen short. Palpi delicate, porrect. Antennae hardly half the length of the costal margin, thin, with distinctly marked club. Larvae onisciform, green, without definite distinctions, the reversible organ short; guarded by ants. Pupa without special distinctions, fastened on the underside of the food-plant. The butterflies have two broods, which differ from one another. They fly low and not fast, are generally distributed in their area and mostly abundant wherever they occur. Only 2—3 species are known; they are distributed over Asia, extending to South-East Europe and southward to Australia. The genus is very artificial.

- trochylus**. **C. trochylus** Frr. (= *parva* Moore) (77 k). Above dark brown, at once recognized by a red half-moon which is situated before the outer margin of the hindwing, bordered with black and interiorly shaded with white. On the underside there are four black spots adorned with glittering green golden scales in a red band before the distal margin of the hindwing: South-East Europe and Anterior Asia,

southward across India to the Malay Archipelago and Australia; in the last countries in the smaller and darker form *pulli* Koll., in which the red band of the hindwing above is quite or nearly absent. — Larva almost without markings, green with black head, which is usually kept concealed; from the 3rd ring a dark dorsal line, besides it short transverse stripes on the segments; on *Heliotropium strigosum*; attended by the ant *Phidole quadrispinosa*. Pupa pale green, clothed with thin but rather long hairs. The butterflies appear in the spring and again late in the summer and autumn; they occur in arid districts with scanty vegetation; they fly close to ground and are for that reason not easy to catch.

C. laius (78 a). Quite unlike the preceding species; above recalling *Zizera argia*, but both wings near the margin with a row of ocelli which, only in the ♂, are often concealed under the blue-violet sheen of the upperside, while they are always present like a row of beads in the often nearly quite sooty black ♀. Underside very characteristic; the ocelli of the submarginal row are here not simple round dots, but are transverse-ovate or bean- or even heart-shaped. The butterflies appear in two very different forms. The first-described form, of the dry season, has the anal area of the hindwing beneath darkened by a dense brown cloud. The name *laius* Cr. must remain for this form, and the names *cajus* F., *kandura* Moore *laius*, *brahmia* Fldr. and *altera* (the last erroneously employed for our figure of the underside, ♂ 78 a, 5th figure) must sink as synonymus. The rainy-season form (named *laius* 79 a) has the ground-colour lighter; the anal cloud on the hindwing is absent and the ocelli therefore are distinct. This form is *varunana* *varunana*. Moore. Both broods do not alternate regularly; the *varunana* flies all through the summer (rainy season) in a number of broods until it becomes replaced in the winter (dry season) by a further series of broods of the „generatio altera“ (*kandura*-form or true *laius*). On Palearctic territory only in Kashmir: I did not meet with it in Palearctic China, LEECH also does not mention it. But as I found it in South China to be one of the commonest butterflies, it may possibly occur in East Asia on Palearctic soil as a rarity. — Larva pale green, of the colour of the food-plant, with black head and dark dorsal line, clothed with minute pale hairs which are placed on very small dust-like whitish granules; the incisions between the segments not deep, the reversible organ of the 12th ring short; the back of the larva without any markings; on *Aurantiaecae*; the guard of ants consists in India of *Camponotus rubripes compressus* F. Pupa green, spotted with brownish on both sides of the back. The butterflies are exceedingly common throughout South Asia, with the exception of the Malay Archipelago, occurring more in districts with abundant vegetation. They rest always with the wings half open on grass-halms, dwarf bamboo or low shrubs, and fly only a few yards when disturbed.

C. phiala Gr.-Grsch. (77 k). Smaller than *laius*, but larger than *trochylus*. ♂ above blue-violet, *phiala*. ♀ dark. Underside pale grey, an elongate black discocellular spot on both wings; close beyond this spot a chain of gray ocelli placed close together, and further ocelli at the distal margin and in the basal half of the hindwing. — In the Pamir, in May, flies particularly on places covered with *Alhagi camelorum*. It is doubtful whether the species is correctly placed in this genus.

33. Genus: **Everes** Hbn.

Similar to the following genus, but more delicate and slenderer, the abdomen longer, the forewing broad, the hindwing tailed. The costal vein quite short, especially in the ♂, for a short distance united with the first subcostal branch. A well-defined genus, which is distributed over a large proportion of the Old World. The larva onisciform as usual in *Lycanids*, with a glandular organ on segment 10 for attracting ants; on *Papilionaceae*. The butterflies occur in several broods, which differ from one another.

E. argiades Pall. (= *tiresias* Rott., *amyntas* Schiff.) (78 a). ♂ above violet-blue, ♀ blackish; beneath *argiades*. both wings a pure clear light grey, almost white. A discocellular bar, a submarginal row of dots and a row of ocelli before the outer third of both wings. Before the anal area of the hindwing there are, on a red-yellow ground, two larger black spots, which bear sometimes metallic scales. Throughout Europe excepting the northern districts and the Iberian peninsula, also in Anterior Asia. The spring-form, *polysperchon* Bergstr. (= *tiresias* Hbn., *alcetas* Hffgg.) (78 b) is considerably smaller. In ab. *coretas* O. *polysperchon*, *coretas*, *decolorata*. the anal red is absent from the hindwing beneath. The same is the case in *decolorata* Stgr., but this form is much larger and has a glossy grey-blue upperside; it is the summer-form of the Danubian countries, the corresponding spring-form being *vernalis* Grund. The ab. *myrmidon* Engram. appears to belong to *polysperchon*; the anal red is also here reduced; characteristic is a blue-white submarginal band on the hindwing. — Also *decolor* Stgr. is a form of *polysperchon*, its ♂ being glossy blue-green instead of violet-blue; from Marghellan. — In East Asia (East Siberia, Japan, China, Corea) *argiades* appears in more intensely coloured and spotted forms; the underside is almost pure silvery white, the rows of dots

are sharp and black, the red area around the black anal spots united into an orange band. The smaller *amurensis*, and above less bright form from the North has been separated by RÜHL-HEYNE as ab. **amurensis**. The larger southern specimens, occurring from Shanghai or thereabouts southward and resembling the Indian form, *hellotia*, have long been made known as **hellotia** Mén. (= *praxiteles* Fldr.); some of the summer-specimens from *parrhasius*, the North are similar to it. — **parrhasius** F. (= *dipora* Moore, *amyntas* Koll.) is the Indian form, which extends into Kashmir; its underside is uniformly white-grey, the anal orange-band broad, the black margin of the upperside of the ♂ also broad, and the upperside of the ♀ is very strongly blue-grey. — Many of these forms have been and some are being considered as distinct species. Among nearly all occur *caeca*, individual aberrations; the black spots of the underside for instance may be absent — ab. **caeca** Aign. — *depuncta*, or but represented by vestiges (these generally in cell 2): ab. **depuncta** Hirschke. The anal red of the hindwing may also be feebly repeated in the anal angle of the forewing, etc. — Egg very small, not larger than that of *Zizera minima*, light blue-green, with whitish reticulation. Larva green, in the centre and on the sides of the back with dark longitudinal lines, head and spiracles blackish, on segment 10 a gland surrounded by short ciliae, which attracts the ants; in July and the autumn on species of trefoil; carnivorous. Pupa rounded, with the head anteriorly truncate; always fastened on the midrib of a leaf by a thin belt and the cremaster, very similar to a rolled in leaflet of trefoil, green, with lighter wing-cases, which have whitish veins. It is not known to me whether also the hibernating pupae are always green. The butterflies of the first brood (*polysperchon*) in April and May, those of the second from July onwards, almost everywhere, but in many places but singly. They have a somewhat flapping and rather weak flight and are found especially at the sides of main-roads and on roads between fields, settling always with the wings half open and not often rising high above the ground.

fischeri. **E. fischeri** Ev. (78 b, c). Above both sexes black-brown, the ♂ with a chain of very thin blue-white dashes before the margin of the hindwing. Beneath very similar to the preceding, but the ground-colour darker grey, the dots more distinct and coarser, and the orange anal band of the hindwing not so prominent. — From the Ural throughout Siberia to the Pacific, in Corea and on Askold, in June and again in August; mostly singly.

potanini. **E. potanini** Alph. (= *umbriel* Doh.) (78 b). Above uniformly black-brown; beneath similar to *argiades*, but the black-brown spots more distinct, bordered with white and somewhat differently arranged; before the margin a dark band-like shadow. — In the interior of China, southward across Yunnan far into eastern India. On Palearctic territory obtained in June.

davidi. **E. davidi** Pouj. (78 b). Above black-brown, the ♀ with a row of bluish white ocelli before the margin of the hindwing. Beneath almost white, with a feeble yellowish grey tint, without distinct orange band in the anal area of the hindwing; the black dots distinct, but rather irregularly arranged. — West China, apparently rare (LEECH).

filicaudis. **E. filicaudis** Pryer (78 b). Similar to the preceding, but beneath darker grey, the black spots heavier and more strongly coming through above, before the anal area of the hindwing beneath distinct orange colouration. — In Northern and Western China, in the mountains, in May and June, not rare.

ion. **E. ion** Leech (78 b). Above very similar to *fischeri*, but the hindwing beneath is darker grey, with brownish bands, without distinct deep black dots and without any orange before the margin. — In West China, in June and July, at 5000—8500 ft.

zuthus. **E. zuthus** Leech (78 b). Above similar to *fischeri*, but the fringes of the forewing darker and somewhat chequered, the hindwing with a row of heavy, black, pale-bordered dots before the margin. Underside grey-brown, with numerous blackish ocelli; before the anal angle a very little orange scaling. — In West China, in July and August at 5000—8500 ft.

arcana. **E. arcana** Leech (78 c). Larger than the previous, the ♀ similar to the ♀ of *Polyomm. baeticus*, above black-brown, the base of both wings shaded with blue; the hindwing has before the outer margin a row of yellowish ocelli with heavy black centres. The underside with pale-bordered lines composed of small brownish spots and with a few dark dots. — Central China, found in June and September.

34. Genus: **Lycaena** F.

Although this genus with its multitude of species is widely distributed over the globe, its main development obtains in the Palearctic Region, whence we enumerate here more than 200 forms. The

second largest contingent of true *Lycaena* is presented by North America, where 30—40 forms occur. The more we approach the tropics the more abundant and prevalent become the *Theclini*, which are but sparsely represented in the North. In tropical America, where there fly hundreds of *Thecla*-forms, only a very few *Lycaenas* are found, and also in the tropics of the eastern hemisphere the *Lycaenas* diminish so much in number that from the enormous Indian empire only about 20 forms are known, which partly are even Palearctic species penetrating in Kashmir but little beyond the northern boundary of India. In South Asia the genera *Arhopala*, *Deudorix*, *Nacaduba*, *Lampides* instead have developed a great abundance of species and, together with *Loxura*, *Bindahara*, *Curetis*, etc., which are poor in species, but plentiful in individuals, contribute to the character of the tropical landscape. In the Palearctic Region, however, *Lycaena* goes up the highest mountains and reaches the farthest northern latitudes. *Lycaena optilete* occurs in Finmark beyond the 70°, and in the region of the eternal snow of the high Alps, far above the limits of the vegetation, single *L. orbitulus* may be encountered, which lie on their side, lethargic and apparently lifeless, but when reached by a ray of the sun suddenly sit erect and soon play about over the stony waste with a lively flight.

The true *Lycaena* are small or very small butterflies which in the ♂-sex are mostly blue and have often a magnificent gloss. The head is small, very strongly hairy; the eyes are naked or hairy, very long, almost bean-shaped, edged with silvery. The frons is narrow, forming a stripe between the eyes; the palpi are of medium length, porrect, not ascending beyond the vertex, scaled, the first and second segment beneath provided with short thick bristles, the third segment naked. The antennae about half the length of the costal margin, mostly distinctly ringed, thin and fragile, with an elongate, somewhat flat club, which does not sharply contrast with the shaft. The thorax short and rather robust, often covered with silky fur-like hair, which has a vivid blue sheen along the back in many ♂♂. Abdomen of median length, generally just reaching as far as the anal angle of the hindwing, more rarely longer and very exceptionally shorter. The legs delicate, the tibiae spinose, the anterior tarsi of the ♂♂ reduced, those of the ♀♀ normal, with small claws. The wings very normal in shape, entire, with long fringes, which are usually spotted; forewing triangular, gradually becoming broader from the base, with the apex but little pointed, the outer margin convex and the hind angle obtuse. The hindwing somewhat pyriform, its outer margin very evenly rounded, always without tail. — Larvae onisciform, usually green, short, with a small head and broad shield-like back. Some resemble the larvae of beetles of the group of Chrysomelidae, but most have bright green and red colouration, sometimes with beautifully coloured dorsal line or contrasting margin. They feed on a great variety of low plants, but mostly on Papilionaceae, such as vetch, trefoil, leguminosae, etc. The pupa small, elongate, rounded everywhere, smooth, immobile, resembling the seed of certain plants. The butterflies from the earliest spring until the late autumn, some species in one brood of short duration, others in a whole series of overlapping broods. They visit flowers and congregate on damp places on roads, at the rills of the high mountains often in cloud-like numbers. They are fond of meadows and open land, dry hills and sunny roads, but are hardly ever found in the dense forest. Most of the species have a very wide distribution and preserve even in the most distant countries essentially the original character. As regards individual variability most species are liable to modifications in the ocelli of the underside; these ocelli may be absent or reduced or enlarged, or their number may have increased; they may be ovate, elongate, or prolonged to form rays, or even confluent with one another. These modifications, which have all been found in nearly every species and certainly occur in all the species, have unnecessarily received names. COURVOISIER, on the other hand, proposes for the same form the same designation in all the species, so that one has in each species a forma *crassipuncta*, *privata*, *caeca*, *radiata*, *striata*, *arcuata*, *parvipuncta*, *sagittifera*, etc., a system of nomenclature which TUTT has already carried out to a certain extent. Most *Lycaenas* are common butterflies. If one knows the flight-places, usually the place where the food-plant occurs, it is not difficult as a rule to obtain as many specimens of the forms flying there as one requires. Some species, however, require certain physiographical features in their habitat, and the inaccessibility of the often very limited flight-places sometimes keeps the price of certain forms at a considerable figure. As many species live in a kind of symbiosis with certain ants, their occurrence in a certain locality often depends on the presence of these protectors.

L. argus L. (= aegon Schiff., argyrotoxa Bgstr.) (78 c). This and the following species have in *argus* the anal area of the hindwing beneath on the black submarginal dots situated between the median branches and the submedian vein some metallic glittering scales which are usually not represented in our figures. The upperside is deep dark blue, with a broad black border. *argus* is very similar to *argyrognomon*, but differs in quite a number of details, of which in the various individuals sometimes one sometimes another is more conspicuously developed. On the upperside the blue gloss is deeper, darker, duller, with a slight violet tint and not so far extended to the margin, the latter being broader and appearing blacker; the row of dark submarginal dots which occasionally appear on the hindwing above in both species, there fore stands always in the black border in *argus*. On the underside both sexes of *argus* have

nearly always a strongly glittering blue-green dusting at the base of the wings, which is usually absent from *argyrognomon*; but we must add that also the inverse occurs, the blue basal dusting being absent from *argus* in exceptional cases and strongly marked in *argyrognomon*. As a rule *argus* L., moreover, is somewhat smaller than *argyrognomon*, but the size varies considerably according to the altitude of the locality and the various broods. — ab. **valesiana** M.-Dürr is frequently found among specimens from the Valais (but not exclusively and not constantly); it is distinguished by a yellowish grey underside and very small ocelli.

corsica. ab. **corsica** Bell., on the other hand, is a form which flies regularly in the mountains of Corsica and differs in the ocelli of the underside bearing pupils of the ground-colour and having larger borders, which almost form pale rings on a grey-brown ground. This form occurs as an exception everywhere, having been obtained by STANDEN even in Norway. ♀♀ which are nearly as blue above as the ♂♂ are not very rare in certain localities, especially among the summer-brood, this is ab. **coerulescens** Peters (= pseudo-*hypochiona* callarga NEUSTETTER). — A constant form is **hypochiona** Rbr. (78 d, ground-colour too dull), from the most southern very sunny districts of Europe (Ionian Islands, Greece, Andalusia); underside rather pale, the black eye-dots small and placed in large pale halos, before the margin a row of bright red spots. Similar individuals are occasionally also found in other districts, e. g. at Digne and according to JONES even in England. — A very large form is **insularis** Leech (78 d), from the north-island of Japan; its underside resembles *hypochiona* in its light pure ground-colour, but bears abundant and prominent black spots.

bella. Above the marginal spots of the hindwing are especially very distinct. — Also **bella** H.-Sch. (78 d. e) is placed by STAUDINGER and REBEL as a variety of *argus*; it is a small form, which resembles *hypochiona* beneath, but is very dark above, with very thin red-yellow submarginal spots on the upperside of the hindwing, which are unfortunately not visible in our figure 78 d, the hindwing beneath bearing paler marginal spots; from the shores of the Black Sea, Armenia and Persia. — Perhaps also **iburiensis** Btlr. belongs here; it is unknown to me in nature and was described from one specimen from Hokkaido; it appears to be a kind of albino of *insularis*. — Very small specimens, as they are found especially in Valais, are **alpina** Berce; exceptionally large specimens were obtained by CHAPMAN at Bejar in Spain and named by him **bejarensis**. — The form **micrargus** Btlr. from Tokio, which is quite unknown to me, is said to have the lilac colour of *argia*, with the black margin dentate and the fringes very bright white; beneath in colour like *pylaon*, the spots as in *argus*, but without the metallic scales on the anal spots. —

pseudaeon. **pseudaeon** Btlr., from the north-island, is smaller than *argus*, with the black margin narrower, the white fringes thinner, and the black distal marginal spots of the hindwing above smaller. ♀ very feebly dusted with steel-blue at the base, underside more extended green than in true *argus* and its ocelli smaller. Likewise unknown to me. — Sometimes there occurs a basal dot on the underside; this is ab. **unipuncta** Mousley; in ab. **coeruleocuneata** Ebert there appear blue wedge-shaped submarginal spots on the upperside of the hindwing. — Larva very variable, usually light green with dark dorsal spots, sometimes however grey or dark brown with pale spots. In June and the autumn on various plants, such as Coronilla, Trifolium, Colutea, and Genista, said to occur also on Erica, Ornithopus, Fragaria, Thymus and other plants. Near or upon the larva there is a guard of ants, usually specimens of *Formica cinerea* Mayr. The larva as well as the chrysalis are found in the nests of this ant. Pupa elongate, green with red dorsal line; abdomen above yellowish green. The butterflies are on the wing in May and again from July onwards, but are said to have only one brood in the north. They are common everywhere, especially on sandy soil, which also its ant prefers, but is said to noticeably decrease recently in numbers in some districts (e. g. in England). The form *alpina* I found in large numbers in Valais below Zermatt towards evening in stony localities where they were at rest in small bushes; I counted 38 sleeping specimens in a small thorn-bush, all having the small size of the form of that neighbourhood.

argyrognomon. **L. argyrognomon** Bgstr. (= *argus* Schiff.)¹⁾. The differences between this species and the preceding have been mentioned above. As widely distributed and as variable as *argus*; the species flies in many districts but singly and that is the reason why quite a number of forms have been based on single specimens. An albinotic ♀ with the ground-colour light yellow has received the name ab. **lutea** Car. The ♀♀ which are blue above and occur everywhere among ordinary specimens are ab. **callarge** Stgr. (78 e). — The species is distributed all over Europe with the exception of the highest North and the North-West (Netherlands, England); it is also absent from North Africa, but extends through the whole of North and Central Asia, Siberia, Tibet and China to the Pacific Ocean; but it does not go southwards across the Indian boundary. Since *argyrognomon* appears in two broods in the southern districts

¹⁾ In order to avoid new changes we have accepted for this species the name *argyrognomon* Bgstr. employed in the Catalogue of STAUDINGER & REBEL. But it was recommended to us from a very competent side to mention in this place that the name is illustrated by a figure (Nomenkl. Taf. 46) whose original, a ♀, was certainly not a normal specimen. Whether the impossible blue tint and the other deviations from the normal in the figure were due to the faultiness of the design, or to abnormal characters in the original specimen, it is to-day impossible to decide. In any case a figure so non-typical should not be the base for a change in nomenclature. From a practical point of view the simplest solution would be arrived at, if the names *aegon* Schiff. (= *argus* L.) and *argus* Schiff. were employed for the two species.

of its area and appears in two broods, and as it differs in the sexes and, being of immense distribution, varies also geographically to a certain extent, a large number of forms have received names, some of which should be sunk as being doubtfully valid, although the lumping together of 5—6 different forms under one name, as has been done in the Catalogue of STAUDINGER-REBEL, is not in agreement with modern methods, according to which constant forms are always kept separate¹⁾. — **calliopis** Bdv. is the form from Southern France: Marseille, Allier, Grenoble, *calliopis*. etc. Above very light blue, in the ♂ with an extremely thin dull black marginal line, the ♀ below being bright yellow at the margin. The ocelli are very delicate, on a clear ground which has a rosy tint. — On the other hand, Russian specimens are described by STAUDINGER as having a sharper and blacker margin than German ones; probably EVERSMANN'S **subsolanus** is only an individual form of it, in which the basal *subsolanus*. half of both wings above is bluish with a little silver, while the underside recalls *arion* and *euphemus*. The original specimen of *subsolanus* came from Irkutsk. Specimens from the Caucasus are said to show affinities with *sephyrus* (ROMANOFF), both sexes being very bright blue (= *caerulescens* Gr.-Grsh.). — **argulus** Frey *argulus*. exists not only in the ♀ but also in the ♂, and differs from true *argyrognomon* in its much inferior size, yellow to brownish underside and usually in its small ocelli. This form has nothing to do with the *argus*-form *aegidion*. Like many high alpine forms, *argulus* occurs also in the low lands in the North: the specimens from there are not distinguishable, but have received the name **iapponica** Gerh. — In the rare *iapponica*. ♀-ab. **unicolor** Favre the yellow marginal spots of the hindwing, generally present in ordinary specimens, *unicolor*. are wanting. — A similar form occurs in the mountains of Anterior Asia, for instance at Kandahar, and has been named **bracteata** by BUTLER. The dark centres of the ocelli of the dull grey underside have very *bracteata*. conspicuous whitish borders and the marginal band is represented by a chain of ochreous lunules. — **tomyris** Gr.-Grsh. has been described from a single ♀ from the Transalai; the underside is said to recall *tomyris*. *eumedon*; easily recognized by the absence of the discal smear; certainly only an individual aberration without ocelli beneath. — **ganssuensis** Gr.-Grsh. is an Asiatic form whose ♂♂ are very brightly coloured *ganssuensis*. above, the underside being greyish white with a red-yellow marginal band interrupted at the veins and with small ocelli; from the Sinin Mts. — ab. **dubia** Schultz is a somewhat larger form, with the upperside *dubia*. of the ♀♀ greyer, the fringes quite white and the underside lighter. Everywhere among the typical form, apparently constant in the East German plains. — **planorum** Alph. (78 c), from Central Asia, is at *planorum*. once recognized by the vividly violet-blue upperside of the ♂♂. The black outer margin very narrow, the fringes pure white, not chequered as shown in the figure, but hardly at all interrupted at the veins. The yellow marginal band of the underside is pale, the ocelli are little prominent and the metallic scales in the anal area of the hindwing less glossy. In the steppes. — The name **dschagatai** Gr.-Grsh. may be retained *dschagatai*. for the specimens from the Altai Mts. and **maracandica** Ersch. for those from the Saraf-shan; the former *maracandica*. are above of a very delicate silky violet-blue with hardly perceivable black edge, while the latter specimens are beneath almost without ocelli. — **aegina** Gr.-Grsh. (= *regina* Rühl) (78 e) is a very robust form *aegina*. from the Tian-shan in which the underside has the ocelli distinct and the submarginal band so brightly yellowish red that it may be considered a parallel development to *argus insularis*; as in the latter the red-yellow band is proximally bordered by a band of black spots placed close together. On the upperside *aegina* bears faint traces of marginal dots on the hindwing, which points likewise to *argus*. — **argiva** Stgr. (78 e), *argiva*. from which several forms have been separated (**roxane** Gr.-Grsh. from the Pamir; **calmucca** Gr.-Grsh. from *roxane*. the Chorgos R.) and in which occur ♀♀ with blue upperside (= ab. **bactriana** Gr.-Grsh.), has the marginal *calmucca*. dots of the hindwing above much more distinct, and the upperside of its ♂ has a slight lilac tint as in *bactriana*. *planorum*, the black margin being less thin however. — **sifanica** Gr.-Grsh., from the Dshachar Mts., is a *sifanica*. large form; dark blue, with broad border and a distinct black discocellular dot. — **mellissa** Edw. has *mellissa*. likewise a broad black margin and represents our *argyrognomon* in North America, but is said to be found by HERZ also in Kamtchatka (ALPHÉRAKY). — A transition to this form is mentioned by RÜHL as **mongolica** *mongolica*. Gr.-Grsh., from Mongolia. — A rather large magnificent form is **casaiacus** Chapm., from Spain, with a *casaiacus*. band of red half-crescents before the outer margin of the hindwing above, contrasting strongly with the

¹⁾ We add here the following explanation: On the plates the names **argus** and **aegon** were employed, as we intended to discard the name *argyrognomon* Bgstr., as not being valid because based on an abnormal specimen. On revising the text we find, however, that it is advisable to follow the otherwise very exact Catalogue of STAUDINGER-REBEL, since we wish to avoid as far as possible clashing with the price-lists of dealers and the nomenclature generally adopted in collections. The relation between the names in the text and on the plates is as follows:

argus L. (*aegon* Schiff.) is represented by the following figures of Pl. 78:

e 7 (named „argus ♂”),
d 1 (named „agon ♂”),
e 6 (named „aegon ♂”),

argyrognomon Bgstr. (*argus* Schiff.) is represented by:

e 8 (named „argus ♀ U”).

The great confusion caused by the different application of the names *aegon* and *argus* by the various authors has also led to the varieties being partly arranged under the wrong species in the catalogues, to which we already drew attention on p. 300. A monographic revision of this group of *Lycaena* based on the typical specimens, which would elucidate the affinities of the various forms and revise the references in literature, is a great desideratum.

aegidion. blue ground-colour. — **aegidion** Meisn., which STAUDINGER-REBEL erroneously place under this species, has nothing to do with *argyrognomon*; the small butterfly, which has a broad black margin and a distinct discocellular spot on the forewing above, is an alpine form of the preceding species, *argus* L. — Larva bright green, with red dorsal and lateral stripe, between which there are light oblique smears, which have occasionally dark shadowy borders; in May and in the southern districts again late in the summer on *Lotus corniculatus* and other Papilionaceae, and on heather. One finds it often surrounded by ants or guarded by one ant, which rides on its back. The ants belong to *Lasius niger* and *Formica cinerea*, in whose nests the pupa sometimes lodges. Pupa at first green, then dark brown, eyes and segmental incisions red-brown. The butterflies are on the wing in June and July, in the South (e. g. in Tuscany) again late in the season, especially on clearings in woods and on sandy places where heather grows. They are plentiful and everywhere, but occur rarely in such numbers together as some forms of the preceding species.

barine. **L. barine** Leech (78 f). A large form, which can hardly be included in *argyrognome*, differing from it in the presence of several discal spots on the forewing beneath and in the absence of metallic scales from the anal area of the hindwing beneath. — Japan, on the main island, from the Assama-yama (PRYER).

tancrei. **L. tancrei** Gracs. (78 f). ♂ very pale blue, so that the veins are quite distinct, especially at the margin. The margin of the forewing very dull black with a feeble reddish tint, which is too strong in our figure. The hindwing with distinct marginal dots, which are quite isolated; ♀ with a strong yellowish red macular band before the margin; ground-colour of the underside very light. — From Amur'land, Nicolajewsk, on mountain-meadows.

cleobis. **L. cleobis** Brem. (= *aegonides* Brem.) (78 f). Much darker than the previous species and especially than *tancrei*. In the ♂ the black margin occupies the whole outer third, and the blue colour of the upper-side, with the exception of the base, is shaded with black; the ♀ with vestiges only of the red-yellow marginal band before the anal area of the hindwing. Beneath the ocelli as well as the red-yellow distal band are very strongly developed, and the anal spots, especially in the ♀, have often metallic scaling. Throughout East Asia with the exception of the non-Palearectic South, locally common. The specimens from Corea are similar to those from Amur'land but larger; Japanese specimens are likewise larger, and *ida* are, moreover, also lighter blue above and darker beneath. — The form **ida** Gr.-Grsh. (= *kenteana* Stgr.) (78 g) has broad bright white fringes, is somewhat smaller and the entire upperside of the ♂ is darkened, being almost without any blue, while the ♀ is nearly without any red-yellow; also the underside is essentially darker than in true *cleobis*. In the Dshachar Mts. — Larva until July on Papilionaceae; the butterflies in July and August.

eversmanni. **L. eversmanni** Stgr. (78 g). Above dark, with narrow black margin and white fringes; in the ♂ the basal half dusted with blue, the forewing with black discocellular spot; the ♀ with bright red-yellow spots in the anal area of the hindwing. Underside similar to that of *ida*, with numerous and very distinct ocelli; anal spots of the hindwing with metallic scaling. The ocelli of the hindwing beneath appear to be more often enlarged longitudinally in *eversmanni* than in any other species of *Lycaena* (= ab. *amplificata* Schultz). Pamir, Turkestan. — **grumi** Stgr. (78 g), if at all belonging here, differs especially in the underside, the base of the hindwing beneath being dusted with green and the ocelli smaller; but also the upperside is distinguished by the blue scaling being brighter and on the hindwing of the ♂ arranged in rays and forming blue rings around the distal marginal dots. From the Transalai (MAURER).

lucifera. **L. lucifera** Stgr. (= *biton* Brem.) (78 g). Above both sexes blackish, the ♂ with the scaling on the disc quite dark blue-green with vivid gloss; the ♀ before the margin of the hindwing with pale ocelli whose centres are formed by the marginal dots. Beneath very uniformly deep dark grey, the ocelli with pale borders, the anal ones with metallic scales. Siberia (Altai), Mongolia and Tibet. — **themis** Gr.-Grsh. is similar to *eversmanni*, with smaller and paler ocelli on the underside; from the Sinin Mts.

eurypilus. **L. eurypilus** Frr. (= *carmon* Gerh.) (78 g, h). Much smaller than the preceding forms, very similar to *argus*, but ♂ not blue above but dark brown like the ♀, bearing often also like this sex red-yellow marginal spots in the anal area of the hindwing. — Asia Minor, Mesopotamia, Turkestan and North Persia, on rocky slopes, from May till July. Larva probably on *Astragalus echinus*, as the butterfly is especially plentiful where this plant grows.

pylaon. **L. pylaon** Fisch.-Waldh. (= *zephyrus* H.-Sch., *cyane* Ev.) (78 h). The ♂ of this small Blue recalls by the peculiar violet sheen of the upperside the form *planorum* of *argyrognomon*. Beneath snowy white, the hindwing with a strong sky-blue sheen and the distal band composed of vivid golden red, strongly glossy spots. — From the Ural, South Russia and the Kirghiz steppes, in May, not rare.

sephyrus. **L. sephyrus** Friv. (78 h). Very close to the preceding, but almost twice the size, the underside dull grey, the red anal spots not so bright golden-red, but duller red like red lead. From the Balkan Peninsula, Asia

Minor, and Armenia. — In **akbesina** Oberth., from Syria, the ♂ has the colour of the upperside more transparent and the black margin of the hindwing reduced, almost hair-like, and possesses beneath red-yellow spots before the margin, which are present also above in the ♀. — **zephyrinus** Christ. (78 h) has the black margin broader above and the ocelli of the underside larger; from Pamir and Turkestan. — In ab. **nicholli** Elie., from Syria and Mesopotamia, the hindwing above bears like the underside orange spots before the margin. Also in the ♀♀ the orange spots are always more conspicuous and form a complete band. — **hesperica** Rbr. (78 h) is above sky-blue instead of violet-blue; from Spain. — **lycidas** Trapp. (78 i) is above much darker violet-blue and has a broad dull black margin; in Valais, from COURVOISIER also found in the Val de Cogne (Graian Alps). ♀♀ of this form from the Valais with blue upperside are ab. **caerulea** Courr.; they are not very rare. Also specimens with the ocelli of the underside modified into rays are sometimes met with (= ab. *radiata*). Occasionally specimens of *lycidas* have been found which are said to bear glossy scales in the anal area of the hindwing beneath and are considered to be perhaps the product of hybridisation with *L. argus*. — The butterflies occur in mountainous districts, in the summer, doubtless in several broods. They are not rare, but confined to the places where the food-plant (*Astragalus exscapus*) grows, although not always found where this plant occurs.

L. allardii Oberth. (78 i) has so far only been found in Western Algeria, especially near Sebdou. As large as the preceding, but darker on both sides, beneath almost coffee-brown, with large and numerous ocelli, of which particularly the submarginal row of the forewing is prominent. — In April and May, appears to fly but singly.

L. loewii Z. (= *empyrea* Frr.) (78 i). Has the appearance of a small form of the preceding; ♂ above very vividly glossy blue, almost as in *bellargus* but darker; the ♀ above brown with yellowish red spots in the anal area of the hindwing. Underside with an abundance of ocelli, behind the red submarginal band of the hindwing there are metallic dots. Asia Minor, Armenia, Persia and Turkestan. — The large form **gigas** Stgr. (78 i, k), from Syria, resembles especially *lycidas*, but the ocelli of the hindwing beneath are larger and placed closer together; moreover, the characteristic intense blue gloss, which no other Blue has in the same tint, is as strong in *gigas* as in true *loewii*. — But another form, which flies at Sharud and in Baluchistan and agrees in size with true *loewii*, is said to be paler violet-blue and has been named **chamanica** Moore. In May and June, locally plentiful.

L. fergana Stgr. (78 k). Much smaller and the ♂ above duller blue, of the colour of *icarus*; ♀ above all brown, feebly dusted with blue at the base. If the ♂ is so placed to the light that the vivid violet gloss is weakened, the markings of the underside shine through very distinctly, particularly the discocellular spot of the forewing and the marginal spots of the hindwing. The underside strongly recalls *loewii*, but all the spots more delicate and the metallic scaling in the anal area of the hindwing stronger. — **torgouta** Alph. is a smaller form of this species from the Tian-shan and the Achal-Tekke country; the ocelli of the underside smaller and but little contrasting with the dust-green ground, so that there is a superficial resemblance to a small specimen of the following species. In Turkestan, in May and June.

L. martini All. (78 k). Above recalling *icarus*, on the underside, particularly on the hindwing, the ocelli and dark spots in the marginal area are entirely absent or are represented by hardly visible vestiges; but the small red spots before the margin of the hindwing beneath are retained. The species is very characteristic and does not appear to come specially near any other; it has certainly nothing to do with *semiargus* Rott., with which OBERTHÜR classifies it. I found the species singly but not rarely in June, at Lambessa in Algeria, where it occurs together with *L. bellargus punctifera* and flies about clusters of *Thymus* at the so-called lion-source. ♂ and ♀ are equally frequent; the flight is exactly as in *L. icarus*.

L. staudingeri Christ. (78 k). Above distinguished from the preceding insect by the more dark blue than violet-blue ground-colour; beneath more uniformly ashy grey, the very straight chain of ocelli of the forewing nearer the outer margin than in *martini*. — In Persia, according to CHRISTOPH on the flowers of *Acanthophyllum*.

L. christophi Stgr. (78 k). ♂ above dusted with violet-blue, ♀ with blackish blue. Beneath the row of ocelli of the forewing is somewhat irregular, being much further away from the margin than in *staudingeri*, standing almost in the centre of the wing. The ocelli of the hindwing small and feebly contrasting. In Persia and Turkestan. — The form from the Issykkul, **agnata** Stgr. (78 k), is larger, darker, the ♂ particularly being deeper dark blue, with a broader black margin. — **rogneda** Gr.-Grsh., from Kashgar and the Pamir, is very much larger, being almost twice the size of true *christophi*, with very small spots and an orange band before the outer margin. — **samudra** Moore (79 a) is hardly larger than *christophi*, but is ashy grey beneath instead of pale brownish; from Kashmir and southern China. In May and June, particularly on the flowers of *Peganum haemida*. BINGHAM considers *samudra* identical with the form *bracteata* of *argyrognomon*.

- alaina*. **L. alaina** Stgr. (= muzaffar Gr.-Grsh.). Rather small; the underside uniformly light dust-grey with but slightly contrasting ocelli, in the anal area of the hindwing at the outer margin with very weak red-yellow spots. Strongly recalls on both sides *Everes polysperchon*, but is at once recognized by the absence of the *Everes*-tail. In the possession of some metallic green scales in the anal area of the hindwing beneath this form approaches a little the *argus-argyrognomon* group. — In the Altai and the Peter-the-Great chain, at 12 000 ft., in June.
- sievers*. **L. sievers** Christ. (= mirza Stgr.) (79 a). Characterized by the discocellular spot of the forewing beneath showing strongly above in the ♂♂, agreeing in this respect with *hyrcana*, which it also resembles in the uniformly ashy grey ground-colour of the underside and the development of the markings. The hindwing beneath has in the anal area some more distinct black spots, one of which bears metallic scales, which are sometimes visible only under a lens. In the Pamir and in Persia, in mountainous districts. —
- haberhaueri*. **haberhaueri** Stgr. (79 a) is considerably larger, sometimes twice the size, otherwise similar; from Turkestan. — *sievers* was found in spring, *haberhaueri* in July.
- hyrcana*. **L. hyrcana** Led. (79 a). Above somewhat recalling *baton*, also in the shape of the wings, with distinct discocellular spot. Much smaller than the preceding species, especially than its large form (*haberhaueri*). The underside well characterized by several metallic glossy spots in the anal area of the hindwing. — In Persia and the Ahal-Tekke country; in June, plentiful; the butterfly is not shy, settles on the stalks of *Artemisia* and when disturbed sometimes falls to the ground.
- bellona*. **L. bellona** Gr.-Grsh. A small butterfly, whose ♂ is deep dark blue above; recognized by the absence of all metallic spots on the underside of the hindwing; the hindwing bears, however, small orange spots before the outer margin. — On the Kondara R. (Pamir), found above 10 000 ft.
- alcedo*. **L. alcedo** Christ. (79 a). ♂ at once recognized by the broad black margin of the forewing occupying nearly one-third of the wing, and by the dark discocellular spot. ♀ above uniformly brown. Beneath dirty grey brown, the ocelli of the discal row on the forewing very large and conspicuous, the small shadowy submarginal spots feebly bordered with white and arranged in a very regular row, so that they form a kind of second chain of paler ocelli before the distal margin, there being beyond this chain more-over a row of feeble marginal dots. Hindwing beneath with yellowish red marginal spots, behind which there are metallic blue-green glossy spots in the anal area. — In Persia, in July; not a fast flier, but is shy and occurs only in pairs, not in numbers (CHRISTOPH).
- optilete*. **L. optilete** Knoch (79 b). This species is quite out of place in the present group of *Lycaena* in characters as well as habits, and would be much better placed in a later group than here where it stands in STAUDINGER-REBEL's Catalogue. Both wings very broad and their outer margins strongly rounded. ♂ above very dull dark violet-blue, sometimes with a broader black margin, sometimes without black margin. In the ♀ only the basal half of the upperside is dusted with glossy blue scales. Underside dirty dust-grey, the ocelli very large, often distorted; only the anal area of the hindwing beneath bears orange spots before the margin, from which they are separated by two large round dots with metallic centres. More in the North, in Central and North Europe as far as Scandinavia and the Baltic provinces, sporadic, on moors, also in the Alps in damp larch-woods, locally abundant. — Now and again the species appears in a smaller form, especially in the high Alps (Valais, Engadine), in Lapland, North Finland, and North
- cyparissus*. **Siberia. This is cyparissus** Hbn. (79 b). Its underside is purer dust-grey, the black spots are smaller, more compact, sharper, more regularly arranged, less distorted or widened; the anal red of the hindwing beneath is usually reduced to one or 2 sharply defined spots, not being smear-like or dull as in true
- sibirica*. *optilete*. — The two forms are connected not only by the specimens from the Amur — **sibirica** Stgr. —, but also by transitions frequently found in West Siberia and Europe and sometimes approaching the one form and sometimes the other. The alpine specimens — *cyparissus* — cannot be separated from the northern ones, as *optilete* also flies in the Alps and *cyparissus* in the North. However, the individuals from the High Alps and the High North appear to incline more towards *cyparissus*, while the form flying on the Sphagnum-swamps of the warmer plains — particularly in North Germany — is the most normal *opti-*
- uralensis*. *lete*. — In the Ural there flies a form with the ground-colour beneath black-grey; this is **uralensis** Courv.
- subtus-radiata*. i. l. — ab. **subtusradiata** Farre are specimens in which the distortion of the ocelli has led to the appearance of rays. — Larva pale green, densely clothed with minute silky reddish yellow hair, and adorned with a light-yellow black-bordered lateral stripe; until June on *Vaccinium myrtillus*. Pupa rounded, obtuse, anteriorly dotted with small yellowish red hairs, green with yellow abdominal segments. The butterflies from the end of June towards September, locally plentiful, on moors, also in woods of high trees, where it is usually the only Blue found. The butterflies occur there mostly on more open places where there is a bush in the centre from which the ♂♂ make short excursions. In the Alps often at small rills, here sometimes in large numbers (Zermatt, Riffelhaus) and often in company with other *Lycaenas*. In consequence of the broad wings the flight is a little different from that of other Blues,

recalling the flight of *Cyaniris argiolus*, but is low. In the Bucovina the species has been obtained at the end of June and in September, which however is no definite proof that there are two broods.

L. panagaea H.-Schäff. (= *endymion* Frr.) (79 b). Above like a small *alcedo*; ♂ blue with a very *panagaea* broad black margin; ♀ black-brown. At once recognized by the underside, on which the fourth spot of the discal row of ocelli of the forewing, which stands before the upper median vein, is shifted towards the outer margin, being entirely removed from the row. — Syria and Asia Minor, especially near Amasia, also in Armenia, Persia and Turkestan, from June till August, in damp localities, not rare.

L. cytis Christ. (79 b). Somewhat larger than the preceding species. Also here the fourth ocellus *cytis* of the discal row on the forewing beneath is removed from the row, but not so far as in *panagaea*, remaining at a considerable distance from the outer margin. The species is above all recognized by these ocelli of the forewing appearing above as a group of small black spots. Persia, Pamir, Turkestan. — The form **panaegides** Stgr. (= *alaica* Stgr.) (79 c) has only the discocellular spot distinctly visible above; the ♂ above *panaegides* less and more thinly blue and with a broader and more sharply defined black margin; Turkestan. In July and August.

L. iris Stgr. (79 b). As large as the preceding forms; both sexes black-brown above. Easily recognized by the underside, on which the discocellular spot of the forewing is surrounded by irregularly arranged additional ocelli. The hindwing above bears small pale thin half-moons before the margin. — Turkestan, from May until July.

L. rutilans Stgr. (79 b). Similar to the preceding, smaller, recognizable by the coppery gloss on the *rutilans* disc, which is especially distinct in the ♂, and by the very distinct discocellular spot on the forewing. On the underside this spot forms with the discal ocelli on almost closed ring. — Ferghana, at a considerable altitude, in June and July.

L. anisopthalma Koll. (= *arsacia* Led.) (79 c). Upperside of both sexes brown with a slight golden *anisopthalma* gloss, the fringes white; the forewing with a small but distinct discocellular spot. Underside dirty grey-brown, the ocelli of the forewing very large, united in one group, those of the hindwing usually much smaller. — In North Persia, end of May, June.

L. triphysina Stgr. (79 d). Above likewise black-brown in both sexes, at once recognized by the under- *triphsina* side, which bears the ocelli on a dark brown ground (as in the next species). This ground-colour has a reddish tint in *triphsina*, which is rather exaggerated in our figure. In the development of the pattern of the underside the species bears a superficial resemblance to *Thecla rhymnus*. — Kashgar.

L. anthracias Christ. (79 d). Similar to the preceding, but somewhat smaller, above likewise dark *anthracias* brown, the tip of the forewing however whitish, the fringes spotted. The likewise dark underside has a grey tint, not a red one as in *triphsina*. — Kirghiz steppe, Turkestan, in the spring, in places where *Alhagi kirghisorum* grows.

L. panope Ev. This Blue, which likewise occurs in the Kirghiz steppe south of the Ural, has several *panope* times been considered as a variety of the following species. The ♂ is dusted with dull blue above, otherwise of a blackish colour, which shows only a few yellowish red, small and narrow, transverse lunules in the anal angle of the hindwing. Underside brown-grey, darker in the ♀, the ocelli of the forewing rather large, the fringes spotted.

L. baton Bgstr. (= *amphion* Esp., *hylas* Schiff.) (79 d). Upperside blackish, the ♂ more or less *baton* dusted with blue, the forewing with a distinct discocellular spot, the fringes spotted. Beneath numerous ocelli on a leaden grey ground, larger on the forewing, the latter usually even with ocelli near the base, the hindwing with red-yellow spots before the margin in typical specimens. Throughout Central and South Europe, with the exception of England, occurring from Pommerania and the Baltic Provinces to the Mediterranean, and from Belgium to Central Asia (Altai). — A form very similar to true *baton*, but beneath without the reddish yellow anal spots occurs singly everywhere among ordinary *baton*, being especially plentiful in the south of Europe: this is ab. **panoptes** Hbn. (= *argus minutus* Esp.) (79 e). — *panoptes* A similar form is found in Spain and North Africa, the reddish yellow submarginal band being absent from the hindwing beneath, the underside of the hindwing purer in tint, more pale dust-grey, with the ocelli distinct but very thin; the upperside very uniform in colour: **abencerragus** Pier. (79 d). — On the southern *abencerragus* slopes of the Atlas, on very arid, almost desert-like slopes, I caught in the spring frequently a very small dwarf-form which is hardly half the size of the common *abencerragus* of North Algeria, and which I call **famelica** form. nov. (79 e). — In Anterior Asia the ♂♂ have a brighter colour, which has often a silvery *famelica* white sheen; this is **clara** Christ. — **vicrama** Moore, from Afghanistan, has no distinct discocellular spot *clara* on the upperside of the forewing, there being also no dark marginal dots on the hindwing above. — *vicrama* **cashmirensis** Moore, from Kashmir, has a distinct black discocellular spot on the forewing like the European forms; on the upperside, moreover, the forewing bears whitish marginal lunules and dark veins and the hindwing dark marginal dots. — Larva laterally strongly carinate, the segments somewhat swollen, light green with blackish *cashmirensis*.

head and rosy-red pyriform dorsal spots divided by a purple dorsal line and accompanied laterally by white dots; stigmata white. In April and again in July, on *Thymus*, particularly at the flowers; in captivity it often attacks other caterpillars. Pupa roundish, obtuse, smooth, clay-yellow, with darker wing-cases; on the ground. The butterflies are on the wing in May and again in August and September, frequenting very sunny grassy hills and slopes, clearings in woods and broad sunny roads. They fly usually very short distances and settle on grasses and the tops of herbage with the wings half open and widely separated. The flight is slow, somewhat hopping, and the butterflies are not shy. While they occur more singly in Central Europe, they are extremely frequent in South Europe and North Africa, where they often fly in great abundance. In the extreme east of the area of distribution, in Kashmir, they are local, but very common (BUTLER).

- orion*. **L. orion** Pall. (= *sedi* F., *telephii* Esp., *battus* Hbn.) (79 e). Above and beneath rather similar to the preceding, but larger and darker, recognizable by the fringes being very distinctly spotted and the white underside abundantly and heavily spotted with black, the hindwing beneath bearing a bright orange-red submarginal band. Throughout Europe, West and North Asia, excepting England, the arctic countries and Japan; *nigra*, from Finland to the Mediterranean Islands and from the Atlantic to the Pacific. — ab. **nigra** Gerh. (79 e, erroneously named *nigricans*) occurs everywhere among ordinary specimens and is the prevalent form in some districts, e. g. in the Valais; differs in the uniformly dark upperside, on which only the discocellular spot is visible — ab. **ornata** Stgr. (79 e, *ornatus*) is very blue above, such specimens being found singly in Europe and as a regular spring-form in East Asia. — **orithyia** Gr.-Grsh. are specimens from the Sinin Mts. in North Tibet, which form a transition to *ornata*, the light blue marginal rings characteristic of *ornata* being entirely or nearly absent. — Egg flattened, white. Larva light green with black head and black spiracles; the first ring, a lateral stripe, the dorsal line and a row of spots on each side of the dorsal line carmine; in the autumn and in the south again in June, on species of *Sedum*; often guarded by ants. Pupa dirty yellow, greenish at the wing-cases, fastened either on the ground or above it on plants, sometimes a number together. The butterflies in the early spring (emerging in a warm room already in February according to TUMMA), and in the south again in August, very local, being absent from large districts, but generally not rare, particularly on chalk in stony places. In China, Corea and Amurland the species is much more generally distributed than in Europe, but always confined to the (rocky) localities of the food-plant.
- bavius*. **L. bavius** Er. (79 e). Beneath almost as in *orion*, but the underside distinctly pale violet-grey. Above the ♂ is blue with weakly red anal spots on the hindwing, the ♀ dark brown, with red submarginal band, which is bright on the hindwing. In South Russia, the Caucasus, Asia Minor, and Syria. — **fatma** Oberth. (79 f), from the Aurès Mts. near Batna in Algeria, is above paler violet-blue and has a more distinct yellowish red band on the hindwing. Transitions to this form are said to occur in the Lebanon and in Syria. — This species appears likewise to be very local and is called „rare“ in many places. The different dates of capture (April, June) point to two broods.
- lanty*. **L. lanty** Oberth. (= *lantyi* Stgr.-Reb.) (79 f). This is the palest form of this group; recognizable by the bright sky-blue upperside and the more sparsely spotted apical area of the forewing beneath. — In West China and Tibet, common at Ta-t sien-lu, rarer at Wa-ssu-kow, at 5000—6000 ft., in May and June.
- divina*. **L. divina** Firs. This largest species of the present group is above almost spotted like *orion*; the underside is more sparsely spotted than in *orion*, but the spots of the forewing beneath are so heavy that they are almost united into a band. — Corea, in June.
- moorei*. **L. moorei** Leech (79 f). Above black-brown in both sexes, the fringes not distinctly spotted, being interrupted only beneath by the dark veins. The underside strongly spotted, so that the discal spots of the hindwing appear as dark dots on the upperside. In this as well as the absence of tails the species differs from *Everes fischeri*, which has a somewhat similar facies. — In Central China (e. g. at Chang-Yang not rare), in June and July.
- cyane*. **L. cyane** Er. Just as the preceding species recalls *Everes fischeri*, so the present one resembles *Er. argiades*, the ♂ having above almost the same delicate violet-blue colour as the latter, the forewing being somewhat whitish before the outer margin. The ♀ is likewise whitish before the margin, but the upperside is otherwise dark brown, with the base dusted with white. Underside nearly as in *orion*, or still more similar to that of a large *baton*, abundantly spotted in the ♂ on a bluish white ground and in the ♀ on a yellowish white ground, the hindwing bearing a reddish yellow submarginal band; the base of the wings always distinctly dusted with blue-green. South Russia and South Siberia to the Altai. — **deserticola** Elw. is a desert-form from the lower districts of the Altai; only half the size, the dark spots of the underside with pale borders. — The butterflies have a fast flight and settle particularly on tall flowering plants, keeping the wings closed (CHRISTOPH). In spring.
- miris*. **L. miris** Stgr. (79 f). Above both sexes black-brown, the ♀ with a red submarginal band on both wings, which is only occasionally obsolescent on the forewing, the underside, which otherwise recalls *orion*, has this

band also very broad and prominent and hence bears a superficial resemblance to *astrarche*, in which the ocelli, however, are much less regular in position than in *miris*. In ab. *oblitescens* Schultz the ocelli of the hindwing beneath have disappeared except for feeble traces. — In Persia, Turkestan and Ferghana, in May and June. *oblitescens.*

L. elvira Ev. (= *oberthueri* Gr.-Grsh.). ♂ very light silvery blue, almost as in *coridon*, but with a comma-shaped elongate discocellular spot and narrow black distal border bearing short marginal bars; the hindwing has no central spot. The ♀ above is black-brown, with a row of deep black luniform bars before the margin. Underside dirty white, on the forewing four rows of black dots, the anterior row being slightly curved in S-shape. — In Turkestan and the Kirghiz steppe, obtained in April. *elvira.*

L. orbitulus Prun. (= *meleager* Hbn.) (79 f). Above dark with light fringes, ♂ with the basal area of both wings glossy silvery blue-green; forewing always, hindwing sometimes with a heavy black discocellular spot, which has occasionally a pale border. Underside yellowish grey-brown, with some larger pale spots and a broad whitish distal border, which sometimes occupies the whole outer third of the hindwing; the spots of the forewing always, those of the hindwing sometimes with dark centre. Very variable. In the Alps, only at considerable altitudes. ab. *aquilonia* Wheel. has the outer margin more strongly glossy than the ground-colour and the marginal dots of the hindwing very indistinct; appears to be hardly different; on Mt. Pilatus. — *oberthueri* Stgr. (79 g) is a considerably larger form with more prominent markings and narrow dark margin, the upperside strongly recalling *coridon*. From the Pyrenees. — In the Pyrenees, however, occurs also *pyrenaica* Bdr. (79 g), which is of wider distribution in Spain; on the whole somewhat larger than ordinary specimens from the Alps, but much smaller than *oberthueri*; the dark margin narrower and the spots of the hindwing without distinct dark centres. — In the high North (Lapland) the species, like most high-alpine forms, descends into the plains, being represented by *aquilina* Stgr. (= *aquilo* Aur.) (79 g). Similar to Alpine specimens, but deviates in the direction of *wosnesenskyi*, the upperside, however, is paler in both sexes, being of a peculiar green-bluish, with the dark margin narrow. — *wosnesenskyi* Mén. (= *diodorus* Brem.) (79 g) has the pale spots of underside, which represent the ocelli of other Lycaenas, smaller and more widely separated from one another, especially on the hindwing; in Siberia, as far as Kamtchatka. — *orbona* Gr.-Grsh. (= *tartarus* Stgr.) (79 g) is the Tibetan form, which has the greater part of the upperside dark (also in the ♂), the spots of the hindwing beneath are partly reddish yellow. — *dardanus* Frr. (79 h) strongly resembles *pyrenaica* and is also said to be found in Spain; smaller than *pyrenaica*, and the pale spots of the hindwing beneath with more distinct black centres. From Asia Minor, also recorded from the Balkan (REBEL). — *aegagrus* Christ. (79 h) is above washed with very light silvery blue, which is not distinct enough in our figure. At once recognized by a prominent group of black dots in the apical area of the forewing above. Persia, on sheltered stony mountain-sides. — *orbitulinus* Stgr. (described from a worn ♂), from Dauria, is darker above and has some metallic blue scales only in the basal area of the wings; the underside, too, is darker, the forewing bearing larger black ocelli; the hindwing beneath has before the margin a dark dentate band, which is sometimes indistinct; from Kentei. — In the south of the large area of distribution the species extends with several forms into Kashmir and even India: *leela* Nicév., from Leh, is larger and darker, and has a row of white spots before the margin. — *jaloka* Moore, likewise from Kashmir, not only has this row of white discal spots, but also the median spots of the wings are whitish instead of dark. In ab. *ellisi* Marsh. these discal spots are larger than in *jaloka* and the light blue-green scaling, which in *jaloka* is restricted to the base, is farther extended towards the margin in *ellisi*. It may be added that the row of spots on the upperside which is typical for Kashmir specimens occurs as a rare exception also in European examples (FREY), for instance in the Engadine, such specimens being named by WHEELER ab. *alboocellata*. — In America there occur, though not exactly varieties of *orbitulus*, some species representing it over a large portion of North America, e. g. *rustica* Edw., *podarce* Fldr., *nestos* Bdr., etc., in the west of the U. S., and *franklini* in Canada. — Larva green with black head, densely clothed with short, stiff, black hairs; on the back a chain of rosy-red spots, laterally to them dark transverse streaks; a lateral stripe above rosy red, beneath white; the stigmata black with thin white border. Until July, during the day under stones. Pupa also under stones, yellowish brown with the incisions between the segments paler, the wing-cases grey-brown with dirty yellow streaks. The butterflies are on the wing in July and August, i. e. throughout the short summer of the high Alps, even plentiful at the snow-line, locally in countless numbers in the region of the higher alpine pastures. It is the commonest butterfly of the high Alps, which swarms everywhere over destritus and grass, always keeping close to the ground, settling with half-open wings on flowers of all kinds. At small rills and puddles on the roads often whole clouds assemble and the insects are even found drinking on the melting snow of the mountains. When the cold wind from the glaciers strikes them or the sun is concealed by a cloud, the specimens become at once lethargic and often helplessly tumble on their sides, remaining in this position until a warm ray of the sun revives them. The flight is fast, almost booming, but the insect is not shy. *leela.*
jaloka.
ellisi.
alboocellata.

L. pheretiades Ev. (79 h). Almost like *orbitulus*, but the margin of the hindwing beneath not white, but only a little paler than the ground colour; on the other hand, there are pale spots before the margin, sometimes only a few, as in our figure, sometimes many more. Many authors regard the *pheretiades*-forms *pheretiades.*

as belonging to *orbitulus*. These forms are: the name-typical one from the Tian-shan and other mountains of Central Asia. — Further, **pheres** Stgr. (= *phereclus* Gr.-Grsh.) (79 h) with only 2—3 pale spots on the hindwing beneath; from Ferghana. — **pheretulus** Stgr. (79 h) with very broad black margin in the ♂, otherwise very close to true *orbitulus*; from the higher plateaus of southern Ferghana. — **tekessana** Alph., beneath like *pheres*, above like *pheretulus*, with broad black margin in the ♂; from the Tian-shan. — The butterflies occur only at higher altitudes (above 8000 ft) and fly near the ground but rather fast; they settle particularly on *Myosotis* and are not rare in June and July wherever they occur.

L. pheretes Hbn. (= *atys* Esp.) (79 h, i). ♂ of a magnificent sky-blue, about the same in colour as the ♂ of *icarus*, with narrow black margin, ♀ black-brown; fringes white, forewing beneath brown-grey with a white-edged discocellular spot and beyond it a row of ocelli varying in distinctness. Hindwing yellowish grey, with a row of white diffuse spots before and again behind the middle. ab. **caerulea** Courv. are ♀♀ with blue upperside, on which the spots of the underside shine through. ab. **caeruleopunctata** Wheel. are ♀♀ with blue spots on the upperside. In ab. **maloyensis** Rühl the row of ocelli of the forewing beneath is absent, so that only the discocellular spot is marked on the brown-green ground; sometimes also the dark centres of the ocelli of the hindwing are wanting and in exceptional cases even the ocelli themselves. In the Alps, not reaching such high altitudes as *orbitulus*, but going as far as the tree-line, much less common than *orbitulus* and more singly. In the high North the species descends into the plains (Lapland, Scandinavia); it has also been found in the Pyrenees and many of the high mountain-chains of Asia as far as Amurland. Specimens from China are larger, deeper blue, have a broader black margin, on the hindwing often distal-marginal dots, and a paler underside with less prominent dots; this form has not received a name. — However, transitions to the latter have been named **sajana** Rühl, with the black margin of the ♂♂ of medium width. — **pheretimus** Stgr. are specimens from Turkestan; they are of a deeper glossy blue above than European ones, the tips of the veins ending in the outer margin are black, the underside is darker, the hindwing often bearing accessory dots. — **lehanus** Moore (79 i), from Kashmir, is much smaller, more violet-blue than sky-blue, the ♂♂ with broader dark margin. The specimens from the Pamir lead over to this form. — Moreover, the species extends in the Himalayas also onto Indian territory (*asiatica* Ehc.). — Nothing is known to me about the larva. It struck me very much that the butterfly occurred particularly in places where *Vaccinium* grew, but in spite of diligent search I did not succeed in finding larvae which might belong to this species. The butterfly is met with singly or in pairs; I found it often in the company of *eumedon*, which the ♀ of *pheretes* resembles when on the wing. The ♂♂ occur among the numerous alpine butterflies which drink on damp places on roads, in July and August.

L. chrysopsis Gr.-Grsh. (79 i). Resembles *cyllarus* on both sides. Above blue, the ♀ with black apical area on both wings; beneath the forewing grey, with a chain of large ocelli, the hindwing with a peculiar silvery verdigris gloss, which is found in no other *Lycaena*. — Pamir, at 14 000 ft., obtained early in July.

L. omphisa Moore (79 i). Much darker than the preceding species; in the ♂ the outer half of both wings is black, in the ♀ the whole upperside dark brown, only the base being dusted with blue. On the underside the hindwing is more glossy green with some white spots¹⁾ and the forewing, besides the chain of ocelli, has a distinct median spot, which is but very feebly indicated in *chrysopsis*. — Kashmir.

L. felicis Oberth. (79 i). Above as dark as in *eumedon*, but the hindwing with red submarginal band. The hindwing beneath is silvery pale blue with pale middle spot and pale distal margin, the latter bearing dark dots. — Everywhere in West China and Tibet, from May until August.

L. dis Gr.-Grsh. Not known to me. Is said to be black above with white fringes and white median halfmoon. Forewing beneath olive-grey, median lunule and ocelli very large, forming a broad transverse band; marginal area white, traversed by brown veins. Hindwing beneath likewise olivaceous, basal spots, median lunule, two subcostal spots and a row of submarginal spots, which partly shade off into the outer margin, are edged with white. — From the Sinin Mts. in Amdo, at a considerable altitude. This *dis*, apparently an aberration and perhaps belonging to *astrarche*, is based on a single ♂ and is conscientiously carried along in all works and catalogues.

L. idas Rbr. (79 k). Above black-brown with dark median spot on the forewing, the fringes pale, only slightly darkened at the tips of the veins. Underside coffee-brown, with feeble reddish tinge, the ocelli being similarly arranged as in *astrarche*; the hindwing with pale longitudinal streak from the centre of the wing to the middle of the outer margin, the streak being generally much more prominent than in our figure. — In the Sierra Nevada, at 1000 ft., in July.

L. psylorita Frr. (79 k). Above with the markings as in a dull specimen of *astrarche*, with obsolescent dull red distal band. At once recognized by the underside, on which the numerous ocelli are reduced to very weak dots; moreover, especially in the ♀, the submarginal band which is so bright in

¹⁾ Moore's figure shows even a white arched stripe, which does not agree with his description, nor have I ever seen a specimen with this marking.

colour in *astrarche* is but vestigial in *psylorita*, and is dull and scarcely recognizable. Crete, on high mountains, especially on the Ida, near the snow-line, fairly common in June.

L. astrarche Bgstr. (= medon Hufn., agestis Schiff., idas Gerh. (♀), nazira Moore) (79 k). Above *astrarche*. similar to the preceding, deep dark brown, with strongly marked discocellular spot, especially in the ♂. Typical specimens have this spot black and bear red spots at the outer margin. Underside with numerous ocelli, the hindwing with a pale smear from the apex of the cell to the centre of the outer margin. From Scandinavia to the Sahara and northern India, and from the Canary Isles to the island of Askold in the Pacific, ascending in the mountains up to 10,000 ft. (DOHERTY). — Besides accidental aberrations in the usual directions of variation, a number of seasonal and geographical forms have been established. If the spring-brood of the Central European form is regarded as name-typical *astrarche*, ab. **aestiva** Stgr. is the *aestiva*. name for the second brood, which occurs regularly in the south and more rarely in the north and which connects *astrarche* with **calida** Bell. (79 k, 80 a). The latter has a much darker, almost coffee-brown, under- *calida*. side, with a broader band of red spots. On the other hand, ab. **albicans** Aur., which occurs singly, being *albicans*. more frequent in the north, has an unusually pale underside. — In specimens from the Canaries the red macular band of the upperside is occasionally quite uncommonly broad and of even width, so that it forms a regular band, only transected by the black veins; this is ab. **cramera** Eschsch. (= canariensis *cramera*. Blach.) (80 a). I also caught very extreme specimens of this form on the slopes of the Aurès Mts. in Algeria, although only singly; on the other hand I met on the Canaries with specimens of *astrarche* which certainly did not belong to *cramera*, but rather to *calida*. — The red band of spots, instead of being enlarged, may also become obsolete; this is frequently the case in specimens from the Alps and constantly in those from Amurland; this is **allous** Hbn. (79 k). A very small similarly developed form, **alpina** Stgr., *allous*. *alpina*. has been described from the Parnassus. — **montana** Rühl-Heyne has weak but visible traces of red, and is *montana*. mostly considerably larger; from Andalusia. — In specimens from certain districts and in some seasonal forms the broadening of the band of red spots is combined with an especially pale silvery grey underside, instead of a dark one as in *calida* and *cramera*. This form is constant in South Russia and many districts of anterior Asia and is then called **sarmatis** Gr.-Grsh. — But also in South Europe and North Africa occur *sarmatis*. similar specimens, which have received the name ab. **ornata** Stgr. (80 a). — A very conspicuous form is *ornata*. that of Great Britain. **artaxerxes** F. (80 a), in which the discocellular spots on the forewing are whitish *artaxerxes*. instead of black; the red spots may be more (*artaxerxes*) or less (ab. **vedrae** Harr.) developed, or even be *vedrae*. absent (ab. **semi-allous** Harr.), being sometimes accompanied by pale dots (ab. **albimaculata** Harr.). The *albimacu-* pale cell-spot, too, is variable; it is well developed on the forewing alone in name-typical *artaxerxes* from *lata*. Scotland, is very small and hardly visible in the English form ab. **inclara** Harr., and present on both *inclara*. wings in ab. **quadripunctata** Tutt, in ab. **salmacis** this white middle spot has a dark centre on the under- *quadri-* *punctata*. side.¹⁾ ab. **brunnescens** Harr. has dark fringes. — Egg pale green, flattened, with the top concave and *brunnescens*. the surface minutely reticulate (TUTT, HARRISON, GILLMER). Larva light green, with a purple dorsal stripe and a similar stripe along the sides, between them oblique pale smears; in spring and summer (in the south throughout the year) on various plants, such as Helianthemum, Centaurea, Erodium, etc. Pupa pale yellowish green, sometimes with a brown dorsal stripe, on or near the ground. The butterflies are on the wing in May and again from July onward, in the south the whole summer until the autumn, in several broods. They fly everywhere, in fields, on field-paths, on rocky hills, even in gardens, always close to the ground and belong to the very commonest butterflies. During the hours of flight they settle with spread wings on blades of grass, blossoms, or clods of earth, while they sleep with closed wings generally hidden under umbels and the inflorescences of grasses.

L. chinensis Murr. (= mandschurica Stgr.). Above like *astrarche*, but the fringes spotted. Beneath *chinensis*. the reddish yellow submarginal band is neither interrupted nor proximally dentate, being edged with short black lunules and standing somewhat farther away from the margin. In North China and Manchuria. — **myrmecias** Christ. (80 a) is a form from Turkestan with the macular band pale yellow instead of reddish *myrmecias*. yellow. In May, found on flowers of Centaurea.

L. kogistana Gr.-Grsh. A very small butterfly, in size and shape recalling a *Zizera*; perhaps only a *kogistana*. dwarfed form of another species. So far only found in the Pamirs (Darwaz). Both sexes above uniformly dark brown; the underside with prominent ocelli and a very dull yellowish submarginal band, which contrasts but little; the discal row of ocelli is very evenly curved; there is no pale streak from the discocellular spot of the hindwing towards the outer margin.

L. eumedon Esp. (= chiron Rott.) (80 a). Above dark brown with white fringes and dark dis- *eumedon*. cocellular spot to the forewing; the ♀ has small red anal submarginal spots on the hindwing, sometimes also on the forewing. Beneath brown, with red-yellow distal band, which is either continuous, or separated into spots, and either restricted to the hindwing or continued on to the forewing, or may be entirely

¹⁾ This form came from the coast of Durham. The name *salmacis* was first introduced by STEPHENS for a form in which the discocellular spot of the forewing was said to be black in the ♂♂ and white in the ♀♀. Such a form does not exist, and HARRISON applied the name to the aberration described above.

absent; the base of the wings beneath dusted with very glossy metallic sealing; ocelli similarly arranged as in *astrarche*, typical specimens bearing also a distinct white streak from the central spot of hindwing to outer margin. Throughout Europe, but sporadic, usually in places where *Geranium* grows, distributed from the Pyrenees to the Pacific Ocean and from Scandinavia to Italy, absent from England. ab. **speveri** *Husz* (80 b, erroneously named *privata*) has the white median streak on the hindwing beneath, but no ocelli. — *fylgia*. **fylgia** *Spångb.* (80 a, b) is a northern form (Lapland) in which the white median streak of the hindwing beneath is absent. Occurs as exception also further south among the name-typical form, e. g. at Mainz *privata*, about 5° (ANDREAS). ab. **privata** *Stgr.* is an aberration of it, in which, besides the median streak, also the submarginal ocelli are wanting or reduced to weak vestiges; such specimens occur as rarities with the aberrational characters more or less well expressed in all localities, but are said to be a constant form in some places in Asia, e. g. in certain localities in Tibet, Kamtschatka, etc. — **antiqua** *Stgr.* (= *eumedon* *Gr.-Grsh.*) (80 b), from Ferghana, has the underside dust-grey instead of brown and the ocelli smaller; the median streak of the hindwing beneath is obsolete or but feebly vestigial. — Of accidental varieties, which occur especially often in the ocelli, we mention specimens with the ocelli distorted, or modified into rays *albolinearis*, (*radiata*), or confluent (*pilzii*). In ab. **albolinearis** *Schultz* the whole marginal area is dusted with white beneath; in ab. **dealbata** *Schultz* the whole underside of the hindwing is white excepting the greyish costal area; ab. **albocincta** *Schultz* has the black discocellular spot of the forewing above thinly edged with white. Also transitional forms and combinations of various aberrational characters occur: e. g. *privata*-specimens may have a white underside to the hindwing, or the ocelli may be absent on the forewing beneath and present on the hindwing (ab. *subtus-impunctata*), etc. — Larva in the pods of *Geranium*. The butterflies occur from May till July, in the high Alps until August; they fly rather slowly and clumsily, nearly always about the flowers of *Geranium*, also passing the night asleep in the blossoms of the plants. During flight they move the wings very regularly up and down and often remain fluttering in the air in front of a flower before settling on it. The sexes are of equal frequency and appear to leave but unwillingly their flight-places, where one often meets with pairs in copula. They are found relatively much more rarely at the rills on the roads in the Alps than other, less abundant, species.

donzelii. **L. donzelii** *Bdv.* (80 b). Scarcely so large as the smallest *eumedon*. Above black-brown with dark discocellular spot and grey-brown fringes; in the ♂ the upperside dusted with metallic blue-green, with the exception of a very broad marginal area, which remains black. Underside grey, the ocelli being but little prominent, on the hindwing almost obsolescent; from the base of the hindwing to near the centre of the outer margin a wedge-shaped white streak. In the high Alps and in the north of Europe, as well as in some of the Asiatic mountain-ranges (Ural, Tian-shan). — Specimens from East Russia (Kasan) are smaller, with narrower border, above more greenish and beneath with a very feebly developed reddish yellow band; this is **septentrionalis** *Krulik*. — Egg flattened, pure white, deposited on *Geranium* in July. The larva emerges early in the spring and feeds in the stalks and buds; full-grown pale olive-green, covered with short, whitish silky hair, on the sides three stripes darker than the ground and on the back a stripe yet darker than these; the lower side-stripes are so arranged that the lowest of one segment is a continuation of the next higher of the preceding segment; the sides reddish at the stigmata, white at the outer edge. Pupa pale olive-green with dark dorsal stripe, the wing-cases very transparent, bearing a minute reddish network and small thin white hairs; fastened low down at the stalks of *Geranium* (McDUNNOUGH). The butterflies are on the wing in July and August, and very closely resemble *L. eumedon* in their habits of flight, feeding, etc., but are far less plentiful. They occur only singly, usually resting quietly on a high-grown flower of *Geranium*; when disturbed they settle again after a short while on the same or a neighbouring blossom. Also this species is met with only in single specimens among the crowds of Alpine Blues drinking at puddles, and generally only at a considerable altitude (Stilfser Joch, Zermatt, Simplon, Maloya, etc.).

hyacinthus. **L. hyacinthus** *H.-Schäff.* (80 b, c). Above similar to the preceding, the dark margin still broader, especially on the hindwing. Very different on the underside, being light blue-grey with rust-red marginal spots, distinct ocelli and on the hindwing without distinct white median streak. — From the countries around the eastern part of the Black Sea.

phillydes. **L. phillydes** *Stgr.* (80 c). Above black brown, the ♀ similar to that sex of *L. eumedon*, but the ♂ dusted with silvery grey. Beneath the ♂ quite light silvery grey, with few and small ocelli on the hindwing; the ♀ somewhat darker, with a silvery white median streak on the hindwing. — In Turkestan, mostly at a considerable height, on steppe-like plateaus, in May and June.

anteros. **L. anteros** *Frr.* (80 c). The ♂♂ dusted with a very bright metallic blue as far as the narrow black margin, with a small but distinct discocellular spot on the forewing. ♂ resembling *astrarche* above, the ♀ on both sides, but the underside with more prominent and larger spots, the discal row of ocelli on the forewing more curved. Especially on the Balkan Peninsula, in Asia Minor and Syria. European specimens bear often some small red spots on the upperside of the hindwing before the outer margin; this is ab.

pupillata Aign. — **crassipunctata** Christ. are Armenian specimens with the discocellular spot of the forewing above much enlarged. — Not rare in June and July, in Europe often restricted to the mountains. pupillata.
crassi-
punctata.
eros.

L. eros O. (= *tithonus* Hbn.) (80 c. d). ♂ very bright blue, with a metallic gloss like enamel, black margin to the forewing and black distal-marginal spots to the hindwing, these spots contrasting strongly with the pure white fringes. ♀ brown, sometimes with yellowish red distal-marginal spots. Underside strongly recalling *icarus*, but ♂ as well as ♀ with distinct white median streak on the hindwing. In the higher mountains of southern Europe as far as the Alps, and in the mountain-districts of Anterior Asia. — In ab. **petrividenda** Favre the hindwing beneath has no black marginal spots, but instead a white band before the margin. ab. **albipicta** Schultz has a white discocellular spot on the forewing above instead of the hardly visible black one. ab. **caerulescens** Oberth. (80 d) are ♀♀ with bright blue upperside, which occur singly and rarely in Europe, but are said to be a constant form in West China; this, however, is very improbable, and LEECH says nothing about it. — **erotides** Stgr. (80 d), from the mountains of Southern Siberia, is a large, blue-green ♂-form, with broad black distal margin to the forewing, into which the deep black veins merge. — **eroides** Friv. (= *anteros* Frr., *everos* Gerh.) is more sky-blue than greenish blue and the largest form of the species after the following one; in Eastern Europe, particularly in Russia, the Balkan Peninsula, westwards extending to Germany, where it occurs in East Prussia and Posen, though only rarely.¹⁾ — The ♂♂ of the South Russian form **boisduvalii** H.-Schäff. (80 d) have again a different blue, being paler, purer, brighter, the outer margin of the forewing is broadly black, the black veins in the apical area of the forewing being thin but sharply marked. — **sutleja** Moore, from Kashmir, is extremely close to **boisduvalii**, having the same tint of blue, but its black margin is somewhat narrower and the black veins in the apical area of the forewing are not quite so sharply defined. — In **amor** Stgr. (80 e), from Ferghana and the Tian-shan, the blue of the upperside of the ♂ has a violet sheen, nearly as in *icarus*, and the black margin is narrower. — **napaea** Gr.-Grsh. has likewise the same blue tint above as *icarus*, but the black margin is much broader, as is also the costal area of the hindwing. From the Boro-Choro Mts. in Central Asia. — **erigone** Gr.-Grsh. (80 e), from the Pamir, is considerably smaller; beneath the ocelli are less prominent and the white streak of the hindwing is very distinct. Also the ♀ bears a superficial resemblance to *icarus*, whose blue colour is almost exactly the same as that of the *erigone* ♂♂: obtained at a considerable altitude (13,000 ft.). — **pseuderos** Moore extends still further south, as far as Kashmir. The distal margin with black-grey spots above; the forewing beneath without basal ocelli and the discal row of ocelli more straight. — **helena** Gr.-Grsh., from the Sinin Mts., resembles East Russian *eroides*, but the blue has already a slight tinge of violet, and the black margin is narrower. In the underside the rust-yellow submarginal spots are larger and the dark marginal spots are deeper black and more prominent. Perhaps *bilucha* Moore, from Quetta, outside the Palearctic territory belongs also here — The early stages of the species do not appear to be known. The butterflies occur from June until August; they are not rare and are in the Alps among the most frequent visitors of damp places on the roads. They agree best with *argus* and *argyrognomon* in habits and flight. petri-
videnda.
albipicta.
caerulescens.
erotides.
eroides.
boisduvalii.
sutleja.
amor.
napaea.
erigone.
pseuderos.
helena.

L. venus Stgr. (80 e). Recognizable by the peculiar dazzling but not very metallic blue of the ♂♂. It is a deep sky-blue, not a violet-blue as in *icarus*, and not a green-blue as in *eros*. The ♀ dark brown with more or less distinct reddish yellow marginal spots. Beneath similar to *icarus* and like this with basal ocelli on the forewing and blue-green scaling at the base, but the spots mostly more prominent, the median streak of the hindwing sometimes vestigial (as in our figure) or more distinct, the red submarginal spots further away from the margin and the row of dots placed at its proximal side situated in a narrow white band formed by the pale borders of the ocelli being merged together. Turkestan and Tibet (Amdo). — The forms **lama** Gr.-Grsh., from the neighbourhood of Chincheng, and **sinina** Gr.-Grsh., from the foothills of the Sinin Mts., are said by STAUDINGER not to differ from the name-typical form; according to GRUM-GRSHIMAILO, who places *lama* with *eros*, the former is more violet-blue and beneath darker, while *sinina* has a broader border than true *venus*. — The species is plentiful and flies on alpine meadows in June and July, ascending in the Pamirs up to 9000 ft. venus.
lama.
sinina.

L. stoliczkana Fldr. is very variable in size and in the markings of the underside. On the whole considerably larger than the preceding insects, above a very brilliant violet-blue, in the shade of *icarus* but with a broader black margin and sometimes with a distinct discocellular spot on the forewing. Underside lighter and more diffuse than in most other species of this group, the red-yellow submarginal markings sometimes absent or very pale, hardly noticeable; on the other hand the underside is much more variegated with white, on the centre of the hindwing, around the ocelli and before the margin, the last being occasionally broadly white. From Kashmir. — **ariana** Moore (80 e), which name BINGHAM treats as a synonym, are according to STAUDINGER-REBEL the larger specimens, such as are found typically beyond the boundary of the Palearctic territory in North India, but occur also already in Southern Kashmir. — **hunza** Gr.-Grsh. (80 e) are very large specimens with almost entirely white underside, the ocelli and russet-coloured marginal spots being reduced to weak vestiges; from the Pamir. — A very remarkable form has been discovered a few years ago at Khamba-Yong (Tibet): **arena** Fawc. The hindwing beneath bears only one ocellus, *arena*. stoliczkana.
ariana.
hunza.

¹⁾ Plate 80 row d fig. 4 *eroides* is erroneously spelt *erotides* ♀.

which is placed below the centre of the costal margin; at the apex of the cell there is a white triangular smear, towards which another is directed from the middle of the outer margin. Distal margin beneath white, with minute black dots, before it a russet-red lunate line. — This species is widely distributed, being in Kashmir the commonest Blue and going up to 15 500 ft. in the Pamir. In the north of its area it flies on pastures in high situations, in June and July; in the south it appears to occur everywhere and throughout the year.

superba. **L. superba** Stgr. (= *magnifica* Gr.-Grsh.) (80 f). A very easily recognized insect, as the brilliant blue colour of the upperside of the ♂ is restricted to the costal and basal areas of the forewing, forming also streaks along the main veins; the hindwing is dark grey and has only when the sun shines upon it a light, grey sheen, which is mainly caused by the hairs. The underside has large ocelli with large pupils, which are partly elongate-ovate. ♀ above brown, with yellowish red spots anteriorly, at once recognized by the underside. — In the Pamir, caught in June at 6000 ft.

dagmara. **L. dagmara** Gr.-Grsh. (80 f). The ♂ strongly recalls the preceding form, but is considerably smaller: the blue colour is restricted to the basal half of both wings, and is not extended along the costa to the apex as in *superba*. The ♀ is paler, only the hindwing shows distinct russet-yellow marginal lunules, of which there are also traces in the ♂. The ocelli of the underside are much less enlarged and prominent in both sexes, those of the hindwing being especially very much smaller and delicate. — In Turkestan, Bokhara, in June, at 5—10 000 ft.

actinides. **L. actinides** Stgr. (80 f). Above very similar to *icarus*, the ♂ of the same violet-blue, the ♀ black-brown with russet-red marginal spots. The underside quite different, bearing a white median streak from the base of the hindwing to the centre of the distal margin; in the disc of the hindwing sparse and inconspicuous ocelli. The margin of the ♂ often without any spots. — In the Pamir, at 4000 ft. in June and July, on steppes locally plentiful. The species has a quiet flight and flies only short distances, so that GRUM-GRSHMAILLO was able to obtain over 50 specimens in two hours in the overgrown dry bed of a brook.

candalus. **L. candalus** H.-Schöff. (= *cornelia* Frr.) (80 f, erroneously spelt *candalus*). This small butterfly looks like a tiny *icarus* on both sides and in both sexes. The very light underside has extremely small ocelli and very thin dull russet-yellow marginal spots, which are variable in size. The median streak which runs from the discocellular spot towards the centre of the outer margin on the hindwing beneath is usually distinct, wedge-shaped and pure white. The forewing above has a thin but distinct discocellular spot, which is always absent in *icarus*. — In Anterior Asia, the Taurus Mts., Mesopotamia, Turkestan, Asia Minor and Syria; from May until July in valleys and on the lower hills (STAUDINGER).

icarus. **L. icarus** Rott. (= *alexis* Scop. *thetis* Esp.) (80 f, only the uppersides). ♂ above bright violet-blue, almost hyacinth-blue; ♀ black-brown with reddish yellow marginal spots. Beneath the ground-colour is dust-grey in the ♂ and brown-grey in the ♀, the base being dusted with blue; the ocelli are numerous and the marginal area bears orange-spots. Throughout Europe, North Africa and North Asia, extending from Finmark to the Sahara and from the Canaries to the coasts of the Pacific, in Asia southward to Kashmir and Baluchistan; absent from Japan. The species varies geographically so very little that the names proposed for geographical races can hardly be maintained. — In the high North of Europe (Scandinavia) the ♂♂ have on the underside a purer ground-colour, with which the ocelli and especially their white borders are said to contrast more strongly; this is **septentrionalis** Fuchs. — **sibirica** Fuchs is larger and particularly more broad-winged; the ocelli of the underside are more diffuse. From Siberia. — In the extreme south, in Mauretania and Sicily, the ♀♀ are said to have a paler upperside and an especially broad and continuous red submarginal band: ab. **rufina** Oberth. (80 g). — In Anterior Asia occurs **persica** Bien. (= *turanica* Rühl) (80 g), in which the underside is very pale, with the ocelli but little contrasting and the russet-yellow submarginal spots almost entirely obsolete. — Similar specimens occur occasionally here and there also in the West, but with the characters of *persica* less marked or only indicated; this is ab. **semipersica** Tutt. — **kashgarensis** Moore (80 g), with which the Syrian **lucia** Culot appears to be identical has a deeper blue on the upperside of the ♂, the ♀ being thinly dusted with dispersed blue scales. The underside of both sexes with very thin ocelli. From Turkestan. — **yarkandensis** Moore, with the ♀ above very densely dusted with blue, but otherwise like the preceding form, came from the neighbourhood of Yarkand. — The number of named aberrations is enormous, especially in the ♀. In ab. **fusca** Gillm. the red-yellow submarginal spots are absent above. ab. **caerulescens** Wheel. has the base of the wings dusted with blue above. In ab. **caerulea** Fuchs (= *glauca* Maas., *casanensis* Krulik.) (80 g) the blue on the upperside of the ♀♀ almost extends to the red-yellow submarginal spots. In ab. **amethystina** Gillm. it extends even beyond them. In ab. **amoena** Schultz the red submarginal spots are modified into rays. ab. **pallida** Tutt has a paler upperside, often with pale whitish spots. In ab. **angulata** Tutt such spots form an elbowed row before the red-yellow lunules. In ab. **clara** Tutt the blue of the ♂ is much lighter, almost as in *bellargus*, and has a very strong gloss, the red-yellow submarginal

spots of the ♀ being shaded with blue. ab. *semiclara* Tutt are ♀♀ in which the bright *bellargus*-like blue extends only to the centre of the wing. ab. *celina* Aust. (80 g) has black dots before the distal margin of the hindwing — The underside varies even more than the upper. It is occasionally unusually dark brown: ab. *brunnea* Gerh. The basal ocelli of the forewing present in ordinary specimens may be both absent: ab. *icarinus* Scriba (= *thersites* Gerh.) (80 f, last figure of the row, erroneously named *icarus*). Or only one basal ocellus is present: ab. *iphis* Meig. On the other hand the ocelli of the forewing beneath may be united above the hindmargin, either forming small streaks: ab. *striata* Tutt, or occasionally a small arc: ab. *polyphemus* Esp. (= *melanotoxa* Pinc., *arcuata* Weym., *arcua* Farre). In ab. *icadius* Gr.-Grsh. (80 g), which occurs particularly in Anterior Asia, the borders of the ocelli are almost of the same colour as the ground and therefore scarcely visible, being much too distinct in our figure. The hindwing, moreover, has a slightly different shape in this form, which is perhaps on the way to develop into a local race. — *pseudocyllarus* is the name given by VERITY to a specimen caught near Florence which is said to be superficially similar to *cyllarus*. — As in other common species so also here occur specimens in which the aberrant characters are combined in various ways, which has led to the creation of double names (*cyano-cuneata*, *icarus-cuneata*, *albo-ocellata*, etc.). — Egg flattened, reddish brown, varying in size according to race and sometimes brood. Larva pale green, covered with thin and short light hair, with a dark dorsal line, at each side of which there are triangular oblique smears; head black, lateral line pale yellowish; on segment 7 a transverse gland, on segment 8 two reversible tubules bearing belts of hair at the tips. When the larva was irritated by ants the gland gave off drops of liquid in quick succession, which the ants sucked up greedily (RAYWARD). The larva feeds on Lotus, Ononis, Sarothamnus, Genista, Trifolium and Fragaria; of the last-named plant it also attacks the fruit, burying itself sometimes entirely in the strawberry. From April to September. Pupa glossy dark brown-green with dark dorsal line and yellow spiracles. The butterfly flies from May until about October, common everywhere on flower-covered field-paths, at the edges of woods and on sunny slopes. Their flight is rather fast and sometimes sustained. They rest in day-time with half-open wings, while they sleep at night with closed wings on Umbellifers, Scabious, etc. In the south occur three overlapping broods. ab. *icarinus* predominates in the second brood in many districts.

L. devanica Moore. A large and fine species, which only enters the Palaearctic territory at its southern boundary in Kashmir. As large as *euphemus*, above blue in the basal area of both wings, very glossy in the ♂, with sooty black marginal area. The underside dark sooty brown, the ocelli with very heavy pupils, those before the margin situated in a yellow halo. The forewing above has a very distinct discocellular spot in the ♂. — The species is doubtless very close to the following one, as noted by ELWES, especially in the dark colour of the underside, but is twice its size. „Probably only a race of *sarta*“ (BINGHAM). Has so far only been observed in the Dras valley in Kashmir, where it is plentiful, in July.

L. sarta Alph. (= *phryxis* Stgr., *devanica* Gr.-Grsh.) (80 h, not *sartha*). Similar to the preceding, but considerably smaller. The underside has likewise the ground-colour dark violet-grey or chocolate, and the hindwing beneath bears a white median streak. Specimens from Turkestan are more uniform in colour beneath, Kashmir individuals more variegated with white. ab. *caeruleata* Rühl-Heyne are ♀♀ whose upper side is more strongly dusted with blue. — Turkestan; Kashmir (Chitral).

L. amandus Schn. (= *icarius* Esp., *corydon* Thunb., *amanda* auct.) (80 h). Resembling *damon* in shape and size and in certain local varieties also in the upperside of the ♂. In true *amandus*, however, the ♂ is above much deeper blue with a slight violet sheen, so that the ♂♂ look like gigantic *icarus*, from which they are however distinguished at a glance by the costal margin being broadly shaded with black. Also the underside recalls a large *icarus*, but the basal ocelli are always absent from the forewing. In South and East Europe, wanting in England and the whole North-West, as well as the greater part of Germany and France. Occurs from Spain to Central Asia and from Scandinavia and Denmark east- and southward to Greece and Asia Minor. In ab. *caeca* Gillm. the discal row of ocelli is absent on the underside. In ab. *confluens* Schrk. some of the spots of the underside are confluent. ab. *stigmatica* Schultz has black marginal dots on the upperside of the hindwing. In ab. *argentea* Lampa, recorded from Sweden, the ♂ has the ground-colour of the upperside modified into silvery grey. — In the form *lydia* Krul. (80 h), from South Russia, the blackish grey shading at the costal margin of the forewing above is absent, the wings having only a narrow black edge; the red submarginal spots of the underside are larger. — *orientalis* Stgr. (80 h) has likewise a narrower black border to the forewing above in the ♂, but the red spots of the underside are rather smaller, certainly not larger than in name-typical *amandus*; from Anterior Asia. — In *amatus* Gr.-Grsh. (80 h) the upperside of the ♂ is much more glossy and more blue-green instead of violet-blue; the underside is purer dust-grey. The ♀ resembles the ♀ of *L. escheri*. From the Pamir. — *turensis* Rühl is larger, the blue of the ♂ is as in the name-typical form, the underside strongly spotted; the red submarginal spots in the ♀ present also on the forewing, which happens sometimes also in *amatus*; from Turkestan. — *amurensis* Stgr. (80 h) is brighter and lighter blue above, the underside bears larger and more distinct dark spots. From Lake Baikal through Amurland to Askold. — Egg flattened, white, minutely reticulated; the meshes of the network polygonal, the corners projecting like the spines of a sea-

urchin (GILLMER). Larva densely clothed with minute hair, the segments dorsally strongly swollen, dark green, with black head and pale-edged red-brown dorsal line, which is accompanied by small brown spots, lateral stripe whitish. Until June on *Vicia cracca*. The butterflies are on the wing from July onward, in the extreme south (Greece) already at the end of May, and fly in the same places and in the same way as *icarus*. In the East they are plentiful almost everywhere, but in the West they are only found singly and sporadically, being absent from large districts.

myrrha. **L. myrrha** H.-Schäff. As large as the preceding, but the blue colour is not that of *icarus*-♂, but the glossy light blue of *eros*. The underside very pale, in the ♀ always, in the ♂ sometimes with a distinct white median streak on the hindwing from the discocellular spot to the centre of the outer margin. The hindwing above nearly always with distinct spots at the distal margin. — In the form **myrrhina** Stgr. (80 i) the ♂ is greenish blue above, the margin being more broadly shaded with black, especially on the forewing, therefore slightly recalling *coridon*. — Both forms are so far only known from Asia Minor.

isaurica. **L. isaurica** Stgr. (80 i). Much smaller than the preceding insects, about the size of *eros*, which it closely resembles. The upperside almost exactly as in *eros*, but the underside much lighter, purer in colour, and more sparsely spotted, particularly the black marginal spots entirely absent or very weakly indicated. The ground of the hindwing with a strong yellowish tinge, and in a strong light one can also recognize the very indistinct median streak, but the base shows only slight traces of blue scaling. — In southern Asia Minor, in May and June; in the Lebanon from 4 to 5000 ft. common everywhere (MARY DE LA BECHE).

hylas. **L. hylas** Esp. (= *dorylas* Hbn., *argester* Bgstr., *thetis* Esp. (♀)) (80 i). Of the size of *myrrhina*; ♂ above of a very glossy and peculiar blue; the ♀ often smaller than the ♂, black-brown, with or without reddish marginal spots. The underside is unmistakable, the ocelli being reduced to a very few so, that the white forewing is usually without markings from the base to the reddish yellow submarginal spots. Central and South Europe as far as Asia Minor, according to SLOPER also obtained in England (at Dover).
obsoleta. ab. **obsoleta** Gillm. (= *glycera* Schultz) are European specimens in which the sparse ocelli of the hindwing beneath are on the road of becoming obsolete. — There exists also a geographical race with obsolescent ocelli, which is distinguished by the fringes being longer and white above; this is **armena** Stgr. (81 a), from Asia Minor, of which identical specimens are said by HORMUZAKI to occur also in the Bukovina. — Very conspicuous is ab. **metallica** Farre; this is the name for ♀♀ whose upperside bears near the base of both wings or only on the forewing intensely bright metallic blue spots, whose glitter can be distinctly perceived even in the flying specimen and which gives the insect a very strange appearance. ab. **nigropunctata** Wheel. has black submarginal dots on the hindwing above. — **nivescens** Kef. (= *albicans* Dup. & Gerh.) (80 i) is a form flying in Spain on limestone. The upperside of the ♂ is dull grey-violet with a white silky gloss, similar to *dolus menalcas* and *coridon albicans*. — Larva very similar to that of *icarus*, dark green, with black head, blackish dorsal line and yellow side-stripe; at each side of the dorsal line yellowish smears. In May and again in August on Thymus, Trifolium, Melilotus, Medicago, etc. The butterflies are partial to limestone soil and sand, and their occurrence is therefore rather sporadic, but they are plentiful in many districts. They fly in May and again in July, and like to drink on damp places on roads.

meleager. **L. meleager** Esp. (= *daphnis* Bgstr., ♀ = *endymion* Schiff.) (81 a). ♂ very large and very light sky-blue, strongly glossy, with a very narrow black margin. Underside pale grey-brown, with the base dusted with blue, the ocelli but little prominent and those near the margin of the hindwing very weak. ♀ at once recognized by the dentate anal portion of the outer margin. From Central and South Germany, Switzerland and South France throughout South-East Europe and Asia Minor to Syria and Kurdistan. —
limbo-punctata. ab. **limbopunctata** Schultz are ♂♂ with black marginal spots on the upperside. ab. **steeveni** Trk. (81 a) are strongly darkened ♀♀, which have a very wide distribution among ordinary specimens, but are more frequently found in the East, in Greece, Asia Minor, etc. — **versicolor** Rühl-Heyne is a form from Mesopotamia with the upperside very light blue and the marginal spots of the underside entirely obsolete. —
ignorata. **ignorata** Stgr. (81 a), from Akbès in the south-western Taurus, is very peculiar as regards colour; the upperside of the ♀ is traversed by many shadowy streaks situated on the veins; the hindwing of the ♂ is likewise dentate in the anal portion, while in the ♀ the teeth are so strong that they form 2—3 short tails. — Larva green with yellow swellings; spiracles black. Until June on Thymus, Orobis, Astragalus, and Coronilla. The butterflies in July and August; they are partial to limestone soil and occur singly in hot valleys, more in the hills and plains than in the mountains; on meadow-flowers, singly.

escheri. **L. escheri** Hbn. (81 a, b). ♂ and ♀ above similar to *icarus*, but much larger; the underside more prominently spotted, with more numerous ocelli, but the forewing beneath always without basal ocelli; the ground-colour of the underside in the ♂ more shaded with grey and in the ♀ sometimes darkened to a chocolate-brown; moreover, the discal row of ocelli of the hindwing is more proximal, standing nearer the discocellular spot than in *icarus*. Southern Europe, from Spain to the Balkan Peninsula, northwards extending into the Alps. ♀♀ with the upperside strongly dusted with blue are ab. **subapennina** Tur. —
subapennina. **dalmatica** Spey. (81 b) is the form from Dalmatia; the ♂ is lighter blue, more similar in colour to *hylas*

than to *icarus*; the black margin, which is very narrow in *escheri*, is here broader, and the hindwing above bears very weak traces of dark spots at the margin. If these spots are especially distinct, we have ab. **punctulata** *Wheel.* — Egg of the usual flattened form, pure white, with small projections at the corners the meshes of the minute network. Larva until April on *Astragalus* and *Plantago*. The butterflies commence to fly at the end of June, occurring in mountain valleys, singly but not rarely; they have a rather clumsy flight and frequent especially the beds of brooks.

L. bellargus *Rott.* (81 b). Of the size of *icarus*, but the ♂ above of a very light and glittering sky-blue; the ♀ dark brown, with a red submarginal band and on the forewing a black discocellular spot. The underside bears some resemblance to that of *coridon*, as the rings of the ocelli are large and contrast conspicuously with the brown ground, which is especially dark in the ♀. Central and Southern Europe, as well as Anterior Asia as far as Kurdistan. — Of aberrations in the upperside we mention first the very light blue and very strongly glossy ab. **adonis** *Hbn.* The opposite development is found in ab. **pallida** *Tutt.*, which is duller and more lilac than ordinary *bellargus*. ab. **suffusa** *Tutt.* (= *ezekelii* *Aign.*) has the blue shaded with plumbeous, which lessens the brilliancy of the colour. ab. **ceronus** *Esp.* (81 c) are ♀♀ whose upperside is strongly dusted with blue. — **polonus** *Z.* (81 c) is found only in certain districts in East Prussia, Russia, Syria and Spain; the light blue colour is shaded with silvery, the black border is somewhat broader and the hindwing bears dark dots at the outer margin. — ♀♀ with the red submarginal band of the upperside very broad are ab. **latefasciata** *Schultz.* — In Algeria flies a form which has a magnificent glossy blue upperside, is usually somewhat larger than Central European specimens and has distinct black spots before the distal margin of the hindwing above; this is **punctifera** *Oberth.* (81 c). — Also in Europe occur occasionally specimens with traces of some submarginal dots on the hindwing above, without the other characters of *punctifera*; *AIGNER-ABAFI* named this form ab. **parvipuncta**. If such dots are present on the forewing, we have ab. **puncta** *Tutt.* The ocelli of the underside may either be so enlarged that some become confluent (*confluens* *Aign.*, *striata* *Tutt.*), or they may become obsolete: ab. **krodeli** *Gillm.* (= *cinnides* *Styr.*, *adonis* *Hbn.* pt.) (81 c). The specimens in which only the usually present basal ocelli of the forewing are absent are ab. **saphirus** *Meig.* — Egg semiglobular, with the top somewhat impressed, pale green, reticulated with white. Larva bright leaf-green, with dark dorsal stripe accompanied by small orange yellow spots, which form two subdorsal lines; similar yellow stripes on the sides; head black. Until April and again in the summer on *Hippocrepis* and *Coronilla*. Pupa green or brown, with a dark stripe on the back, on or close to the ground. The butterflies are on the wing in May and June and again in August, in the South a third time in September and October. They love open places, fallow ground, young plantations and sunny slopes; they rest in day-time with open wings and sleep on Umbels, Thistles, and Scabions, also on stalks of grass, keeping the wings tightly closed. When disturbed they fall with a jump into the grass. They are common at their flight-places in most districts and occur in mountains up to 7000 ft.

L. coridon *Poda* (81 c, d). ♂ above light blue green with a silvery glitter, the black margin of the forewing broad, the hindwing with dark dots at the margin. The underside light violet-grey on the forewing, brownish on the hindwing, variegated with white and bearing yellowish red submarginal spots; both wings very densely ornamented with ocelli. ♀ above russet grey-brown, beneath earth-brown and like the ♂ with very numerous ocelli. The area of distribution is essentially smaller than in most Blues, being apparently entirely restricted to Central and South Europe. The species occurs from England, Pomerania, and St. Petersburg southwards to Spain, Italy and Brussa, and from the Pyrenees to Orenburg. Although the species is very uniformly developed, quite a number of forms have been provided with names, being partly based on very minute differences. We deal first with the variation of the upperside. — **hispana** *H.-Schäff.* (= *aragonensis* *Gerh.*), from Spain, is paler with the distal margin more strongly spotted. — **apennina** *Z.* (81 d) is on the whole paler, the dark marginal border of the forewing being lighter in consequence of an intermixture of the ground-colour; from Italy. — The Greek form **graeca** *Rühl-Heyne* is quite similar. — **rezniceki** *Bartel*, from Northern Italy, is a transition to the previous; according to the description the upperside of the ♂♂ is still paler. — **albicans** *H.-Schäff.* (81 d) is the lightest form, which is almost white above; it flies on limestone in Spain, sometimes as the only form, sometimes in the company of *hispana* (*RIBBE*). — **caucasica** *Led.* (= *ossinar* *Gerh.*) (81 e) extends on to the Asiatic continent, flying in Armenia and at the Black Sea. The upperside of the ♂ is brighter blue. — In specimens from the Taurus Mts. even a slight violet sheen is present, especially in the outer area of the wings; this is **corydonius** *H.-Schäff.* (= *olympica* *Led.*) (81 d). — The blue colour of the ♂ may occasionally appear also in the ♀, being sometimes restricted to the base — ab. **semibrunnea** *Mill.* (= *semisyngrapha* *Tutt.*) — sometimes occupying the whole upperside: ab. **syngrapha** *Kef.* (= *mariscolore* *Gerh.*) (81 d). On the other hand the blue upperside of ♂♂ may be dulled by a grey suffusion: ab. **suffusa** *Tutt.* Other accidental forms are ♂♂ with red spots at the margin above: ab. **suavis** *Schultz.* and ♀♀ with such spots: ab. **aurantia** *Tutt.* In ab. **inaequalis** *Tutt.* the glossy blue colour forms irregular streaks on a dark ground. In ab. **marginata** *Tutt.* the black margin is broadened. In ab. **fowleri** *South* the margin is white

punctata, instead of black, while in ab. **punctata** *Tutt* the margins are spotted. ab. **calydonius** *Lowe* has the ground-colour darkened and the black borders enlarged. — Equally variable as the upperside is the under surface. The ground-colour beneath may be very dark (especially in certain ♀♀) or remarkably pale; the latter is the case in ab. **pallida** *Tutt*. The ocelli may be distorted into rays: ab. **striata** *Tutt*. Some of the ocelli may be united: ab. **tiphys** *Esp*. They may be increased in number: ab. **luxurians** *Courv.*, or they may be reduced (ab. *privata*, *unipuncta*, *impuncta*) or all be absent: ab. **cinnus** *Hbn.* (= *solmi* *Rühl*) (81 d). Moreover, all these variations may be more or less slightly developed or vestigial (ab. *semiaurantia*, *caeruleo-marginata*, etc.), or various aberrational characters may be combined in one individual, as for instance in *parisiensis*. ab. **parisiensis** *Gerh.*, which is an ab. *syngrapha* with the ocelli as in ab. *tiphys*, etc. — Egg greenish white, with minute pale reticulation, the meshes being hexagonal. Larva bright blue-green, beneath paler, the dorsal line appearing dark owing to the dorsal vessel, accompanied by chains of yellow spots, a similar but duller row of spots above the abdominal legs. Until June on Hippocrepis, Coronilla, Astragalus, Vicia, etc. Visited by *Formica flava*, which is attracted by the dorsal gland. Pupa rather slender, smooth, dirty yellowish brown, with dark dorsal line and on the wing-cases pale smears, free on the ground, often under stones. The butterflies occur from June till August, being rare in some places, exceedingly abundant in others; they are everywhere found in particular localities. They have a rapid flight, which is also more sustained than in most other Blues, and go early to sleep, settling for the night with closed wings on stalks of grass or on the top of flowers while it is yet full day-light. This offers the best opportunity for collecting aberrations, since the ocelli of the underside are so clearly visible that one can pick out without difficulty and put into the cyanide bottle what one requires.

marcida. **L. marcida** *Led.* Scarcely half the size of *coridon*, the ♂ above of a similar aeneous gloss, but with a narrower border. The underside of the forewing entirely without basal ocelli. The fringes uniformly white above. — Persia.

glaucias. **L. glaucias** *Led.* (81 e). ♂ above dark iron-grey, aeneous, ♀ dull dark brown. The underside quite different from that of *marcida*, more like the underside of *coridon*, with many ocelli; the eye-spots of the forewing mostly unusually large, the basal ocelli being present; on the hindwing a white smear from the apex of the cell to the outer margin. — Persia (Shakuh), singly, in June.

aedon. **L. aedon** *Christ.* (81 e). Above similar to *glaucias*, iron-grey, dull with a metallic greyish blue sheen; ♂ above without distinct discocellular spot. Beneath leaden grey, without reddish yellow submarginal spots, the forewing with one ocellus near the base in the cell, the ocelli of the discal row large on the forewing, ovate, oblique, the ocelli of the hindwing smaller, reduced in number; the median streak of the hindwing beneath white, commencing at the central lunule. — Persia, in July.

erschoffi. **L. erschoffi** *Led.* (81 e). At once recognized by the costal area and basal portion of the median vein bearing in the ♂ a strong bright violet gloss. ♂ and ♀ are moreover easily recognized by their undersides: the ocelli of the discal row of the forewing are very heavy and black, and the clear brown ground of the hindwing is traversed by a long white mesial streak. Persia. — A ♂ from Askabad in Turkestan which is larger and has no discocellular spot on the forewing above and entirely white fringes, has received the name **tekkeana** *Christ.* — The butterflies occur in May, and are the commonest Blues in the neighbourhood of Shakuh according to CHRISTOPH.

admetus. **L. admetus** *Esp.* (81 e). ♂ and ♀ above dull dark brown, without metallic blue or aeneous gloss; the discocellular spot of the forewing and the black veins mostly distinctly contrasting. The hindwing, especially of the ♀, bears often obsolescent reddish anal spots. Underside somewhat paler brown than upper, with distinct ocelli, but no basal ocelli on the forewing. In South-East Europe, from Hungary and *ripartii*. Galicia through the Balkan Peninsula and Asia Minor to Mesopotamia; also in Spain. — **ripartii** *Frr.* (81 f), has on the hindwing below a white mesial streak which extends from the base to the outer margin. More widely distributed than *admetus*, being found in the Alps, South France, in eastern Europe, Asia Minor, Persia and Turkestan. — Egg at first greenish, later on white. Larva on *Onobrychis cristagalli*. The butterflies are on the wing in June and July and fly on slopes with sparse vegetation, settling particularly on lavender. They are plentiful in most places where they occur.

mithridates. **L. mithridates** *Stgr.* (81 f). Similar to the preceding species, both sexes being as in *admetus* dull brown above without markings, but the underside is much paler, dull dust-grey, so that the rather small ocelli contrast but little with the ground, especially on the hindwing. — In Asia Minor, in June and July.

dolus. **L. dolus** *Hbn.* (= *lefebvrei* *Godt.*) (81 f). ♂ above with a light, silky, grey-blue gloss, nearly as in *coridon*, but this gloss is restricted to the outer half of the wing, the proximal half being a dirty brown. ♀ above dark brown with darker veins, resembling almost exactly a ♂ of *ripartii* on the upperside. Underside rather similar to that of *admetus*, clearer, with smaller ocelli and without white mesial streak. In *vittata*. South France, and Northern and Central Italy. — ab. **vittata** *Oberth.* (81 f) are specimens with a whitish *menalcas*. mesial streak on the hindwing beneath; from the Cevennes (Lozère). — **menalcas** *Frr.* (= *epidolus* *Frr.*) (81 g) is a form from Anterior Asia (or a distinct species?) which has a paler underside, smaller ocelli

and a very distinct, sharply defined mesial streak on the hindwing beneath. In the ♂ the brown colour of the upperside is restricted to the forewing and here concentrated into a dirty brown patch. Turkey and Asia Minor to Turkestan. Larva green when young, later on violet; until June on *Onobrychis* and *Medicago*. The butterflies from June till August, locally plentiful, especially flying on fields of *Espareet*.

L. hopfferi H.-Schäff. (81 g). ♂ of the same ground-colour as *menalcas*, but above without the dirty brown spot at the base of the forewing, and beneath with such a pale ground-colour that the whitish mesal streak is hardly discernible. The ♀ almost like a *dolus*- or *ripartii*-♀, but the underside with the marginal spots more distinct and the ocelli quite small. Asia Minor and Kurdistan. — **hadjina** Heyne. *hadjina*. Rühl (81 g) is larger and has no mesal streak on the hindwing beneath: the ocelli are reduced to minute dots; from Mesopotamia.

L. phyllis Christ. (81 g). ♂ above sea-green, with a silvery silky gloss; ♀ dark brown, with a distinct discocellular spot on the forewing. On the underside both sexes have a very sharply defined conspicuous mesial streak which extends from the base across some ocelli to the outer margin. From Persia. — **posthumus** Christ. (81 h) is a mountain-form. The ♂ beneath much more dusted with verdigris at the base, usually smaller and the upperside of a more bluish tinge. ♀ strongly marked with dark, the veins deeper black and more prominent. At Shakuh, but only at higher altitudes (9—11 000 ft.), while *phyllis* flies in abundance already low down in the valley.

L. damon Schiff. (= *biton* Sult.) (81 h). ♂ large, brilliant shy-blue with a greenish tinge, the margin broadly black, the bright brown underside with or without ocelli, but always with a sharply marked white mesial streak. ♀ dark brown, above sometimes without traces of reddish submarginal spots. Central and South Europe, throughout Anterior and Central Asia as far as the Tian-shan. — Specimens entirely without ocelli on the hindwing beneath are ab. **gillmeri** Krod. (= *caeca* Agn.), while individuals with the ocelli distorted into oval spots or streaks, produced by KRODEL by low temperature, are ab. **extensa** Krod. In ab. **agrophomena** Verdy the white streak of the underside is obsolescent, while ab. **ferreti** Farre is a dwarfed form of the ♂ with narrow border on the upperside. — Larva greenish yellow, finely and densely hairy, alternately striped with paler and darker green, the head being brownish and the side-line darker or paler yellow; until June on *Espareet*. The ants are so much after it that the presence of some larvae in a breeding cage in a room is sufficient to bring into the house whole crowds of ants, which gather about the cages, sometimes as many as ten ants being found on one larva. Pupa ochreous, above greenish, darker along the back. The butterflies occur in July and August on fields of *Sainfoin* and do not venture far away from them. They are plentiful where they occur.

L. damone Er. (81 h). At once distinguished from *damon* by the quite different tint of the blue in the ♂; the name-typical form, moreover, has a narrow black border. The white mesial streak of the hindwing beneath is either absent or present, but in the latter case is mostly much less conspicuous, diffuse, obsolescent or shortened. ♀ above dark brown, usually with obsolescent reddish yellow submarginal spots on the hindwing. In the southern Ural, ab. **damocles** H.-Schäff. is a rare aberration whose ♂♂ is smaller, very bright sky-blue, bearing on the thin black border of the hindwing dark triangles resembling diffuse marginal dots. — **damonides** Stgr. (81 h. i), from Transcaucasia and Persia (e. g. at Shahrud) is larger, darker above and beneath, the ground-colour of the underside being dark chocolate-brown; the white mesial streak, though prominent, is thinner and shorter. — **sibirica** Stgr. (= *altaica* Eluc.), from the Altai, is smaller and has the base of the wings more brightly dusted with blue beneath. — **carmon** H.-Schäff. (= *kindermanni* Led., *alpestris* Frr., *euryphilus* Gerh.) (81 i) is much smaller than all the other forms of *damone*; the ♂ bright cyanous blue, with broad black border to the forewing. From Asia Minor (Taurus), Armenia and Persia. — **transcaspica** Stgr. is lighter blue above and darker brown beneath; from Turkestan. — In **cyanea** Stgr. the ♂ has nearly the same colour as the ♂ of *icarus*, with distinctly black veins and thin black border; the costal area is a lighter blue and contrasts with the rest of the wing. Armenia. — **xerxes** Stgr., from Shahrud in Persia, is still smaller, the underside paler with the mesial streak entirely obsolete or nearly. — **iphigenia** H.-Schäff. (81 i) is again similar to *damon*, above more greenish blue, with broad black border, the costal and apical areas of the hindwing also being black. The underside is paler and has smaller ocelli. Asia Minor and Persia. — **iphidamon** Stgr. (81 i) is somewhat larger than the preceding form and the dark border is deeper black; from the Taurus, Kurdistan and Persia. — **juldusa** Stgr. (= *iphigenia* Alph.) (82 a) is more greenish blue above, the black scaling so extends from the black border over the blue ground that the border gradually fades away. From the Tian-shan. According to ALPHERAKY very local and flying about a low plant with blue flowers. — **iphigenides** Stgr. (= *melania* Gr.-Grsh.) (82 a). Much larger than *juldusa*, above very similar to *iphigenia*, but both sexes beneath with yellowish red marginal spots on the hindwing. Turkestan. — **melania** Stgr. Upperside of ♂ more green, with very broad border; the underside yellowish grey, with larger ocelli and yellowish red submarginal spots on both wings; from the Pamir. — The butterflies of this species are always local, some races appearing to have a very restricted distribution. They fly in May and June, particularly in desolate stony places where *Oxytropis* grows, and occur up to 10 000 ft.

- actis*. **L. actis** H.-Schäff. (= *athys* Gerh.) (82 a). The smallest form of the whole group, but rather variable in size. The upperside so abundantly and densely dusted with very shiny blue on a deep black ground that it has a wonderful deep blue glitter. The ♀ is dark brown with white fringes and on the forewing a black discocellular spot. Beneath both sexes have very large ocelli on the forewing, the hindwing bearing very small ocelli and a white mesial streak. In Asia Minor, Armenia, Persia and Kurdistan, also already in the Caucasus. — In the form **athys** Frr. (82 a) the margin of the forewing and the whole outer half of the hindwing are devoid of blue scaling, being deep black. In Asia Minor: Konia, Tokat. — The butterflies occur on poor soil, here and there together with forms of *damone* (STAUDINGER), and are not rare where they fly.
- poseidon*. **L. poseidon** Led. (= *damone* Gerh.) (82 a). As large as a large *icarus*, being also similar in colour above, but yet of a more delicate, paler, violet-blue, the black border being very feebly marked on the forewing and very thin on the hindwing, the fringes being long and white. ♀ above similar to *admetus*, sooty black-brown with black discocellular spot and black veins. On the underside the hindwing bears minute ocelli, which are visible only under a lens in some specimens, and a white mesial streak. Asia Minor. — ab. **refulgens** Gr.-Grsh. are ♀♀ from the Pamir which form a kind of transition to *caerulea*, their upperside being feebly dusted with blue. — In the form **caerulea** Stgr. (82 b), from Southern Armenia and Northern Persia, the ♂ has a heavier black border to the forewing and the ♀ a blue-scaled upperside. — **mesopotamica** Stgr. (82 b) is above similar to true *poseidon*, but the ground-colour of the ♂ is different, being more sky-blue than violet-blue, and the white mesial streak on the underside of the hindwing is either absent or obsolescent, hardly recognizable, as are also the ocelli. Asia Minor, western Kurdistan. — **poseidonides** Stgr. has beneath the ground-colour darker, the markings stronger and before the outer margin red spots; the ♀♀ bear also above on both wings a band of red submarginal spots. Pamir, on the whole rare, but GRUM-GRSHIMAILO obtained it once in abundance on a meadow at 4000 ft. The butterflies, as far as it is known, resemble in habits the previous species, flying in June and July on pastures in the mountains and on steppes.
- dama*. **L. dama** Stgr. Larger than all the preceding forms, in size like a large *damon*, the ♂ above of a magnificent brilliant sky-blue which has a somewhat metallic gloss. ♀ similar to the ♀ of *hopfferi*, above sooty black-brown, the hindwing bearing some reddish yellow submarginal spots. The underside of the hindwing without a trace of the mesial streak, otherwise similar to that of *poseidon*. — At Malatia, the end of July.
- gigantea*. **L. gigantea** Gr.-Grsh. (= *ipicles* Stgr.). As large as *iolas* or even larger; the ♂ above not violet-blue, but bright sky-blue. ♀ above quite black, not blue like the ♀ of *iolas*. The underside similar to that of *iolas*, without white mesial streak, but the small ocellus present in *iolas* in the centre of the cell is absent. — Ferghana and Saraf-shan, in May and June, in stony localities and on detritus, the butterflies being found at a yellow Papilionacea.
- iolas*. **L. iolas** O. (82 b, c). ♂ above a magnificent violet-blue, with narrow black border and white fringes. ♀ with broad black margin to the forewing and large black distal marginal dots to the hindwing. Underside dust-grey, with feeble blue dusting at the base of the hindwing; besides the discal row of ocelli only the discocellular bar and two basal ocelli to the hindwing are distinct. The ocelli of the discal row are sometimes more strongly developed (ab. *opulenta* Schultz), sometimes more weakly (ab. *debilitata* Schultz). — In the South and South-East, from Vienna and Hungary southwards to North Africa and eastwards to Persia and Turkestan: also in Spain. Larva in the pods of *Colutea arborescens*, according to the colour of the pod green, reddish or coffee-brown, with dark dorsal line accompanied on each side by pale-bordered blackish oblique smears; until June and again in the autumn, often in the pods together with earwigs and ants (AIGNER). Pupa grey-brown, with dark dots on the sides, in a sparse web on the ground, sometimes lying over into the next year. The butterflies in May and again in July and August, in two (irregular?) broods; they fly usually singly, in localities where the food-plant occurs.
- lycormas*. **L. lycormas** Btlr. (= *scylla* Oberth.) (82 c). ♂ above bright cyaneous blue, not violet-blue like *iolas*, both wings with a broad black margin; the underside with the ocelli as in *iolas*, but the ground not brownish but pale silver-grey. ♀ above black-brown, also beneath with a darker ground-colour than the ♂, being more brown-green. In facies this species recalls a strongly enlarged *cyllarus*, but the latter has only very short fringes, not the long white ones of *lycormas*. — East Asia: Amurland, North China and Japan. The continental specimens, which have been named *scylla*, are a little deeper blue, while Japanese ♂♂ are sometimes very black (PRYER). Common in many places, e. g. at Hokkaido.
- coelestina*. **L. coelestina** Ev. (82 c). ♂ reddish violet-blue (not so deep blue as in our figure), similar in colour to *athys*, with black border and black discocellular spot; hindwing with black marginal dots. ♀ black-brown, with obsolescent reddish yellow submarginal spots. The underside is very characteristic, the hindwing beneath being dusted with bright metallic pale blue from the base close to the margin. In the South Russian steppes, at Sarepta, Orenburg, etc., in the Caucasus. — **alticola** Christ. is a smaller form from Armenia with the ocelli of the hindwing beneath obsolescent, the verdigris-dusting occupying nearly the whole hindwing, and with broader border to the upperside of the forewing. In June.
- alticola*.

L. sebrus Bdv. (82 c). Above dull violet-blue (♂) or black-brown (♀). with the markings of the *sebrus*. underside feebly shining through, narrow black margin and white fringes; beneath light ashy grey, the base dusted with blue, the ocelli and the median spot being very delicate. In the Alps, locally plentiful, southwards to Italy, south-eastwards to Asia Minor and eastwards to the Altai. Specimens with the ocelli prolonged occur also in this species, as proved by a fine specimen in COURVOISIER's collection: ab. *elongata* *elongata*. *Courr. i. l.* — Larva on *Onobrychis* and *Orobis*, until April and again in June. The butterflies in the mountains, sporadic, in May and again from the end of June onwards.

L. persephatta Alph. (82 d, e). Both sexes above black-brown without markings, the fringes white. *persephatta*. Beneath earth-brown, dusted with blue at the base, the ocelli as in *semiargus*, but smaller, those of the forewing being scarcely visible and frequently quite obsolete. In the Tian-shan in Turkestan, 4000—6000 ft. — *minuta* Gr.-Grsh. is a smaller mountain form from the Pamir, without blue scaling on the underside *minuta*. at the base; not below 5500 ft., upwards to 12 000 ft. On steppes, from the middle of May into July.

L. semiargus Rott. (= *acis* Schiff., *argiolus* Fuessl., *argianus* Zett.) (82 e). ♂ above dull but deep *semiargus*. blue, without gloss, with black margin and thin dark discocellular spot; the fringes pure white. ♀ above black-brown, the fringes darkened. Underside earth-grey with blue scaling at the base, distinct discocellular spot and a row of discal ocelli as well as a basal ocellus below the costa of the hindwing. Of the modifications in the ocelli of the hindwing we mention first ab. *spadae* *Hellweger*, in which the ocelli are *spadae*. all absent. In ab. *caeca* *Fuchs* there is only one ocellus on the forewing. In ab. *striata* *Wheel.* *caeca*. *striata*. the ocelli are modified into streaks. The ocelli are enlarged and placed nearer to the outer margin in *aetnaea* *Zett.*, which was (accidentally) found on the Etna. Throughout Europe and North Asia, eastwards *aetnaea*. to the Pacific; also in England, but here rare and apparently disappearing; in Europe and Asia as far north as 68° (HERZ). — *montana* M.-Dür (82 e) is an alpine form which occurs in the higher Alps and the *montana*. mountains of South-East Europe; smaller, the ♂ bright blue above, with broader black distal border. — *bellis* *Frr.* (82 e, f) is above like *montana*, but the hindwing beneath bears traces of yellowish red spots *bellis*. in anal area. — *impura* *Krul.* has dull yellow spots before the whole outer margin, especially on the *impura*. hindwing; from East Russia. — *parnassia* *Stgr.*, from the Balkan Peninsula, resembles *impura*, but is *parnassia*. larger. — In *helena* *Stgr.* (82 f), a small form from the mountains of Southern Greece, the reddish yellow *helena*. spots of the underside form a continuous chain and some of them appear in the ♀ also on the upperside, which is quite generally the case in the still more southern form *antiochena* *Led.* — Larva dull greenish *antiochena*. yellow with brown head, a dark dorsal line and a dark lateral one; in July and in the autumn on *Anthyllis* and *Armeria vulgaris*, in the inflorescences. Pupa light olive-green, the hibernating pupae become brown later on; fastened with anal end at the stem of the food-plant (ASSMUS). The butterflies in May and again in August, in most districts singly but common, flying on broad forest roads and grassy borders of fields. Their flight is rather clumsy and very low, the insects usually keeping quite close to the ground and frequently visiting *Potentilla*, *Ranunculus* and *Trefoil*. In the high mountains the species is one of the commonest on damp places on roads.

L. cyllarus Rott. (= *damoetas* Schiff.) (82 f). ♂ above light cyaneous blue with a violet sheen *cyllarus*. and narrow black border; ♀ darker blue with the black border gradually shading off, so that it occupies nearly the whole outer half of the wings. Beneath silver-grey (♂) or ashy grey (♀), the forewing with 5 or 6 large rounded black spots, the hindwing with small ocelli and in its whole basal half with metallic blue-green dusting. In ab. *dimus* *Bgstr.* the ocelli of the forewing beneath are reduced to 4; on the other *dimus*. hand, they may also be increased in number, or may be elongate (= *subtus-radiata* *Oberth.*). In European Turkey and the neighbouring districts of Anterior Asia the ocelli of the forewing appear to be constantly or at least commonly enlarged, the blue also being darker; this is ab. *tristis* *Gerh.* Throughout Central *tristis*. and Southern Europe, North Africa and North Asia to the Amur; absent from England and Japan. — ab. *andereggii* *Rühl* (82 g) occurs in the Alps (perhaps also elsewhere); it is a large ♀-form which is above *andereggii*. entirely black-brown, the underside being dark ashy grey, with the very large ocelli placed in pale rings. — *blachieri* *Mill.* (82 g) is a very small form from Southern France and the Valais which has beneath only *blachieri*. 4 ocelli on the forewing and very scanty blue-green dusting at the base of the hindwing; above darker and duller blue. — *coelestina* *Mill. nec Ev.* (82 g) is similar to the preceding form; above very dull in *coelestina*. colour, underside with blue-green scaling only in the basal half, the ocelli of the forewing reduced in size, those of the hindwing almost obsolete. — *lugens* *Car.* (82 g) has altogether lost the ocelli of the hindwing; *lugens*. the ♂ is darker blue above, the ♀ being entirely black-brown almost like the ♀ of *semiargus* without any blue; the blue-green scaling on the hindwing beneath is entirely absent or nearly. — *aeruginosa* *Stgr.*, *aeruginosa*. from South Russia, Asia Minor (especially the Lebanon) into Central Asia, has the hindwing beneath entirely dusted with blue-green. — *laetifica* *Püng.*, from the Ili R., has similar underside, but the blue *laetifica*. of the upperside is purer and more brilliant in both sexes; the club of the antenna has a different shape (being more elongate) and is reddish yellow on the innerside, so that PÜNGELER regarded *laetifica* as being perhaps a distinct species. — Larva green or brownish, with reddish brown dorsal line accompanied by dark oblique parallel stripes which stand close together; head black. In June and the autumn on *Cytisus*, *Genista*, *Astragalus*, *Melilotus*, etc. Pupa greyish brown. North of the Alps, where occurs only one brood,

the larva probably hibernates. The butterflies occur singly but are mostly common, being found on clearings in timber-woods and on wide roads, where they flutter along usually 1 to 2 m above the ground, with a slow, straight, flapping flight. They appear in the South in the spring and again from July onwards, in the North only once, at the end of May and in June.

- melanops.* **L. melanops** Bdv. (= *saportae* Hbn.) (82 h). Above similar to the smallest varieties of *cyllarus*, but the ocelli of the forewing beneath are enlarged, usually much more than in our figure; the row, moreover, is strongly curved and the ocelli gradually increase in size from the first to the fifth, the sixth ocellus, if present, being smaller again. In South-West Europe. ab. **elongata** Courv. (= *marchandii* Gerh.) *elongata.* has elongate ocelli; ab. **marchandii** Bdv. is beneath without ocelli. — In North Africa there occurs a considerably larger form with broader black margin to the forewing and somewhat darker underside; this *marchandii.* is **algorica** Rühl-Heyne. — Larva pale green, with thin dark markings; a brownish dorsal stripe and a white side-line, between which a dark green pencilling; head black. Until June on *Dorycnium*. Pupa pale brown, with black dots on the sides. In spring, usually frequent wherever it occurs.
- astraea.* **L. astraea** Frr. (82 h). Similar to *melanops*, the underside of the forewing bearing also here a row of large ocelli; this row, however, has another direction, running from the costal margin obliquely and almost straight to the centre of the distal margin, separating the apical area from the rest of the wing. — Asia Minor and Kurdistan.
- argali.* **L. argali** Elw. This species is said to be allied to *melanops*, but to have the upperside pale silver-grey. — ELWES discovered this insect in the Altai, and considers it possible that *argali* is identical with one of the North American forms of this group (*Nomiades* Hbn.), perhaps with *lygdamas* or *couperi*.
- charybdis.* **L. charybdis** Stgr. (82 h). Beneath almost entirely as in *cyllarus*, but without the verdigris scaling on the hindwing, which shows only slight traces of blue dusting at the base. The upperside of the ♂ much more delicate violet-blue than in *cyllarus*, the ♀ on the contrary quite dark. Specimens without ocelli *exuta.* on the hindwing beneath are ab. **exuta** Schultz. — Turkestan, found in April.
- alcon.* **L. alcon** Schiff. (= *arcas* Esp., *euphemus* Godt.) (83 a). Large, the ♂ above deep blue, but without brilliant gloss. The ♀ black-brown, dusted with dark blue in the basal area. The dark violet-grey underside has numerous ocelli. *L. alcon* is easily distinguished from the following species by the ♂ bearing on the blue disc of the forewing no other black spots but the discocellular lunule. Central Europe and North Asia, from the coast of the North Sea (Hamburg, Bremen, Belgium) to the Mediterranean, and from *nigra.* France to the Altai, Dauria and Tibet. ab. **nigra** Wheel. has the ♂♂ strongly darkened, the ♀♀ being *cecinae.* quite black above. In ab. **cecinae** Hormuz. the ocelli of the underside are absent or strongly reduced. *pallidior.* In ab. **pallidior** Schultz the margin is grey instead of black. — **marginepunctata** Gillm. has a row of black *marginepunctata.* dots before the margin, almost parallel with it: found by HAFNER at Loitsch and other places in Carniola.
- rebeli.* — In the form **rebeli** Hirschke the blue of the upperside is more brilliant and more extended, the dark *monticola.* margin being reduced, in the ♀ only the apical area black; Styria. — **monticola** Stgr. (83 a) has a narrow black margin like *rebeli*, but the blue is very deep and dark, so dull as in true *alcon*; from the Alps of Switzerland and the Caucasus. — Egg white, finely reticulated, laid on the flowers of the food-plant (*Gentiana pneumonanthe*). The larva generally does not break through the shell on the upperside, so that the holes of empty eggs are not easily noticed. At first grey, later on reddish brown with dark dorsal line and dark head. The butterflies occur on damp meadows where *Gentiana* grows; they are plentiful in such places, sometimes even in abundance, from the end of May into July, in the North not before the end of June.
- coeligena.* **L. coeligena** Oberth. As large as *iolas*, above quite uniformly light violet-blue, the apex edged with black. Ocelli beneath as in *cyllarus*, the forewing bearing 4 large black ocelli, the hindwing smaller distal and basal ocelli. In the somewhat larger ♀ the whole apical angle of the forewing and the costal area of the hindwing are black. — In West China, rare, more frequent in Central China (Ichang) in May and June.
- euphemus.* **L. euphemus** Hbn. (= *diomedes* Rott.) (83 a). ♂ above almost entirely blue, but not shining; the margins, the discocellular spot of the forewing and commonly some small spots on the disc black; ♀ much blacker, often a little paler on the disc, this lighter area bearing rows of black spots. Underside with very numerous ocelli, which are rarely as large and conspicuous as in our figure of the underside. The species is at once distinguished from the very similar *arion* by the underside not bearing an ocellus in the cell proximally to the discocellular spot. Throughout Europe (with the exception of England) and the adjacent districts of Asia, from North Germany and Russia to Italy, and from Paris to Dauria. — Near the North-Western boundary there occur especially small individuals (of the size of *icarus*), which *paula.* have but few ocelli; these are ab. **paula** Schultz. In ab. **obsoleta** Gillm. the ocelli of the hindwing are *obsoleta.* entirely absent or almost, while in ab. **striata** Gillm. they are modified into streaks. — **obscurata** Stgr. *obscurata.* (83 b) is a strongly darkened form from Central Asia (also already in the Ural) — **euphemia** Stgr. (83 b) *euphemia.*

is much larger than European specimens, with a broad black border which sharply contrasts with the light blue; from Amurland, North China and and Corea. — **kazamoto** Druce (83 b), from Japan, is above uniformly black-brown above in both sexes, without any trace of blue, and the underside has is more strongly ocellate. — Egg semiglobular with the top sunk in, greenish white, laid on Sanguisorba (usually on the inflorescence). The young larva purplish brown with black head and pale segmental incisions; it bores into the heads of the plant and lives later on in the seed-pods; it hibernates. Pupa on the ground, under stones, clods of earth, and the dead leaves of the food-plant. The butterflies are sporadic, their localities being widely dispersed. They fly in damp meadows where Sanguisorba grows, being here usually very abundant. They settle almost exclusively on Sanguisorba; when disturbed they fly mostly only as far as the nearest cluster of that plant, where they settle on a flower with the wings always closed, their flight being rather slow and flapping. In July and August.

L. arcas Rott. (= *erebus* Knoch) (83 c). ♂ similar to *euphemus*, but the ♀ quite black-brown above; particularly recognizable by the underside being coffee-brown and bearing only one row of ocelli. ab. **minor** Frey are small specimens from Switzerland. In ab. **inocellata** Sohn the ocelli of the underside are reduced, in ab. **lycaonius** Schultz they are entirely absent. In the ♂-ab. **lucida** Geest the forewing above has the blue lighter and more extended and the black discal spots reduced or obsolete. Throughout Central Europe, from Alsatia to the Ural, Caucasus and Armenia, and from Pommerania and the Lower Rhine to Italy. — Egg like that of *euphemus* laid on Sanguisorba. The young larva pale, later on purple-brown and finally probably yellowish-brown, at first at the flowers, later on at the leaves of Sanguisorba. The butterflies have exactly the same habits as *euphemus*, with which they frequently fly together, in July and August; they are usually still more plentiful than in *euphemus* in the places where they occur (damp meadows).

L. arion L. (83 c). Larger, above of a lighter and more shining blue, with a row of black spots across both wings, the spots being sometimes obsolete only on the hindwing of the ♂. At once recognized by the large number of ocelli on the underside, especially on the hindwing, and by the bright blue dusting of the base beneath. Europe and Anterior Asia, from North Europe, the Baltic provinces, and England to the Mediterranean (Corsica), and from Spain to Armenia and South Siberia. In ab. **unicolor** Hormuz. the upperside is entirely blue, all the black spots with the exception of the discocellular one being absent. ab. **arthurus** Melvill is without ocelli beneath. In ab. **jasilkowskii** Hormuz. the ocelli are absent beneath in the cell as in *euphemus*, from which this aberration is at once distinguished by its blue-green basal scaling on the underside. In ab. **coalescens** Gilm. the black spots of the upperside are confluent. — Quite a number of local forms have been separated. Northern specimens, which are feebly spotted, are named **alconides** by AURIVILLIUS. — **obscura** Christ. (83 c) is an alpine form in which the whole outer half of the wings above is black or dark brown; it occurs typically in the High Alps, being locally very plentiful, e. g. at Bergün, Zermatt, Stilvio and at many places in the Alpes Maritimes. This darkened form occurs also in the Ural (= *ruchli* Krulik.) — In the South two aberrant forms have been found, namely **ligurica** Wagn., at the Riviera between San Remo and Bordighera, with a conspicuous row of white marginal ocelli on the upperside of the hindwing, and **aldrovandus** S. L., from the Vesuvius, with the underside darkened with brown. — **cyanecula** Stgr. (83 d) is an Asiatic form, from the Caucasus to Mongolia, with the metallic blue green dusting of the hindwing beneath being abundant, bright, and extending almost to the distal edge. — Egg very flat semiglobular, pale bluish white, deposited on Thymus which just begins to flower. Larva adult pale ochreous, with a pale lilac tinge at the sides; head ochreous, marked with black anteriorly; prothoracic plate black; feeds until the autumn on Thyme, then disappears and is found full grown the next June in the nests of ants. It is therefore suggested that the ants feed it up (FROHAWK) and perhaps also protect the pupae. The chrysalis the colour of amber except for the wing-cases, smooth, somewhat elongate, without web. The butterflies occur usually singly, being locally frequent on open ground, on broad roads through shrubby woods, flying about 1 m above the ground. They rest with closed wings, particularly on Thymes and Scabious. On the wing from the end of June into August.

L. arionides Stgr. (83 d). After the next species the largest Blue; like a gigantic *arion*, but above lighter and more shining blue, the black spots more prominent, very close together, touching each other on the almost quite white, feebly bluish, underside of the disc of the forewing, being separated only by the thin veins. The base beneath with little blue dusting, which is very light in colour and not metallic. — In Amurland, especially near Wladiwostock and on Askold, in July and August.

L. atroguttata Oberth. (83 d, e, form. *albida*). White above and below, duller at the base, beneath with black round dots, which appear also above. DOHERTY erects for this species the genus *Phengaris*, in which the upper discocellular vein of the hindwing is short and elbowed outwards. Almost entirely white specimens like the one figured have been separated by LEECH as ab. **albida** from the rather more bluish grey ones. Both forms fly together at Moupin in West China, but at Chia-ting-fou only the white form

here figured (*albida*) appears to occur. — Widely distributed in West China and plentiful, also in India (Naga Hills).

pryeri. **L. pryeri** Murr. (83 e). Very large, above with a broad dark margin, the basal area violet, in the ♂ the disc also violet, but in the ♀ whitish. Underside white with 2 rows of dark dots near the margin. — In Amurland and Japan, not rare, in June and July. The species looks on the wing like a Pierid. The larva on *Syringa amurensis*, full-grown in June (DOERRIES). This aberrant-looking form might likewise be placed into a separate genus.

35. Genus: **Cyaniris** Dalm.

Delicate and slender Blues, usually with a brilliant gloss on the upperside, and a white underside with small black dots, the ♀♀ with broad dark border. Head small, densely scaled, with very thin, brush-like hairs on frons and at the base of the antennae. Eyes rather small, widely separated by the relatively broad frons, sparsely clothed with minute hairs. Palpi thin, porrect for the length of the head. Antennae thin, mostly less than half the length of the costal margin, with distinctly marked club. Thorax and abdomen delicate and slender, the latter just reaching to the anal angle of the hindwing. Wings very delicate and thin, broad at the distal margin, the costal margin often strongly curved. — The eggs strongly flattened, sunk in at the top, with minute and but little projecting tubercles which are connected by a thin network. Larvae onisciform, green or variegated, elliptical in a dorsal view, very flat beneath, on segment 7 a gland and on 8 two tubercles. Pupa about twice as long as broad, minutely hairy, with straight sides, anteriorly and posteriorly very obtusely rounded, the mesonotum with a slight carina. The butterflies fly higher in the air than all the other *Lycacnini*, their flight being slow and somewhat dancing, the white underside and blue upperside showing alternately. I noticed of several species in China, India and Africa that they were always to be found in the neighbourhood of brooks; *C. albidisca* I always observed swarming over the water, settling occasionally on wet stones in the brook. Most species are not rare. They have several broods and hibernate as chrysalis.

argiolus. **C. argiolus** L. (= *acis* F.) (83 g, h). ♂ above shining violet blue, only the apical portion of the costal margin being minutely edged with white. The ♀ has both wings broadly bordered with dark, the margin of the hindwing bearing vestiges of ocelli. Underside silver-white, in the disc a row of black *parvipuncta* spots, some of which are elongate, and before the margin blackish shadowy dots. ab. *parvipuncta* Fuchs *argalus*, are specimens of the second brood with fewer dots. ab. *argalus* Bgstr. has the black discal dots normal *argyphontes*, beneath, but the black shadows before the margin are wanting. ab. *argyphontes* Bgstr. has likewise no *cleobis*, submarginal spots, but the discal spots are also reduced. On the other hand, in ab. *cleobis* Sulz. the sub-*albocincta*, marginal shadows are likewise developed to a row of distinct lunules. In ab. *albocincta* Tutt the dark *thersanon*, spots of the underside have pale borders. In ab. *thersanon* Bgstr., which is commoner in America than with us, the forewing above bears a thin black discocellular spot. According to the colour of the upperside, which may be more metallic, more violet, etc., a further number of aberrations have been named (ab. *clara*, *lilacina*, *suffusa*). Several aberrational characters may also be united in one individual, which has given birth to names like *albocincta-cleobis*, *pauper-lata*, *lilacina-suffusa*, etc. Widely distributed, occurring throughout Europe with the exception of the coldest districts, North Africa, and Anterior and Central Asia; further local forms are found in a large part of India, the whole of East Asia, and North America.

hypoleuca. — **hypoleuca** Koll. (83 h) is very pure silvery white beneath, the dots being very few in number, very *ladonides*, dispersed and minute, but sharply defined. — **ladonides** Orza (= *ladon* Mén.) is the Japanese form; larger. *kobei*, with a slightly different blue tint, and with more black, in ab. *kobei* Tutt the black may be so much *levetti*, increased that the hindwing of the ♀ only bears a slaty blue discal spot. — In *levetti* Btlr. (= *huegelii* Fics.) the border is broader, especially in the ♂, the underside more grey with the dots strongly prominent; *huegelii*, this is the form from Corea and Amurland. — **huegelii** Moore (83 h) is a large form from Kashmir, with the black border broad and sharply defined; the underside with very distinct and abundant markings *coelestina*, at the margin. — **coelestina** Koll. (= *kasmira* Moore) (83 f) is a somewhat smaller form (perhaps seasonal?) with narrower border and beneath less prominent markings, from the same country. — Egg very flat, whitish. Larva green or brown, marked with yellowish white, bearing catenulate stripes on the back, on segment 7 a gland to attract ants; head brown. On Ivy, Ilex, Evonymus, Rhamnus, Robinia, Genista, Spartium, Astragalus, Rubus, Erica, Pyrus and many other plants; in Europe visited usually by ants of the genus *Lasius*; in June and the autumn. Pupa mostly fastened to the underside of a leaf, ochreous with brown spots and markings. The butterflies in the spring and again in July, occasionally a third time at the end of August and in September, everywhere common, particularly at the flowers of ivy and brambles.

dilectus. **C. dilectus** Moore (83 f). The forewing of the ♂ without any black border, but with whitish scaling on the disc. ♀ with the base dusted with very bright metallic blue, and the black margin not very broad.

Very characteristic is the underside, which is white with black dots and hook-spots, which are especially distinct on the hindwing. — In West and Central China: also in India (Sikkim, etc.), where it is seasonally dimorphic according to DE NICÉVILLE.

C. hersilia *Leech* (83 f). Ground-colour whitish above and beneath, the margin in the ♀ very *hersilia*, narrowly blackish grey, with pale ocelli before the margin. Underside with very few dispersed dots and feeble submarginal lunules. — In Central China (Chang-Yang), in June and July.

C. oreas *Leech* (83 f). ♂ somewhat similar to the ♂ of *argiolus*, but deeper violet-blue and the *oreas*, black apical area of the wings broader. The ♀ too, is darker, being more purplish blue, the underside bearing fewer, but very strongly marked elongate spots. — In West China, up to 10 000 ft.

C. nebulosa *Leech* (83 g). Similar to *oreas*, but the underside more abundantly and brightly spotted, *nebulosa*, the spots arranged in more complete and more regular rows. — Central and West China.

C. vardhana *Moore* (83 g). Easily recognized by the very bright metallic greyish blue gloss along *vardhana*, the veins of the forewing, and particularly by the very conspicuous underside. The latter is snowy silver-white, bearing on the forewing a large black discocellular spot and 4—6 heavy black spots of the discal row. — In Kashmir, Cheena (Nainital), from August to October, appears to be met with but singly. Also in several Himalayan countries belonging to the Oriental Region.

C. albocaerulea *Moore* (83 h). Forewing of ♂ above dark at the base and margins, light on the *albocaerulea*, disc; the hindwing dark only at the base and outer margin. ♀ above rather more shaded with lilac. Underside white, the forewing with markings only at the margin, the hindwing more strongly spotted. — In the North-Western Himalaya; also widely distributed on Indian territory and seasonally variable. Specimens of the wet season are much darker than dry season individuals.

36. Genus: **Taraca** *Nicér.*

Allied to the Indian genus *Spalgis*, but the forewing more rounded, its outer margin convex instead of straight, as it is in *Spalgis*. The hindwing likewise more rounded. The insects are larger, but more delicate, slenderer, less robust, and quite different from *Spalgis* in pattern. The genus has also been placed near *Gerydus*. Which is its proper place, only the life-history will teach us.

F. hamada *Druce* (85 f, g). Above dark brown, the disc of the forewing more (Indian specimens) *hamada*, or less (Palearctic specimens) pale; the black dots with which the whole under surface is covered are visible also on the brown upperside. — In West and Central China as well as Japan; at Yokohama and many places on the west coast in July and August, flying at the Bamboo which grows along the brooks, being local but not rare where it occurs.

Alphabetical List

of the Palearctic Lycaenidae with reference to the original descriptions.

* signifies that the form is also figured in the place quoted.

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| abdominalis <i>Tecl. Gerh.</i> , Monogr. Eur. Schmett. * | albicans <i>Lyc. H.-Schäff.</i> , Syst. Schmett. Eur. * |
| abencerragus <i>Lyc. Pier.</i> , Ann. Soc. Ent. Fr. 1837, p. 21. * | albida <i>Lyc. Leech</i> , Butt. China, p. 317. * |
| acaciae <i>Thecl. F.</i> , Mant. Ins., p. 69. | albipicta <i>Lyc. Schultz.</i> , Entom. Zeitschr. 19, p. 214. |
| acamas <i>Ceg. Klug.</i> , Symb. Phys. * | albocaerulea <i>Ziz. Rüb.</i> , Iris 1, p. 59. * |
| acandata <i>Thecl. Stgr.</i> , Stgr.-Reb. Cat., p. 70. | albocaerulea <i>Moore</i> , Proc. Zool. Soc. Lond. 1879, p. 139. |
| actinides <i>Lyc. Stgr.</i> , Stett. Zg. 1886, p. 214. | albocaerulea <i>Cyan. Moore</i> , Proc. Z. Soc. Lond. 1879, p. 139. |
| actis <i>Lyc. H.-Schäff.</i> , Syst. Schmett. Eur. I. * | alboocellata <i>Lyc. Wheel.</i> , Bull. Switzerl. Lond. 1903. |
| acuta <i>Cur. Moore</i> , Ann. Mag. Nat. Hist. (4) 20, p. 50. | albocineta <i>Cyan. Tutt.</i> , Brit. Butt. 2, p. 398. |
| aditya <i>Chrys. Moore</i> , Proc. Zool. Soc. Lond. 1874, p. 571. * | albocineta <i>Lyc. Schultz.</i> , Berl. Ent. Zeitschr. 48, p. 265. |
| admetus <i>Lyc. Esp.</i> , Eur. Schmett. Abb. I (2). * | albofasciata <i>Thecl. Tutt.</i> , Brit. Butt. 2, p. 200. |
| adouis <i>Lyc. Hbn.</i> , Abb. Eur. Schmett. * | albolinearis <i>Lyc. Schultz.</i> , Berl. Ent. Zeitschr. 48, p. 267. |
| aedon <i>Lyc. Christ.</i> , Hor. Ent. Ross. 7, p. 236. * | albovirgata <i>Thecl. Tutt.</i> , Brit. Butt. 2, p. 149. * |
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B. Grypocera. Skippers.

This division, though exceedingly abundant in species, consists of forms whose structure is very similar throughout, and is therefore not quite equal in value to the division A, the true butterflies, which comprises 8 families. The skippers are always of compact build, their frons is very broad, the palpi are short but thick, the wings short in proportion to the stout body, and all six legs are always well developed. The larvae are always quite naked or bear only very dispersed bristles, and never have projections on the head, or tails, tubercles or other prominences.

No other group of Lepidoptera decreases so rapidly as we go from the Equator towards the Poles. In the tropics they occur wherever insects at all exist. The first Lepidoptera which come on board as the ships approach America are generally Grypocera. Even in the densest virgin forest shade-loving Grypocera are met with, and where there is a flowering shrub on a sunny hill, they swarm about in numbers. But there exists no single arctic form, and not one hibernates as imago. In rainy or dull weather these insects so completely disappear that one does not become aware of the extraordinary abundance of the Skippers in species and individuals in some warm countries. Also in Central Europe the principal time of flight is the hottest part of the season, July and the first half of August.

America is the home of the greater number of species. From tropical America alone more than 1000 species are known, while there occur about 200 in the Palaearctic Region, more than 350 in the Ethiopian and over 800 in the Oriental Region. In America this group has so much ascendancy over the other butterflies that in some districts of tropical South America more than half the number of species of butterflies are Skippers. Nearly all the Grypocera visit flowers, some being exclusively adapted to blossoms. The tongue of many species (e. g. of *Calpododes ethlius*) is more than twice the length of the body from the head to the apex of the abdomen, and therefore is sufficiently long for sucking the honey from the very bottom of the deepest nectary which no other insect can reach. In the chrysalis of these species the tongue-sheath projects beyond the apex of the abdomen as a dagger-like process, and the shelter in which the pupa lies is specially modified for the sake of this organ, which latter is obviously acquired by natural selection. None of the Palearctic Grypocera can be considered as a transition to the Heterocera, although they approach them in their structure and some also in their habits, as is stated in the description of the family *Hesperiidae*. In America, however, there occur species (*Megathymus yuccae*) which live as larvae in wood and which come so close to the *Castniidae* in build that some authors place them with the latter. Also the Australian *Euschemon rafflesiae* approaches the Heterocera so much that it has often been removed from the Diurnals.

The Grypocera are very uniform in size. By far the larger number of species has an expanse of from 2 to 3 cm, while less than 1 per cent. has a size of 6 to 7 cm. The prevailing ground-colour is black-brown or ochreous. The dark markings of the yellow species are so uniform and the arrangement of the hyaline spots in the blackish species shows so little variation that the identification of the various forms without the help of very minute and intrinsic descriptions offers great difficulties. This is also the reason why the author of this section has given analytical tables and thereby avoided lengthy descriptions and tedious repetitions.

The larvae live almost never quite exposed, but shelter themselves often only by rolling in and fastening together the edges of a leaf. Sometimes, however, they show particular skill in constructing their house. The larvae of *Erionota*, for instance, feed on the gigantic leaves of *Musa*, which are yards long. In forming their shelter they commence by making two incisions from the edge of the leaf towards the midrib at a distance of about 8 to 10 cm one from the other, and then proceed to roll this piece of the leaf up like a cigar, the larva living in the cylindrical hollow within this roll. The larvae of *Calpododes cethlius*, which feed on *Canna*, turn the leaves into regular funnels, which are gradually narrowed into a point towards the ground, the chrysalis lying in an upright position in this funnel and the long projecting apical portion of the extremely delicate tongue-case being well protected in the narrow lower part of the funnel.

The colouring of the larvae is very diverse. Besides simply green and wax-yellow caterpillars one meets with all sorts of hues and often even zebra-like transverse bands in vivid and contrasting colours. Sometimes the larva or pupa is dazzling white in its green leaf-cradle, as for instance in *Pythonides cerealis*. The head of the caterpillar has nearly always a peculiar dark tint and contrasts with the rest of the body; it bears often markings on the face, and is horny, whereas the skin of the body is very thin and

as soft as in a maggot. This is explained by the habits, the head leaving the shelter when feeding and therefore being exposed, while the rest of the larva remains concealed.

The Grypocera are obviously not protected by internal properties. The fast and somewhat skipping flight may be the reason why they are but little molested by birds, as is the case in most butterflies. Some instances of young birds (Muscicapidae, Tyrannidae) trying to catch Hesperids convinced me that only very few species of birds are at all able to seize the Grypocera in their darting flight. The Skippers are not very tenacious of life. The thorax is hard but brittle, and even a slight pressure renders the specimen completely incapable of flight.

1. Family: **Hesperiidae**, Skippers.

The Palearctic Skippers are medium-sized to small species, with the upperside on the whole dark or black. The chief home of this family are the Tropics. The number of species considerably decreases towards the Pole. In structure they approach the moths, or rather form a sharply defined family by themselves. The larvae — as far as they are known — have a characteristic facies. The first segment behind the head is constricted and usually ornamented with a collar which contrasts conspicuously with the colour of the body. They spin the leaves together with some threads and live in this shelter like Tortricids and also *Pyrameis*. The imagines are at a glance recognized as belonging here by their thick head and the shape of the club of the antenna.

The species of our fauna have their place here and there in the midst of the large mass Hesperids. We bring here a short characterization of the family and refer the reader for further details to the respective fascicle of *Wytzman's Genera Insectorum*.

The habits of the Hesperids agree with those of the majority of our butterflies. They love the sun and hot places. The first individuals appear in May and the season closes for the Skippers in August. The flight is extraordinarily rapid. Quick like lightning do they disappear from our view and return as suddenly the next moment, settling on a leaf or on the ground. In some the wings are spread out when at rest, in others they are kept raised. Nocturnal or crepuscular habits, as known from many American and African Hesperids, do not seem to obtain among the forms of the Palearctic fauna; the genera in which such habits have been observed are indeed entirely restricted to America and Africa.

The Skippers have a thick short head, which is always broader than the thorax, and large protruding eyes, which are widely separated from each other. The legs are strong, on the whole short or of medium length, in many genera spinose. The hindtibiae nearly always bear 2 pairs of spurs, one pair in the centre, the other at the apex. The venation of the wings is very characteristic. The four main veins arise from the base of the wing and all the branches from the cell. In the hindwing veins 1a and 1b are always present, but 1c is absent in every instance; the hindwing has altogether 8 veins, the outer margin is rounded in the European species or feebly lobate at the anal angle. The forewing has 12 veins, and its costal margin bears in the ♂♂ of many genera a fold, the so-called costal fold, which is often a little open. The numerous other particularities will be given under the respective genera.

The Hesperiidae of the Palearctic Region belong to 5 sections of the whole family:

Hesperiinae, sections A and B.,

Ismeninae, and

Pamphilinae, section A and B.

1. Subfamily: **Hesperiinae**.

Section A.

This section is characterized as follows: the club of the antenna is curved in hook-shape or falcate, the apex being always pointed. The third segment of the palpus is small, porrect or vertical, never curved back over the frons. The cell of the forewing is always longer than two-thirds of the costal margin, vein 5 is nearer to the vein 4 than to vein 6, but never approaches it considerably. The outer margin of the hindwing bears either a tail at the anal angle (American species), or has a tooth near the centre, or is rounded; vein 5 rarely developed.

1. Genus: **Capila** Moore.

This genus is characterized by the club of the antenna being hardly thicker than the shaft and being curved into a slight hook, and by the vertical setose palpi, whose third segment is small. Vein 5 of hindwing present, 3 arising from close to the lower angle of cell. ♂♂ without a costal fold. The hindtibia with 2 pairs of spurs and a long brush of hair.

C. translucida Leech (84 a). Dark brown, both wings in the centre with a large, triangular, yellowish white, semitransparent spot, which is traversed by the thick black veins. The folds in the cell of the hindwing separate 4 small characteristic areas. — As the species is not known to me in nature, I leave it in the genus where it was originally placed, although it appears to me to be more nearly related to *Orthophaetus*. Only one specimen is known, which was obtained on the Omei-shan (West China).

2. Genus: **Calliana** Moore.

Club of antenna curved; palpi slightly turned upwards; hindwing rounded; vein 5 present and near to 6; hindtibia with 2 pairs of spurs and a long brush of hair. Sexes different.

C. pieridoides Moore (84 a). ♂ with white wings. The forewing with a black apex, below which towards the anal angle there are 3 large spots. The hindwing bears a small black spot at the tip of each vein and besides a larger isolated spot in cellule 7; moreover, the black spots of the underside shine through. On the hindwing beneath three unequal rows of black spots. The body white, the patagia are anteriorly yellow, as are also the palpi. The ♀ black-brown according to NICÉVILLE (Journ. Bomb. Nat. Hist. pl. C. f. 25. p. 377); the forewing has a broad, short white band which stops at the hindmargin of the cell, and below the cell 2 large white spots; on the hindwing beneath a semicircular row of black spots near the margin and a large spot at the apex of the cell, besides 2 small dots at the base. — Putsu-fong, West China.

3. Genus: **Pisola** Moore.

Close to *Capila*, from which it differs in the hindtibia not bearing a brush of hair.

P. zennara Moore. The wings of the ♂ black-grey with a semivitreous streak between all the veins and two in the cell. The thorax and the base of the wings of the same brown colour as the wings. The wings of the ♀ smoky brown; the forewing traversed by a white semitransparent band from the centre of the costa to the hindmargin. The hindwing with 2 elongate grey streaks between all the veins. Underside uniformly brown. The abdomen with a light grey brush of hair at the apex. — Omei-shan, West China.

4. Genus: **Orthophaetus** Wats.

Antenna with a sharply curved short club whose thin apex is longer than the rest of the club. Palpi vertical. Cell of forewing two-thirds the length of the costal margin. Vein 3 of the hindwing strongly approaching the anal angle. In two of the four known species the ♂♂ have a costal fold.

O. omeia Leech (84 d). A rather large species with broad black wings. In the centre of the forewing three vitreous spots close together, below the last of them a smaller spot and at the apex three white opaque dots. The hindwing with a curved row of small blackish longitudinal spots a little behind the centre. Palpi yellow. The ♀ with somewhat larger abdomen than the ♂. — Omei-Shan, West China.

O. lidderdali Edw. (84 a). Larger than *omeia*. Wings very broad, brown, paler between the veins. Forewing with a row of five yellow vitreous spots arranged as in *omeia*; further, two small quadrangular spots below the three discal ones, and the apical spots are continued by three small quadrangular spots arranged in a semicircle. On the hindwing a row of yellow-bordered black ocelli between the veins. The underside of the forewing yellowish, the hindwing bearing an additional large black spot in the cell. The ♂ with costal fold. — The only known specimen came from Bhutan.

5. Genus: **Lobocla** Moore.

Club of antenna curved, gradually incrassate. Vein 5 of forewing somewhat approaching 6. Vein 3 of hindwing close to the angle of cell, 2 a little beyond middle of cell. Femora with long hairs; hindtibia with 2 pairs of spurs. The ♂♂ with costal fold.

L. liliana Atk. (84 a). Wings above dark brown, the forewing traversed by a broad, oblique, white, vitreous, macular band which is composed of five spots separated from each other by the veins, and which terminates at vein 1; at the apex three dots, below which there are two small spots. The

fringes of the hindwing whitish, interrupted at the veins. Underside of hindwing with three very broad black bands which appear bordered with white on the outer side; the outer margin dusted with lilac. — *easyapa*. ***casyapa*** Kirby has a broader band and larger white dots. There is no justification for separating this form as a distinct species. — *L. liliana* is distributed throughout the western Himalayas, extending southwards to Pegu and the Khasia Hills.

bifasciata. ***L. bifasciata*** Brem. (84 b). Wings dull greyish black. The forewing with a transparent white band composed of five spots, which are separated by the veins; it ends before vein 1. The underside of the forewing is greyish lilac before the three apical spots. The hindwing beneath bears three but little prominent bands, the outer margin being dusted with lilac-grey before the fringes. — The species occurs throughout North Asia with the exception of the high North: Corea, Amur, North China.

simplex. ***L. simplex*** Leech (84 b). Smaller than the preceding species (38 mm), deep black. The forewing has a discal band composed of five contiguous, transparent white spots, the band terminating rather far from vein 1; three apical spots in a straight line; fringes reddish. Beneath the forewing is dusted with lilac-grey along the outer margin; the hindwing bears two blackish bands in the middle and its outer margin is likewise lilac-grey. — Distributed in West China.

proxima. ***L. proxima*** Leech (84 b). Somewhat larger than *simplex*. On the upperside of the forewing the transparent white spot placed in the fifth cellule is somewhat removed from the discal band; moreover, there are two additional small spots below the apical spots. The fringes of both wings distinctly interrupted. The underside of the hindwing resembles a little that of *germanus*, being dark-brown with two continuous black bands edged at both sides with white. At the base of the cell near the costal vein a white dot. — Ta-tsien-lu, Mupin, Tibet.

nepos. ***L. nepos*** Oberth. (84 c). Wings grey-brown. The median band of the forewing is composed of four narrow small spots and a fifth which stands isolated between veins 4 and 5; at the apex three smears, below them two spots, all transparent white, forming an arched band. On the hindwing beneath, which is ashy grey, there are three brown macular bands. Palpi white. Fringes whitish, feebly interrupted. — W. China: Ta-tsien-lu, Pu-tsu-fong.

germanus. ***L. germanus*** Oberth. (84 c). Somewhat larger than *nepos*, from which it differs in the spots of the median band of the forewing being less separated. The median band of the hindwing beneath is deeper black, its spots closer together, the central spot extending with a point into the cell. Fringes of both wings whitish and more strongly interrupted. — Ta-tsien-lu, Pu-tsu-fong.

All these species belong to section A of the *Hesperinae*. Europe proper has no single representative of this section, which includes the largest American Skippers.

Section B.

Club of antenna only rarely curved into a hook, sometimes obtuse, but usually pointed. Third segment of palpus small and porrect, never curved above the frons. The cell of the forewing is less than two-thirds the length of the costalmargin; vein 5 closer to 6 than to 4. Hindwing frequently with tail. — The position of vein 5 and the short cell are characteristic of this section.

6. Genus: *Celaenorrhinus* Hbn.

*Club of antenna of medium length, curved at the apex. Vein 3 of forewing a little before the discocellular. Hindwing with the outer margin sinuate; vein 3 close to angle of cell. Hindtibia with 2 pairs of spurs and a brush of hair. — This genus is represented by numerous species in tropical Asia, Australia, Africa and South America, only nine occurring in our fauna, being found in China, Tibet and the adjacent Himalayan countries.

pulomaya. ***C. pulomaya*** Moore (84 c). Wings black. Forewing with a small yellow dot above vein 2 towards the base; in the centre a row of four separated spots, below them a very small fifth spot, all yellowish; three apical spots and below them two more spots placed a little more costad. Hindwing with three rows of small dark yellow spots. Thorax above with brown hair. Hindwing with interrupted yellow bands. — Himalaya, from Kangra to Sikkim; also at Mupin in West China.

maculosa. ***C. maculosa*** Fldr. (84 c). Wings reddish black. Forewing with whitish spots and dots, which are arranged as follows: a spot near the base, a median row of five spots, below them between veins 3 and 4 a small additional spot shifted distad, a second row at the apex of wing consisting of five small dots. Hindwing clothed with reddish hair and traversed by three rows of bright yellow dots. On the underside

the base of the forewing is dusted with yellow and the hindwing bears a fourth row of elongated dots, the abdominal area being yellow. Fringes yellowish white, interrupted. ♀ larger, otherwise similar to the ♂. Distributed in Central and West China, the butterflies occurring in grassy localities.

C. aspersa *Leech* (= *clitus* *Nicér.*) (84 d). The forewing black with a reddish tinge, and 10 trans-*aspersa*. parent white dispersed spots as follows: three small apical dots close together, below them two smaller ones nearer the margin, three rather large ones in cellules 2, 3 and 4, forming an arc, one in cellule 2 near the margin and one more near the base. On the hindwing there are three rows of dark yellow spots. Fringes orange, interrupted by black spots. Underside similar to upper, but the hindwing bears three yellow smears at the base. Thorax reddish, with yellow hairs. West China.

C. consanguinea *Leech* (84 d). Close to *maculosa*, differing from it in the two white spots of the median row of the forewing being large and rectangular. The rows of spots on the hindwing are reduced, the basal row containing but one spot, the median row three and the distal row four small dots of a paler yellow tint. On the underside the base of the forewing is black. The fringes of both wings are white and interrupted. This rather rare species flies in Eastern Tibet, and West and Central China. *consanguinea*.

C. sumitra *Moore* (= *pluscula* *Leech*, *patula* *Nicér.*, *plagifera* *Nicér.*) (84 d). A variable species, *sumitra*. divided into several species by de NICÉVILLE. The northern form, **pluscula** *Leech*, has large, broad, black-*pluscula*. brown wings, with two transverse rows of white spots on the forewing, the one being apical and composed of five spots, the other median and containing five or six spots: all the spots isolated. The hindwing has three rows of very broad, light orange spots: the first row basal, containing two spots, the second row antemedian, consisting of four spots, and the third row near the margin, likewise composed of four spots. On the underside the number of spots is sometimes increased (= *plagifera*). The base of both wings is dusted with dark red and the shaft of the antenna has partly a silvery gloss in the ♂♂. China (Sze-chuen).

C. leucocera. Dark brown. Forewing with a median row of two, almost quadrangular, white spots, one in the cell and the other below it, the row being continued by a streak at the costal margin, a dot below the second spot and another small dot at the outer corner of that spot; three apical spots, below them two additional dots. Hindwing black, with two pale yellow spots on the discocellulars, a median row of three spots and a marginal row of four to six unequal spots. Fringes white, interrupted. The spots are very distinct on the underside and pale yellow; in the cell a double spot; in the centre a row of three spots, at the posterior part of the outer margin a row of four. The upperside of the antenna silvery white in the ♂. A very variable species. In the form **putra** *Moore* all the spots mentioned are *putra*. present; in **leucocera** *Koll.* only the two large white discal spots of the forewing remain, the hindwing not *leucocera*. bearing any spots; but there occur also specimens in which half the spots are present or in which all the spots are very small. — The species is common and distributed from the North-Western Himalayas to Central China and southwards over India to the Malayan islands.

C. nigricans *Nicér.* (84 e). A species of medium size (35 mm); black, with a pure white median band, *nigricans*. not interrupted by the veins, which are white, the triangular spot of the band completely fills the angle between veins 3 and 4; a small spot at the lower end of the band is isolated. Three apical spots and below them two more, which are close together. Fringes blackish, on the hindwing dirty white. Underside without spots. North-Western Himalayas.

C. asmara *Btlr.* (84 e). Of the same size as *nigricans*. Wings black; median band of the forewing *asmara*. white, terminating at vein 2; only three apical spots. Hindwing rounded, with blackish fringes. Underside somewhat paler, the hind angle of the forewing dusted with white. I have received specimens which are said to be from Japan. The species is rather widely distributed in southern India, Pegu and the Malay Archipelago.

C. tibetana *Mab.* (84 e). Wings deep black. The forewing traversed by an uninterrupted, white, *tibetana*. transparent band which extends from the costal towards the inner margin, ending at vein 1; three apical spots close together. The fringes of the hindwing white, hardly interrupted. On the underside the hindwing has a narrow whitish discocellular spot, and a row of pale, often scarcely visible spots placed between the veins. West China (Mupin), in Tali and Tibet; also in Yunnan (Siao-lu).

7. Genus: **Satarupa** *Moore*.

Club of antenna thin, hook-shaped, the long apex being curved backwards. Palpi porrect, with the third segment conical. Vein 3 of forewing very close to lower angle of cell, vein 2 nearer the base than usually. Hindtibia with 2 pairs of spurs and a long brush of hairs.

nymphalis. **S. nymphalis** Spr. (84 d). This large species differs from the Indian *gopala* Moore in the white spot of the cell being reniform and extending right across the cell to its hindmargin. Palpi yellow. Amurland and almost the whole of North and Central China.

diversa. **S. diversa** Leech (84 e). Wings black; forewing with three apical spots forming a triangle and below them two more, very small, spots, a white median band commencing with two isolated spots in cellule 4 and 5 and being continued by three large united spots. This band is continued on the hindwing, where it is broader. The fringes are blackish. The underside is similar in markings, but there are two conspicuous black dots on the hindwing anteriorly on the outer side of the white band towards the margin. The palpi are yellow. Central China.

sinica. **S. sinica** Fldr. Wings deep black. On the forewing three prominent apical spots and a median band of fine separated spots, all white; on the hindwing a rather narrow white band, bearing at its proximal edge five black dots. Fringes white, interrupted by the black extremities of the veins. On the underside the base of the hindwing is pale grey-blue, with three black spots placed in a triangle; the row of black dots is situated within the white band, which is wider than above. Palpi white; body black. —

moorei. **moorei** Mab. (84 e) is a form with two additional white dots below the apical ones. West and Central China; *moorei* at Mupin (Sze-chuen).

tethys. **S. tethys** Mén. (84 f). Wings deep black. On the forewing a median band of five spots, and three apical spots, often followed by two smaller ones. Hindwing black, with a narrow grey macular band, which is often diffuse above, but always distinct beneath. Fringes white. Body black, with the palpi and under surface blue. Amur, Japan, North China.

S. Genus: **Coladenia** Moore.

Club of antenna strong and curved at the apex. Palpi porrect. Distal margin of the hindwing sinuous. Hindtibia with two pairs of spurs and a brush of long hairs.

dan. **C. dan** F. Red-brown, with three apical spots and a median band of six yellowish spots, the cell-spot the largest, distally excised in arc-shape; near the body two small transparent dots, which are often hardly visible. The hindwing bears two brown macular bands on the disc, and the fringes are dirty

fatih. white between the veins. Hindwing beneath paler. — **fatih** Koll. is only a lighter, more greyish, form.

dea. which moreover is often larger. — ab. **dea** Leech (84 f) are specimens which are larger than the ordinary form and differ in the transparent spots being larger and closer together and in the markings being lighter, pale yellow, especially on the hindwing, where the yellow transverse bands are more prominent and better defined. This form, which is probably seasonal, appears to be rather widely distributed in the valleys of the North-Western Himalayas.

vitrea. **C. vitrea** Leech (84 f). Wings greyish black. On the forewing three apical spots followed by two additional less pale spots; moreover, a median band of six white transparent spots or dots, two of these spots being very large, namely the one situated in the cell and the one between veins 2 and 3; the four other spots are mere dots, one being placed at the costa, one above and one below the second large spot, and the fourth isolated on vein 1. Hindwing with a dot at the costal margin, and two transparent white macular bands in the centre near each other, the first band consisting of three spots and a dot, the latter placed at the edge of the abdominal area, the second band being much narrower and composed of six dots placed close together. Underside similar, but paler, with whitish interrupted fringes. Ta-t sien-lu, West China.

moeniata. **C. moeniata** Oberth. (84 f). This species is very close to *vitrea*. It differs in the wings being pale ashy grey, especially the hindwing, and in the spots of the second band of the hindwing being indicated by black dashes or dots, only the two central ones being transparent. Fringes uniformly whitish grey. — I suspect that *moeniata* is only a form of *vitrea* in spite of the different fringes. The first specimen was obtained in Sze-chuen (at Ta-t sien-lu), and the second at Menia, which is not far off. I have received the insect also from Tali in Yunnan.

9. Genus: **Sarangesa** Moore.

Club of antenna of median length, a little curved. Second segment of palpus sub-erect. The second division of the median vein of the forewing is slightly curved, and the distal margin of the hindwing sinuous. The hindtibia bears two pairs of spurs and a brush of hair.

purendra. **S. purendra** Moore. Wings black. Forewing with white spots at the apex and at the end of the cell, also with a large white spot in the second marginal cell. The species is easily distinguished by this spot

from *S. dasahara* Moore, which is abundant in India. Moreover, the hindwing beneath has small white dots, which are absent from the latter species. — North-Western Himalayas.

10. Genus: **Abraximorpha** Elw.

Differences from *Celaenorrhinus*: ascending palpi with the third segment long and porrect; fore coxa of ♂ on the inside with a long hair-pencil; hindtibia with two pairs of spurs, but without brush of hair.

A. davidii Mab. (84 g). Forewing black, its whole central area occupied by a broad white band *davidii*, consisting of four rectangular spots; there are, moreover, three apical spots, which are followed by four more spots, with which they form a curved row, a small whitish subterminal macular band, and a white streak at the base of the cell. Hindwing white, with greyish black distal border traversed by the white veins, and two bands of the same colour, the proximal one being interrupted in the centre; underside white. All the bands of the upperside are macular. Palpi pale yellow, with black hairs on the upperside. — Mupin in Sze-chuen.

11. Genus: **Tagiades** Hbn.

Club of antenna slender, curved in a right angle, with the long apex again curved. Palpi porrect, the third segment short. The second division of the median vein of the forewing strongly curved. Hindwing rounded. Hindtibia ciliate, with two pairs of spurs.

T. menaka Moore (84 g). Forewing black, with small vitreous spots, five in a curved row at the apex, a more prominent one between veins 3 and 4, and two towards the centre of the costa. Basal third of the hindwing black, the rest pure white, with a marginal band of six large black spots, of which four touch the fringes, and with a centrally interrupted row of two or three less large spots. Underside of the hindwing ashy blue, the spots absent from marginal cellule 1 b. The posterior abdominal segments white. — This species flies in the North-Western Himalayas. It is the only Palaearctic representative of the genus, which occurs in an abundance of species all over tropical Asia, Australia and Africa.

12. Genus: **Ctenoptilon** Nicér.

Club of antenna strongly curved and pointed. Palpi long and porrect. Apex of forewing subacute. Outer margin of hindwing rounded at apex, with a tooth at vein 7 and a second smaller one at vein 4. Hindtibia with two pairs of spurs.

C. vasava Moore (84 f). Forewing light reddish brown, with a median band of five isolated, transparent white spots, and a row of four elongate apical spots, which are connected with the band by means of three small dots of the same colour. Hindwing paler, in the basal area with vitreous spots which stand close together and form three rows. Underside paler and duller. Sze-chuen.

13. Genus: **Carcharodus** Hbn.

Club of antenna strong, straight, with a short point. Palpi erect, with porrect third segment. Forewing of ♂♂ with costal fold; outer margin of hindwing dentate. Hindtibia with two pairs of spurs. The ♂♂, moreover, have with one exception a brush of stiff hairs on the underside of the forewing at the base.

A. Male without brush of hairs on the forewing beneath.

C. alceae Esp. (= *malvarum* Hoffmsgg., *malvae* Hbn.) (85 a). Dark brown. Hindwing with two rows of yellowish grey spots, which are not prominent. — Throughout Europe and Western Asia.

C. lavatherae Esp. (85 a). Yellowish grey or ash-colour: hindwing darker, with two rows of distinct, almost white, spots. Underside of hindwing with two small grey bands in the centre. — Southern Europe, North Africa, Syria, Armenia.

B. Male with a brush of stiff hairs at the base of the forewing beneath.

C. altheae Hbn. (= *gemina* Led.) (85 a). Black-brown; on the disc of the forewing with a black area resembling a short broad band; in the centre of the hindwing a row of four small, but little pro-

baeticus. minent spots. Hindwing beneath grey, with three bands of whitish spots. — var. **baeticus** Ramb. (85 a) is light grey; the dark discal band is pale, almost like the ground-colour. Hindwing with a median band of four yellowish white, very prominent spots; beneath white with three brown macular bands. The specimens from Algeria are larger, more ashy grey, and the spots more brilliant white (from El Kantara, coll. A. SEITZ). South Europe, North Africa. The larva feeds on *Marrubium vulgare* L.

14. Genus: **Hesperia** Latr.

Club of antenna short, arcuate, with the tip obtuse. Palpi erect, second segment rough with brushes of scales and hairs, third segment thin, obliquely curved backwards. Forewing of ♂ with or without costal fold. Outer margin of hindwing rounded or dentate. Hindtibia with two pairs of spurs, with brush of hair or without it.

A. Subgenus *Battus* Ramb. Without costal fold in ♂ and without brush of hair.

a) Forewing with a row of quite obsolescent small white marginal dots or entirely without it.

therapne. **H. therapne** Ramb. (85 b). Underside of hindwing brick-red, with a white macular band, of which the discocellular spot is proximally neither dentate nor prolonged. On the underside the spots and fringes are yellowish red. On Corsica and Sardinia and in North Africa.

b) Forewing with a row of distinct white marginal spots.

galba. **H. galba** F. (= *superna* Moore, *evanidus* Btlr., *zelva* Btlr., *hellas* Nicér.) (85 b). The hindwing beneath bears a light, continuous band in the centre and a similar one near the base. At the base of the cell of the forewing beneath a distinct white dot; the second marginal cell with a longitudinal row of four white dots. In the North-Western Himalayas (Kashmir), throughout India, and in Arabia.

orbifer. **H. orbifer** Hbn. (85 b). The forewing beneath has no distinct white dot at the base, but a diffuse patch. Upperside grey, with a yellowish tint. The white discocellular spot of the underside with projecting angles. South Europe and Asia Minor, throughout Central Asia to the Altai and Amur. —

hilaris. **hilaris** Stgr., which is constant at Mardin, but occurs as an individual aberration also in Syria, has larger spots and more numerous spots. — **lugens** Stgr., from Ferghana and Turkestan, is larger and more blackish.

sao. **H. sao** Bgstr. (= *sertorius* Hoffmsgg.) (85 b). The white discocellular spot of the hindwing is dentate or on both sides incised, somewhat diffuse. Ground-colour of the hindwing beneath brick-red. Central and South-West Europe, Germany, France, Belgium, Spain, Italy and Alps. — ab. **eucrate** O. (85 b) is more greyish beneath, the hindwing being paler. — Larva brown, dotted with yellow, side-line pale, head black; from the autumn till May on raspberry. Pupa with a blue flush. The butterflies are on the wing in June, in the south already from May, in the High Alps into August, occurring especially on stony hill-sides and being generally plentiful, in the High Alps even very common.

ali. **H. ali** Oberth. (85 c). Facies of *sao*, but with the underside of the hindwing pale red or reddish grey and the spots distinct, elongate, pale, usually silvery. In North Africa, in May and June, locally abundant, e. g. at Constantine, Lambèze, etc.

c) Underside of the hindwing yellowish grey, with broad light spots or a continuous band.

geron. **H. geron** Wats. (85 c). Median band interrupted in the sixth interspace, the white spots of cellules 7 and 8 being shifted distad and the spot in the angle between veins 6 and 7 absent or hardly indicated. Persia and Baluchistan.

phlomidis. **H. phlomidis** Herr.-Sch. (85 c). The median band complete and continuous. The triangular spot between veins 6 and 7 strongly elongated, and the one in interspace 8 continued to the angle. Eastern Europe, Asia Minor and Persia, as far as Central Asia (Ferghana).

B. Subgenus *Pyrus* Hbn. (pt.). The males have a costal fold on the forewing and, with the exception of two species, a brush of hair on the hindtibia.

poggei. **H. poggei** Led. (85 c). Costal fold of ♂ very feebly developed, represented by a ridge on the costa. *lutulentus*. Hindwing beneath without white spot in the centre of interspace 7. Syria, Armenia. — In **lutulentus** form. nov. (85 d), from Turkestan, the forewing is not dusted with ashy grey, but is as black as the hindwing. All the dark places of the underside are blackish. The ground-colour of the hindwing is darker, the white spots smaller.

H. cashmirensis Moore (85 c). Without the marginal row of dots on the forewing. Underside of hindwing without white dots or with some obsolescent smears. Kashmir. — In **alpina** Ersch., which is only a form of *cashmirensis*, the spots of the hindwing above are distinctly white and form a short median band. From Turkestan. — **darwazica** Gr.-Grsh. differs from *cashmirensis* only in the somewhat broader and more whitish fringes. — There occur intergradations between all three forms.

H. cribrillum Ev. (85 e). The median band of the hindwing beneath does not terminate at vein 8, but extends beyond it. Hindtibia without brush of hair. Tarsi and tibiae spinose. The interspace between veins 7 and 8 of the hindwing beneath with only one white spot towards the middle; the whole area between the brown postmedian band and the fringes is white, as are also the veins. Four apical spots. South Russia, and from the Ural to Amurland and China. — In the form from Kentei, the upperside of the wings is dull black; at the apex of the cell a small ashy grey lunule. The two white smears before the two terminal spots of the median band are absent; the terminal spots of both fore- and hindwing are small and almost circular. Specimens from northern Amurland and Dauria with darker ground-colour and smaller white marginal dots are called **obsurior** by STAUDINGER.

H. nobilis Stgr. (85 e). At once recognized by the characteristic underside. The white band of the hindwing beneath is very distinct on an ashy grey ground, broad and regular; the marginal area between the brown postmedian band and the fringes white; the latter not interrupted beneath. Turkestan. — In the Tianshan flies the form **fucata** form. nov. The upperside of the wings is quite black without a single grey scale. The forewing has no median band; the band of the hindwing is reduced to three spots. The row of marginal dots complete, but all the dots are small and ashy grey. The dark places on the underside of both wings are blackish grey with an intermixture of greenish.

H. leuzeae Oberth. (85 e). The marginal area of the same colour before the fringes as the ground; the interspace between veins 7 and 8 on the underside of the hindwing bears two small white dots, one being the first spot of the median band, and the other lying before it; there is moreover a small pale dot towards the fringes, often connected with the latter. The subterminal row of dots on the hindwing beneath developed to a white (?) band which is almost as broad as the median band. Mascara in Algeria, only one specimen known. Very near *proto* Esp.

H. proto Esp. (85 d). The interspace between veins 7 and 8 on the underside of the hindwing bears only a single spot in the centre, namely the one which is the first spot of the median band; in the marginal area a second spot, which may be united with the fringes. Upperside of the wings grey-brown; the spots but little prominent, yellowish. Hindwing beneath yellowish grey or pale reddish; beyond the median band follows a brown postmedian one, the whole marginal area beyond it being of the same colour as the ground. In each marginal cellule a dark dot, above which there is a light arched smear. South Europe, Syria, Armenia, Turkestan. — The form **mohammed** Oberth. (85 e) differs in the large spots of the underside of both wings, in the very distinct subterminal row of dots and in the hindwing beneath being more variegated with white. Algeria.

H. staudingeri Spr. The marginal band with distinct separate dots. The white spot situated on the upperside of the forewing between veins 3 and 4 large, longer than broad, always very distinct. The dots of the marginal row grey and but little prominent on both wings. Hindwing beneath reddish, with very prominent spots in the subterminal band. Fringes interrupted beneath. Central Asia, from the Alatau and Tianshan. — **plurimacula** Christ., from Persia and Mesopotamia, has a paler underside to the hindwing and shows a larger rounded spots towards the costal margin. — **proteus** Stgr. (85 d) is as large as the name-typical form. The white spots are smaller, especially on the hindwing, on which they may all be absent except for 3 or 4 in the centre of the disc. Hindwing beneath red, the median band narrow and the marginal dots very small. This form is very variable and intergrades imperceptibly with the name-typical form. From Ferghana. — **prometheus** Stgr. (85 d) is smaller than the name-typical race; darker, sometimes even blackish; the marginal dots but little marked. — **epimetheus** form. nov. (85 d) is of the same size as the name-typical race, black, not variegated with grey. Median band of the upperside reduced to three large spots forming a triangle, one situated in the cell, another in interspace 3 and the third in 4. Median band of hindwing with four small spots. Marginal dots absent. Hindwing beneath dark reddish grey, with a very distinct median band. Subterminal row of spots obsolescent or absent. This variety flies at Margelan.

H. tessellum Hbn. (85 e, f). Hindwing beneath grey-green or light olive, with three bands of light spots; the basal band, consisting of two spots, terminates in the cell; the median band very broad, reaching from veins 4 to 8; the white spot between veins 3 and 4 projects strongly from the band. Forewing with four apical spots. From Russia throughout Anterior Asia to West China, Tibet and the Tianshan. — The form **nigricans** form. nov., from Juldus, of which I have a ♀, has the upperside of the

wings black: the median band of the forewing consists of only two spots, the lunule at the apex of the cell is absent, so that the disc bears only three white dots and a diffuse smear in interspace 2. The dots of the hindwing are reduced, obsolescent. The underside of both wings almost normal, but the centre of the forewing is nearly black, the white spots of the hindwing on the contrary broader and all very sharply developed. — *nomas* *Led.* (85 f) resembles name-typical specimens above; the underside of the hindwing, however, is uniformly white, without markings. South Russia, Asia Minor, Altai and West China.

protheon. **H. protheon** *Rambr.* (85 f). Five apical dots: all the spots of the upperside distinct. Hindwing beneath light brown; subterminal band composed of distinctly separated spots. The white spot between veins 3 and 4 less projecting than the cell-spot situated above it. South Russia.

gigas. **H. gigas** *Brcm.* (85 f). Upperside of the wings blackish grey. Size considerable, 48 to 50 mm.

Ground of wings black. The white spots small. ♀ black, with the spots small and but little numerous. The hindwing black. ab. *minor* ab. *nov.* has only the size of *tessellum* and all the spots well developed. From Amurland.

C. Males with a costal fold; hindtibia with brush of hair.

a) The white discocellular spot of the hindwing beneath straight and without a projection towards the base.

melotis. **H. melotis** *Dup.* (= *hypoleucus* *Lcd.*) (85 g). The underside very characteristic, the markings and spots of the hindwing being united to form a uniform white area. From Syria and the island of Milo.

carthami. **H. carthami** *Hbn.* (= *malvae* *Esp.*, *tessellum* *O.*) (85 g). Markings and spots of the underside of the hindwing strongly contrasting with the brownish ground. Along the distal margin there is a continuous white band. Central Europe as far north as St. Petersburg, and Western Asia; apparently absent from Greece and Italy. — *moeschleri* *Herr.-Sch.*, from South Russia and Hungary, is somewhat larger than name-typical *carthami*, with the ground-colour light ashy grey; the spots of the forewing are large and the two rows of spots on the hindwing distinct. — *valesina* *Mab.* (= *valesiaca* *Rühl*) (85 i), from the Valais and Tyrol, has the spots of the forewing less numerous, the hindwing above being completely devoid of spots. — Larva on Malva and Althaea. The butterflies in May and June and again from July until the autumn, on steppes and dry hills, not everywhere, but plentiful in most districts.

speyeri. **H. speyeri** *Stgr.* (85 g). On both sides darker than the preceding, the spots of the forewing above smaller; the first spot of the median band of the hindwing beneath, situated in interspace 6, is absent, being sometimes represented by an indistinct smear. Otherwise similar to *serratulae*. Amurland, Ussuri, *scitzi*, and Dauria. — In *scitzi* *form. nov.* (85 g), of which I have a ♀ from Sajon, the upperside of the wings is uniformly black, the forewing bearing an indistinct grey diffuse discocellular halfmoon. Fringes white, interrupted by conspicuous black spots. On the underside the apex of the wing is dark grey, the centre blackish; a spot in the cell, a discocellular arc, in interspace 10 a streak, further three small apical spots, and six dots forming an oblique curved row from interspace 6 to 2; these dots small, white, non-transparent. Hindwing olive-black, with three spots at the base, three larger ones close together, situated at the costa and vein 4, moreover a spot in interspace 1 b. Subterminal row of dots as in *speyeri*, but less prominent.

serratulae. **H. serratulae** *Rambr.* (85 h). Very close to the preceding, but interspace 6 bears a small white spot, this being the first spot of the median band on the underside of the hindwing. The latter beneath greenish grey; the two white spots between veins 2 and 4 are absent or reduced to small elongate smears. *tarasoides.* In ab. *tarasoides* *Höfn.* the white spots of the upperside are partly confluent. Throughout Europe and West and Central Asia, from Sweden to the Mediterranean, and from France to Eastern Siberia, but *caecus.* absent from England. — In *caecus* *Frey* (85 h) the spots of the upperside are strongly reduced or may *major.* even be absent. From the higher valleys of the Alps and from the mountains of Hungary. — *major* *Stgr.* is larger and has the spots larger and purer white; from the slopes of the Taurus Mts., from the Pontus *alveoides.* and Turkestan. — *alveoides* *Stgr.* is smaller than true *serratulae*, with the ground-colour of the wings ashy grey; the white spots of the forewing are larger; the hindwing has a median row of white dots; underside paler. Appears to be a second brood; in Syria. — Larva, according to ZELLER, on *Potentilla incana*. The butterflies are on the wing in June and July in Central Europe; they are locally abundant, and congregate in the Alps at road-side puddles and rills.

cirsii. **H. cirsii** *Rambr.* (85 h). Underside of hindwing blackish brown or reddish; the spots between veins 2 and 4 larger and sharply defined; in interspace 1 b near the margin a small oblique row of 2 to 4 black dots, which are sometimes confluent. The ground-colour of the wings reddish in the first brood, often brownish in the second. France, Northern Spain.

H. carlinae Rambr. (85 h). Underside of hindwing reddish brown; the white spots between veins 2 *carlinae*. and 4 much reduced; in interspace 2 a white, usually rounded, spot, which belongs to the subterminal band, the latter being otherwise but feebly marked. In the Alps and the mountains of Arragonia.

H. alveus Hbn. (85 h). Upperside blackish brown to greenish brown; on the forewing a marginal *alveus*. row of small grey dots, which row is represented on the hindwing by distinct light dots. Hindwing beneath blackish brown to yellowish; the light median band of the hindwing very broad, extending from veins 4 to 8; the white spots of the marginal band always dentate distally or extended on to the fringes; the discocellular spot preceded costally by two dots. Central and Southern Europe, eastwards through Asia to the Amur in the north and West China in the south. — **iberica** Gr.-Grsh. is said to be a form of *iberica*. *alveus*; the author himself, however, considered it as belonging to the Eastern species *cinarae*. It differs in the underside of the hindwing being reddish ochreous. Not known to me in nature. — **sifanicus** Gr.-Grsh. *sifanicus*. is the name of the race from the Kuku-nor and Western China, which is light above and beneath and has smaller spots. — Larva from April till June, found on Polygala. Pupa light brown, with a blue bloom. The butterflies from May until August, usually singly, but often common in the mountains.

H. cinarae Rambr. (= *cynarae* Frr.) (85 i). No marginal row on the forewing, but a very strongly *cinarae*. developed median band on both wings, the spots of the band being large and white. Underside of hindwing light yellowish green. The white discocellular spot not prolonged forward. South Russia, Bulgaria, Turkey, Asia Minor; in June.

b) The white discocellular spot on the underside of the hindwing prolonged towards the base.

H. andromedae Wallgr. (85 i). A row of small white dots extends from the costal to the inner *andromedae*. margin across the cell, the row being rarely incomplete. From the mountains of Scandinavia, Lapland, and the Alps of Switzerland and Savoy; from June until August.

H. cacaliae Rambr. (= *alveus* Bdr.) (85 i). Without a row of dots across the cell as in *andro-cacaliae*. *medae*, but interspace 2 bears an isolated dot. The white dots of the forewing very small. The hindwing above without dots, beneath yellowish grey, the spots not very distinct. In the Alps, Apennines, Pyrenees and the Altai, as a rule at considerable altitudes, in July and August.

H. onopordi Rambr. (? = *cirsii* Rambr.) (85 i). Spots and dots much more distinct than in the *onopordi*. preceding insects, with which *onopordi* agrees in size. Underside of hindwing yellowish brown or reddish, the median band washed with yellowish, the terminal row of dots absent. South France, Spain, Morocco and Algeria.

H. centaureae Rambr. (86 a). Likewise large, dark, with very distinct white dots and spots. *centaureae*. Underside of hindwing dark brown or blackish with a greenish tint. The brown band which forms the outer border of the white band, bears spots and forms the inner border of a white terminal band, which appears divided by a row of strong brown dots so that there are two white bands beyond the median band. Scandinavia, Finland, the Altai; also in North America; in June and July.

H. conyzae Guen. (86 a). Smaller than the previous; the hindwing beneath as before, but the *conyzae*. brown bands stronger, so that the narrow white marginal band is reduced, sometimes even obsolete. Switzerland.

H. malvae L. (= *alveolus* O.) (86 a). Likewise a smaller species. The terminal row of white dots *malvae*. developed, at least on the hindwing. Underside of hindwing reddish, with distinct white dots, those of the subterminal band being rounded. Veins bordered with yellowish white or white. In ab. **taras** Bergstr. *taras*. (86 a) the white spots of the forewing are united to form bands; occurs singly among ordinary specimens. Europe, Asia from the Mediterranean Sea to the Amur; Mongolia. — Larva yellowish grey, minutely dotted with greenish, the dots bearing short thin hairs, dorsal line darker, spiracles yellowish; in June and October on Potentilla, Dipsacus, Strawberry, Raspberry, and other plants. The butterflies are on the wing in April and May and again from the end of July onwards, on sunny slopes, roads among fields and clearings in woods, being common everywhere in Central Europe.

H. fritillum Hbn. (86 a). Very close to the preceding species, but the underside of the hindwing *fritillum*. dark red, the row of terminal dots obsolete with the exception of a feeble dot each in interspaces 1 b and 2. This form, which is sunk as a species in all catalogues, appears to be essentially different from *malvae*. It occurs only in Spain.

H. malvoides Elw. Markings as in *malvae*; tergite of anal segment (♂) with a tooth on each side. *malvoides*. Spain, South France.

H. bieti Oberth. (86 b). Underside of hindwing with a well marked white macular band, proximally *bioti*. to which there is a broad irregular brown band shaped like an Y; without dark submarginal band on the hindwing beneath. West China and North-East Tibet, very abundant, in May and June.

- oberthuëri*. **H. oberthuëri** *Leech* (86 b). Similar to the preceding, but with a dark terminal band, which is separated from the subterminal one by a white dentate line or a row of white dots. In West and South China, in May and June.
- zona*. **H. zona** *Mab.* (= *sinicus* *Btlr.*) (86 b). Above more sparsely spotted. Base of hindwing beneath greyish white, with a white dot at the base of interspace 7; median band white, narrow, beyond it a broad brownish band; submarginal band very broad, black, posteriorly united with a whitish-blackish subterminal band. — Japan, Central China, abundant.
- albistriga*. **H. albistriga** *Mab.* (86 b). Base of wings blackish, with a white dot in interspace 7. Median band white, distinct, the whole marginal area uniformly blackish. North and Central China.
- maculata*. **H. maculata** *Brem. & Grey* (= *amurensis* *Stgr.*) (86 c). Base of wings blackish grey. The white median band forms the border of a brownish red spot. Marginal area reddish brown, often with a small second, white, subterminal band. The white dot obsolescent or absent. Amur, North and Central China. — Larva uniformly light green inclusive of the abdominal legs; the second segment and the first pair of thoracic legs red-brown, the head velvety black; on Spiraea and Raspberry in September. The butterfly in May and June.
- thibetana*. **H. thibetana** *Oberth.* (86 c). Above very similar to the preceding. Underside of forewing with the apex white and a short oblique spot yellowish brown; the two small white spots in interspaces 4 and 6 united. West China, in May and June.
- sidæ*. **H. sidæ** *Esp.* (86 b). Underside of hindwing with two light orange-red bands which are bordered with black, extend to vein 7 and terminate with a black spot in interspace 8. The white spots on the upperside of the forewing very small; the two spots in interspaces 2 and 3 smaller than all the others. Central and South Europe, and from Asia Minor to Turkestan.
- antonia*. **H. antonia** *Spr.* (86 b). The orange-yellow band extends to vein 8. Underside of forewing with very distinct white dots, those in interspaces 2 and 3 the largest, equalling the cell-spot. In Turkestan
- gigantea*, and the valley of the Amur. — **gigantea** *Stgr.* is one-third larger; from Ferghana.

15. Genus: **Thanaos** *Bdv.*

Club of antenna curved, obtuse. Palpi porrect, very bristly, segment 3 conical, short. Forewing of ♂ with costal fold, which however is absent from some species; vein 5 midway between 4 and 6. Hindtibia with two pairs of spurs.

A. Male with costal fold.

- tages*. **Th. tages** *L.* (86 c). Forewing grey-brown, with two oblique black bands, which are proximally edged with yellowish grey. A marginal row of small light dots and two apical dots, of which one is transparent. Hindwing black, in quite normal specimens without spots. Throughout Europe and Northern Asia to the Amur. ab. **clarus** are very pale specimens, which may occur everywhere among true *tages*. —
- popoviana*. **popoviana** *Nordm.* (= *sinina* *Gr.-Grsh.*) (86 c) is hardly more than a synonym; light grey, with a row of white marginal dots and a second similar row in the centre, the hindwing with a light discocellular spot.
- unicolor*. Dauria, Amur, China. — **unicolor** *Frr.* (86 c) is uniformly brown grey without any markings. Greece and
- cervantes*. Asia Minor. — **cervantes** *Grasl.* (86 d). Larger and much darker than true *tages*. The dark bands obsolete or only indicated by black streaks; the marginal dots scarcely visible. South Spain. — Larva green, with the head brown and yellow lateral stripe dotted with black; on Eryngium and Lotus, in July and late in the autumn. Pupa green, with reddish abdomen. The butterflies in April and May and again from July onward, everywhere plentiful. They fly low above the ground and like to settle on roads.
- montanus*. **Th. montanus** *Brem.* (= *rusticanus* *Btlr.*) (86 d). Forewing dark brown, with an almost black band, which is dusted with reddish and extends from the apical spots to the hindmargin. On the underside the first row of light dots is diffuse and irregular below the cell. Hindwing with two yellow macular bands, the proximal one consisting of larger and irregular spots. Amur, China, Japan.
- leechi*. **Th. leechi** *Elw.* (= var. *nigrescens* *Leech*) (86 d) differs from *montanus* in its smaller size. On the underside of the forewing the proximal row of light dots is regular below the cell and distinct. Ta-tsen-lu, Tehang-kon and Tibet.

B. Male without costal fold.

- marloyi*. **Th. marloyi** *Bdv.* (= *sericea* *Frr.*, *rustan* *Koll.*) (86 d). Wings black; the forewing with two oblique black bands; fringes hardly lighter than the ground-colour. The light dots in interspaces 7 and

8 very distinctly white, especially on the underside, where there are three spots, one of them being vitreous. South Europe, Asia Minor, Syria and Persia.

Th. pelias *Leech* (86 d) is closely allied to the preceding. Ground colour paler, the black lines or *pelias* bands more prominent, the fringes somewhat greyer. The light dots in interspaces 7 and 8 obsolescent. Differs from the preceding species really only in the genitalia. In *pelias* the lower lobe of the clasper bears proximally a narrow vertical process, which is absent from *marloyi*. West China, Tibet.

Subfamily: Ismeninae.

The species of this well characterized subfamily have a peculiar habitus. The club of the antenna is more or less incrassate, being swollen in the centre and terminates in a long and thin point, which is sometimes longer than the incrassate portion and is always hook-shaped. The second segment of the palpus is upturned and applied to the frons, the third segment being long, awl-shaped, naked and horizontal. The cell of the forewing equals two-thirds the costa in length; vein 5 is straight and originates midway between 4 and 6. Vein 5 of the hindwing is sometimes developed, but usually absent. The ♂♂ have never a costal fold, but often other secondary sexual characters. The *Ismeninae* are for the greater part tropical insects, only 7 species occurring in the Palearctic Region, extending northward to Japan and to the valley of the Amur.

16. Genus: **Hasora** *Moore*.

Club hook-shaped, with thin apex which is shorter than the incrassate part; shaft longer than the club. Cell of forewing two-thirds the length of the costa; vein 5 nearer to 6; vein 1 of ♂ curved in S-shape at the base. Hindwing with lobe; vein 5 present.

H. anura *Nicér.* (89 h). Wings above dark bronze-brown; the base very densely clothed with ochreous hairs: in ♂ a small yellow spot near the apex. Underside of the wings dark brown with a glossy sheen; the margin of the forewing lilac-blue or light grey, towards the apex of the cell a dark band; the first internervular space yellowish. On the hindwing the base is darker than the rest of the wing; above the anal angle an ochreous spot. The ♀ differs from the ♂ in having three apical dots and two spots between the veins, which are transparent bright yellow. The anal lobe is almost entirely absent from this species. China.

H. chromus *Cr.* (= *malayana* *Fldr.*, *alexis* *Moore*) (89 g, h). Wings above uniformly black-brown; ♀ with red hairs at the base and two small transparent spots in the cellules 3 and 4. Beneath dull brown; centre of forewing darker; hindwing with a more or less broad white band, slightly washed with pale blue. This band ends at the anal angle in a large blackish spot, which covers the lobe almost entirely. On the abdominal side a rather broad pale stripe. Thorax brown, with metallic green hairs. South China and southwards all over Indo-China and India.

17. Genus: **Badamia** *Moore*.

This genus is distinguished by the very short antenna, the slender club of which is most strongly curved where it is thickest, further by the narrow hindwing being prolonged at the apex, the large anal lobe and by vein 5 being well developed.

B. exclamationis *F.* (= *ladon* *Cr.*, *thymbron* *Fldr.*) (86 e). Wings black-brown with yellowish base. ♂ with transparent spots on the forewing, namely: between veins 2 to 4 two small spots which are almost longitudinal, and a very small spot in the cell. ♀ with the same spots, which however are broader and longer. Underside of the wings sericeous grey, with a yellowish white spot above the anal lobe. Pectus and palpi white, abdomen ringed. A chiefly Indian and Malayan species, which extends into the northern districts of the Himalayas.

18. Genus: **Rhopalocampta** *Wallgr.*

This genus is distinguished from the preceding by the hindwing not being narrow and anteriorly long. The cell of the forewing exceeds two-thirds of the costa. Vein 5 of the hindwing is absent, and the hindtibia bears a long brush of hairs.

R. benjaminii *Guér.* (86 e). Wings dark brown above; the base and whole disc of the hindwing covered with metallic green hairs like the thorax. The anal lobe margined with orange-red. Underside glossy green, anal lobe with a short, broad, and bright orange band which bears a large black spot in its centre; the margin with black dots. True *benjaminii* occurs in Tibet. — **japonica** *Murr.* differs in the upperside of both wings being metallic green. In Japan. — The species is distributed all over India.

19. Genus: **Ismene** *Swains.*

The club of the antenna is very strong, twice the length of the thin apex, which is gradually curved. The cell of the hindwing very short; vein 5 is well developed.

septentrionis.

1. septentrionis Fldr. (= *striata* Hew.) (86 f). Forewing black-brown, clothed with red-yellow hairs at the base; along the costa as far as the apex of the cell a streak of the same colour. Hindwing with a red-yellow border. Beneath the apex of the forewing and the whole hindwing glossy green; the veins and internervular folds almost black-green. Head and thorax red-yellow, as is also the pectus, underside of abdomen, and the tarsi. The ♀ is similar. China: Shanghai, Siao-lu.

aquilina.

1. aquilina Spr. (= *jankowskii* Oberth., *chrisaeglia* Btlr.) (86 f). Brown with a red sheen. Forewing, especially in the ♀, with 3 or 4 pale spots between the veins, which become more and more obsolete towards the costa; between the spots and the almost reddish yellow base a darker band. Underside of the wings duller and with larger and more distinct spots. Amur, Japan.

lara.

1. lara Leech (86 e). Very near *gomata* Moore and perhaps only a form of it. Wings black-brown above, with an elongate, broad, yellowish white area; streaks of the same colour between the veins. Underside similar, but whitish green; interspace 1 a white; all the streaks between the veins of the hindwing are light green, with the exception of the light elongate patch, which is white. Palpi and pectus yellowish grey. Central China.

Subfamily: Pamphilinae.

Section A.

The species of this subfamily are recognized by the club of the antenna having an obtuse apex or being but slightly curved. The third segment of the palpi thin and long, or conical and short, but never horizontal. Vein 5 of the forewing almost always near vein 4. The ♂ without costal fold and without brush of hair on the hindtibia.

20 Genus: **Suastus** Moore.

Club of antenna moderate, with the tip short and curved back. Palpi erect, the long third segment reaching higher than the vertex. Hindtibia with two pairs of spurs.

gremius.

S. gremius F. (= *clivodosa* Moore, *subgrisea* Moore) (86 f). Upperside of wings dull dark brown. Forewing with three vitreous spots between veins 2—4 and with yellowish white apical dots. The disc of the hindwing above pale ochreous and covered with greenish hairs. Underside of hindwing ashy grey, with a black spot in the cell and 3 or 4 similar spots between the veins. Throughout the north-western Himalayas and India.

21. Genus: **Aeromachus** Nicér.

Club of antenna of medium thickness, with a short, recurved tip. The second segment of the palpus erect, the third porrect. Vein 5 of forewing midway between 4 and 6. The ♂♂ have usually a linear stigma on the forewing which extends from vein 3 to 1.

A. ♂♂ with a black stigma which extends obliquely from vein 3 to 1.

stigmata.

A. stigmata Moore (86 g). Black. Hindwing beneath with a subterminal row of dark dots on a greenish brown ground. Spots in cellule 7 barely indicated. In the north of the Himalayas.

chinensis.

A. chinensis Elw. (= *inachus* Leech) (86 g, erroneously named *sinensis* on the plate). Near the preceding, but the dots of the subterminal row greenish black, velvety. The spots in cellule 7 well developed. Hindwing rounded. West China: Ta-tsien-lu.

piceus.

A. piceus Leech (86 g). Hindwing beneath uniformly greenish grey, the veins not paler than the ground; the space between the postmedian and subterminal macular bands not darker than the ground. West China: Mupin.

B. The stigma consists of a small longitudinal fold covered with light scales which is situated a little proximally to the middle of vein 1 and is occasionally absent.

inachus.

A. inachus Mén. (86 g). Veins on the hindwing beneath paler than the ground. Amur, Japan.

nanus.

A. nanus Leech (86 g, as *nana*). One of the two marginal rows of spots of the forewing in cellules 5, 6 and 7, or 6, 7 and 8, the other in cellule 2 and 3; no light spot in cellule 4. A spot in the cell near the upper angle ash-colour. China: Shanghai, I-chang.

catocyanea.

A. catocyanea Mab. Above pale brown. The stigma is a stripe which runs from the base of vein 3 to vein 1. Hindwing beneath with a curved subterminal band of glossy blue spots, extending from the apical angle to vein 1 b. West China: Mupin.

22. Genus: **Pedestes** Wats.

Club of antenna strong, curved beyond two-thirds, with pointed tip. Vein 5 nearer to 4. Hindwing rounded. ♂ without stigma.

P. masuriensis Moore (86 g). Deep black. Forewing with three apical dots and two united cell-*masuriensis*. spots which touch the base of two other spots, the latter being elongate, contiguous and placed in cellules 3 and 4; in cellule 2 likewise a small dot. All these spots and dots glossy white. Underside of forewing black, of hindwing reddish brown with two small white spots between veins 2 and 4 and a subterminal row of small grey dots. North-Western Himalayas and Sikkim.

23. Genus: **Hyarotis** Moore.

Antennae long, club elongate, with curved apex. Palpi erect. Vein 5 of the forewing nearer 4. Hindwing rounded.

H. adrastus Cr. (= *paha* Moore, *phoenicis* Hew.) (86 g, h). Wings black-brown. The forewing *adrastus*. bears 2 almost quadrangular white spots in a straight line obliquely across the disc, a smaller spot in cellule 4 and another in cellule 2; there are also 3 subapical dots. On the underside the row of white spots is continued to the costa by means of an ill-defined spot. Before the centre of the hindwing a narrow, transverse, white macular band and a submarginal row of brown dots; all the rest black. The spot in cellule 6 is divided and placed outside the general direction of the line. Himalaya and distributed over India to South China and the Sunda islands.

24. Genus: **Isoteinon** Fldr.

Club of antenna moderate, terminating in a short point. Third segment of palpi semierect and not extending above the eyes. Vein 5 of forewing nearer 4; vein 2 from the middle of the cell in ♂, and a short distance below it in ♀. Hindwing rounded. Hindtibia with two pairs of spurs.

I. lamprosilus Fldr. (= *vitrea* Murr.) (86 h). Wings black above. Forewing with a spot in the cell and three others in a straight line in cellule 2, 3 and 4, there being also three pure white, transparent, apical dots. Hindwing beneath with yellow scales and hairs on the disc and a circular row of 8 white spots; the two costal spots darkened and edged with black. A similar spot, moreover, in the cell. Palpi yellow. China, Japan. *lamprosilus*.

25. Genus: **Astictopterus** Fldr.

Antennae thin, with a slender curved club. Palpi porrect. Vein 11 of the forewing curved back near its base and hence nearer 12; vein 5 nearer 4. Hindwing rounded. Hindtibia with two pairs of spurs.

A. henrici Holl. (86 h). Black. Forewing beneath sooty brown; apex and costa reddish brown. *henrici*. Both sexes have usually vitreous white dots in cellules 6, 7 and 8. The ♀ has often a similar small spot at the base of cellule 3. Hindwing beneath reddish brown, with two darker bands, and some grey dots, which are ash-colour in fresh specimens. West China, extending from there into north-eastern India.

A. olivascens Moore. Wings dull black-brown, lighter at the apex and along the costa. ♂ without *olivascens*. apical dots; ♀ with three dots in cellules 6, 7 and 8. Underside of hindwing with dark bands, which are ill-defined above and below the centre of the wing. Central and South China.

26. Genus: **Apostictopterus** Leech.

Antennae thin with slender club, reaching to the middle of the costa. Palpi curved upwards, third segment porrect. Forewing long and narrower, apex obtuse; vein 5 approaching 4 a little.

A. fuliginosus Leech (86 h). Black. Distal margin of forewing straight from vein 5 to the costa, *fuliginosus*. thence oblique towards the apical angle, an obtuse angle being formed at vein 5; vein 11 in its normal place. Omi-shan. West China.

27. Genus: **Erionota** Mab.

Club of antenna strong with sharply curved tip. Palpi ascending, third segment concealed. Vein 5 of forewing approaching 4 a little. Distal margin of hindwing sinuous. Hindtibia with 2 pairs of spurs.

E. thrax L. (87 a). Black-brown; Palearctic specimens of this Indian species are much darker than *thrax*. true *thrax*. Forewing with three large, long, transparent spots, which are yellow. Underside yellowish brown; the forewing blackish in the centre. Across the hindwing below the middle a dark band-like shadow. This form, named *lara* Swinh., differs from Indian *thrax* only in its blackish colour. Himalaya, *lara*. Manchuria.

E. grandis Leech (87 a). One-fourth smaller than *thrax*, deep black, with three spots as in *thrax*, *grandis*. but small, white and almost square. Underside of hindwing blackish. Centre of forewing lighter. Hindwing with a darker shadow at the costal and distal margins. Sexes similar. China.

28. Genus: **Heteropterus** *Dunc.*

Antennae short, less than half the length of the costa; the club short, straight, obtuse. Palpi porrect, third segment short. Vein 5 of forewing nearer to 4. Hindwing rounded. Abdomen reaching beyond anal angle of hindwing. Protibia with a short spur on inner side; hindtibia with two pairs of spurs.

morpheus. **H. morpheus** *Pall.* (= *steropes Schiff.*) (87 b). Forewing above black with 3 apical dots and a spot each in cellules 4 and 5. Some ♀♀ have on the hindwing a row of 4 or 5 yellow dashes and a small dot in the cell. The forewing bears beneath a spot in the cell, another proximally to the apical dots and a narrow short band near the margin. The hindwing has three rows of oval, mother-of-pearl spots which are surrounded by small yellow spots, there being also a narrow yellow band near the margin. The butterfly is called „mirror“ on account of the mother-of-pearl spots. Europe, Asia, eastwards to Japan.

29. Genus: **Leptalina** *Mab.*

Forewing narrow, with prolonged apex. Protibia without spur on the inner side; hindtibia with only one pair of spurs. Abdomen extending far beyond the hindwing.

unicolor. **L. unicolor** *Brem.* (87 b, only the upperside). Black, above without spots. Beneath the apex of the forewing and the whole hindwing dull ochreous, sometimes yellowish grey with an indistinct yellowish streak from the base at the inner margin. Palpi, pectus and underside of abdomen pale yellow. ab.

ornatus. **ornatus** *Brem.* (87 b, the underside named „unicolor“) differs only in the hindwing bearing two very light, silvery white, broad stripes, one in the middle and the other in cellule 1 a. The ground traversed by the whitish veins. Intermediate specimens bear white streaks between the veins besides the two broad ones. Amur, Central China, Japan.

30. Genus: **Dejeania** *Oberth.*

Antennae with obtuse club. Palpi porrect. Vein 5 of forewing midway between 4 and 6; this vein well developed in the hindwing. Hindtibia with two pairs of spurs.

bicolor. **D. bicolor** *Oberth.* (87 a, b). Black, on the forewing with a broad yellow band which extends from the costa to the hindmargin. On the discocellular a black dot. On the underside the forewing has the same band as above and the hindwing bears a narrow yellow band which runs obliquely from the costal margin to the anal angle. Body black above and beneath. Tibet: Tse-kou, Siao-lu.

31. Genus: **Pamphila** *F.*

Antennae shorter than half the costa; club thick and obtuse. Palpi porrect. Hindtibia with one pair of spurs, one species excepted. In order to render the determination of the species more easy we give a key to this genus:

1. Hindwing beneath without light spot in the centre of cellule 8 or with 3 light spots in this cellule 2.
Hindwing beneath with a light spot in the centre of cellule 8 6.
2. Hindwing beneath with 3 macular bands of a lighter colour than the ground, the spots being very distinct and separated 3.
Hindwing beneath with the spots less distinct or quite absent, being sometimes only represented by black dots 4.
3. Forewing pale yellow with 3 oblique black spots on the disc and another spot in the cell, there being also a marginal row of small black dots **P. silvius** *Knoch* (87 b, c).
Forewing black, with 3 rows of pale spots, namely: a row at the base, connected with a very large cell-spot, a second row between the branches of the veins, of which the two spots in cellules 5 and 6 are situated much beyond the row, and lastly a marginal row of dull, pale, small spots **P. palaemon** *Pall.* (= *paniscus F.*, *brontes Schiff.*) (87 c).
4. Forewing pale yellow above with black spots. The spot of the cell of the hindwing likewise black, extending from the base to the discocellular **P. houangty** *Oberth.* (87 b).
Hindwing black, with pale spots 5.
5. Hindwing beneath with silver markings, viz. a stripe above the anterior edge of the cell, a semicircular spot in cellule 4, a dot at the margin in cellule 6, another rounded spot at the base of cellule 2, a key-shaped one at the base of cellule 1 b, and lastly a marginal row of small dots **P. pulchra** *Leech* (= *ops Gr.-Grsh.*) (87 c).
Wings black. Forewing above with 5 large pale spots, hindwing with 4 only. On the hindwing a broad whitish stripe from the base of the cell to the distal margin **P. abax** *Oberth.* (87 c).

silvius.*palaemon*.*houangty*.*pulchra*.*abax*.

6. Hindwing with a light spot in the centre of cellule 8. The upperside of the wings with yellow or yellowish spots 7.
Spots pure white 9.
7. Hindwing beneath without light dot at the end of cellules 2 and 3. The disc of the wings with a pear-shaped, large, silvery spot which extends from the centre of cellule 7 below the discoidal cell **P. avanti** *Nicév. avanti*.
Hindwing beneath with a light spot at the end of cellules 2 and 3 8.
8. Forewing beneath with a light spot which covers the extreme base of cellule 2, and with another placed towards the centre of the same cellule **P. argyrostigma** *Er. argyrostigma*.
Forewing beneath without light spot at the base of cellule 2, but with an almost square spot before the centre of this cellule **P. flavomaculatus** *Oberth. (87 c). flavomaculatus*.
9. On the hindwing beneath the light spots of cellules 6 and 7 not united with those placed in cellules 2 and 3 and not forming a silvery marginal band 10.
These spots united to form an uninterrupted marginal band 11.
10. Forewing above without white dot at the base; hindwing beneath with 2 unequal discal dots, which are distinct **P. niveomaculatus** *Oberth. (87 d). niveomaculatus*.
Forewing above with 2 white dots at the base, a vitreous spot at the base of the cell and another, opaque, spot at the costa. Hindwing above with a large white discal spot which is composed of 2 spots united **P. christophi** *Gr.-Grsh. (87 d). christophi*.
11. Forewing beneath with the spots in cellules 1 a and 2 not touching those situated in 3. **P. dieckmanni** *Graes. (= gemmatus Leech, demeia Oberth.) (87 d). dieckmanni*.
Forewing beneath with the spots in cellules 1 a and 2 united with those in cellule 3, forming an uninterrupted median band **P. micio** *Oberth. micio*.

Distribution of the species of *Pamphila*.

- P. silvius* Knoch: Northern Europe, Asia eastwards to the Amur. May, June, usually singly.
- P. palaemon* Pallas: Throughout Europe and Asia as far as the Amur; North America. May, June, locally abundant.
- P. houangty* Oberth.: West China (Ta-tsien-lu). The ♂♂ abundant, the ♀♀ rarer.
- P. pulchra* Leech: North-Eastern Tibet, West China. In June and July.
- P. abax* Oberth.: East Tibet (Mupin, Ta-tsien-lu). The ♂♂ abundant, the ♀♀ apparently very rare.
- P. avanti* Nicév.: North-Western Himalayas, northern Sikkim.
- P. argyrostigma* Er.: Altai, Mongolia, Amur. According to Graeser in June.
- P. flavomaculatus* Oberth.: West-China, Tibet.
- P. niveomaculatus* Oberth.: East Tibet, West China, South China.
- P. christophi* Gr.-Grsh.: Tibet, Sinin-Shan.
- P. dieckmanni* Graes.: Amur, West-China, Tibet.
- P. micio* Oberth.: Tse-kou, East Tibet.

32. Genus: *Ampittia* Moore.

Antennae short, club obtuse. Third segment of palpi erect. Vein 5 of forewing slightly nearer 4. Hindmargin of cell angulate between 2 and 3. Hindtibia with 2 pairs of spurs.

A. Forewing of ♂ with a stigma.

A. maro *F.* (= *camertes* *Hew.*) (87 c, d). 25 mm. Cell of forewing in ♂ yellow beneath with the *maro*. exception of the base. Kashmir. Distributed throughout India.

A. virgata *Leech*. 30–32 mm. Cell of forewing beneath yellow with a black streak in the centre. *virgata*. Central China: Chang-Yang.

B. Forewing of ♂ without stigma.

A. maga *Leech* (87 d). Forewing rather pointed. Underside of the hindwing with black markings *maga*. consisting of dispersed small dots. China, I-chang, Ningpo.

A. trimacula *Leech* (87 e). Forewing obtuse. Hindwing beneath yellow with brown markings, which *trimacula*. are more or less distinctly arranged in three transverse rows: there is, moreover, an elongate light spot in the middle of cellules 3 and 4. West China: Wa-su-kow.

A. dalailama *Mab.* (= *lyde* *Leech*) (87 e). Hindwing beneath brown, densely dusted with yellow *dalailama*. scales, with 3 yellow spots near the base and a postmedian as well as a subterminal row of yellow dots;

the postmedian spots of cellules 3 and 4 are placed near the centre of these cellules and cover their whole breadth. Mupin, West China; Tibet.

Section B.

Antennae diverse, but never curved in hook-shape, the tip curved, short or long, sometimes absent. Third segment of palpi long, slender, vertical, often curved backwards, sometimes very short. The cell of the forewing always shorter than two-thirds the costa; vein 5 curved at the base and always near 4. ♂ often with a stigma, and always without costal fold. Hindtibia very frequently with 2 pairs of spurs, but never with a brush of hairs.

33. Genus: *Taractrocera* Btlr.

This genus is characterised by the club of the antenna having the shape of a flattened disc and being without a pointed tip. The palpi curved backwards, their third segment thin and long, reaching above the frons. ♂ without stigma.

The genus contains at least 11 species, which mostly occur in India and the Malayan and Pacific islands. Only three species are found on Palearctic territory.

maevius. **P. maevius** F. (= *sogara* Moore) (87 e). The spots of the wings small and white. Veins white on the underside of the forewing, very prominent; a spot in the cell and an angulate band of white spots across the branches of the veins. North-Western Himalayas, and throughout India.

danna. **T. danna** Moore. The veins the same, but not white, no white spot in the cell, but with a white stripe in cellule 1 b. North-Western Himalayas, at 2000 m and upwards.

flavoides. **T. flavoides** Leech (87 e). Spots of the wings yellow. Hindwing beneath with the basal third yellow and with an almost square yellow spot below the centre of the cell. Omi-shan and Mupin, West China.

34. Genus: *Adopaea* Bilberg.

Widely distributed in the Old World, occurring from Europe to the Chinese seas. The genus contains more than 12 species, of which 11 are Palearctic. It is recognized by the short antennae, whose club is long, but lacks a pointed tip, further by the porrect palpi, whose third segment is needle-shaped and obliquely erect. The wings are yellow in all the species, with black bands and spots. The following key gives the principal characters which distinguish the species and by which they can be recognized.

1. Veins on the hindwing beneath of the same colour as the ground 2.
 Veins black 6.
2. Forewing of ♂ with stigma 3.
 Forewing of ♂ without stigma. Underside of wings uniformly pale ochreous. Base of the median vein of forewing outlined by a black streak which is continued beyond two-thirds of vein 2 **A. stigma** Stgr. (87 f). Turkestan.
3. Stigma black and reaching to the base of vein 3 or beyond 5.
 Stigma black, ending at or before the point of origin of vein 3 4.
4. Stigma very short and ending before reaching vein 3. Wings pale reddish yellow, narrowly bordered with black. **A. lineola** O. (= *virgula* Hbn.) (87 f). Europa and North Asia as far as Amurland. Stigma very feeble. Butterfly of lesser size. Wings above dark reddish yellow, broadly bordered with black, darkened in the ♀. ab. **ludoviciana** Mab. In the Alps and the Auvergne.
 Stigma extending beyond the point of origin of vein 3 5.
5. Stigma black, reaching to the point of origin of 3, consisting of two portions, the one extending from 3 a little beyond 2 and the other terminating on 2, but being usually continued by a stripe of scales of the same colour as the ground. **A. hyrax** Led. Anterior Asia.
 Stigma curved, continued from 2 across the point of origin of 3 and beyond the discocellular vein. Wings above pale brown, before the cell with a yellow, macular, patch, which is more distinct in the cell. **A. acteon** Rott. (87 g). South and Central Europe, Canaries, North Africa und Asia Minor.
- Similar, but the costa and the anterior half of the forewing pale yellow, absorbing the yellow patch. **A. hamza** Oberth. (87 g). North Africa.

Dark reddish yellow, above with a row of pale spots beyond the cell of the forewing. On the hindwing a row of yellow spots, which are prolonged in the centre of the wings. Under-side of the hindwing blackish red-yellow, with a central row of 5 whitish dots or dashes, of which the central one is often prolonged to the apex of the cell. **A. christi** Rbl. (87 g). *christi*. Canaries.

(These last 3 species are very closely related to each other and may be local forms of *acteoi*).

Stigma black, curved, reaching to the point of origin of vein 3, from this point running a little beyond 2. whence it is continued by a line of pale scales. Wings above pale reddish yellow, narrowly bordered with black. **A. thaumas** Hufn. (= *linea* Schiff., ♀ = *venula* Hbn.) *thaumas*. (87 g). Europe and Asia Minor.

6. Forewing with a broad black border. Base of the wings blackish 7.

Forewing without black border or only with a narrow one 8.

7. Pale band between base and margin rather broad. Veins of the hindwing beneath narrowly outlined in black. **A. sylvatica** Brem. (87 h). Amur und Japan. *sylvatica*.

This band very narrow. Veins on the underside of the hindwing very heavily black. **tenebrosa** Leech (87 h). China. There can be no doubt that *tenebrosa* is only a black and very conspicuously coloured form of *sylvatica*. *tenebrosa*.

8. ♂ with stigma. Wings above light reddish yellow, all the veins striped with black; border of hindwing broader. On the underside all the veins are heavily black. **A. leonina** Btlr. *leonina*. (87 f). Amur and Japan.

♂ without stigma. Vein-lines weaker, especially beneath. **A. nervulata** Mab. (87 h). West *nervulata*. China.

35. Genus: **Augiades** Hbn.

Club of antenna elongate, ending in a short thin point. The hindtibia with long fringes and two pairs of spurs. Stigma on forewing of ♂ extends from vein 3 to 2 and is linear.

1. Underside of the hindwing with the veins unicolorous with the ground 2.

Veins of hindwing beneath black 7.

2. Underside of forewing with black base, this colour limited distally by the stigma and anteriorly by the cell. **A. sylvanus** Esp. (88 a). Europe, North Africa, Asia Minor, Syria. *sylvanus*.

We consider the following insects to be local forms of *sylvanus*:

f. **selas** Mab. (= *herculea* Btlr.). ♂ uniformly golden yellow. Wings above with a narrow blackish or reddish edge near the fringes. Underside of hindwing dull yellow, hardly with any trace of the pale spots of true *sylvanus*. Amur, China. — f. **venata** Brem. Grey (88 a). *renata*. Forewing without black border. Underside of hindwing with large and very pale spots. North China, Japan. — f. **amurensis** Mab. is pale yellow. Wings with a black border along the fringes. All the spots lighter yellow, not very distinct, distally accompanied by a marginal row of small spots which are paler than the ground. Underside hardly blackish at the base. Stigma reddish, prominent. Hindwing ochreous with pale yellow spots. Amur, Corea, North China and Japan. — **faunus** Tur. is pale yellow with very broad blackish costal margin. *faunus*. Hindwing with yellow spots which disappear in a large discal patch. Italy and South France. — In **anatolica** Ploetz the underside of the hindwing is greenish ochreous or green. Asia *anatolica*. Minor. — Both sexes of **hyrcana** Christ. are darker, with a broad black border. Posterior half of forewing beneath black below cell and vein 3. Persian West Gilam and Masenderan. *hyrcana*.

3. Hindwing above with the spots more or less confluent 4.

Hindwing with 2 or 3 ochreous dots which do not touch one another 5.

4. Forewing above with a diffuse spot towards the middle of the hindmargin. **A. subhyalina** *subhyalina*. Brem. Grey (88 a), from China, Corea, Japan and also India (Khasia Hills), is somewhat smaller. Hindwing beneath darker, with the spots reduced. — **thibetana** Oberth. I consider to *thibetana*. be a dark form of *subhyalina*; from the north-side of the Himalayas.

- sylvanoides*. Forewing beneath without diffuse spot towards the middle of the hindmargin. **A. sylvanoides** *Leech* (88 a, b), from West China
- similis*. Wings darker brown, not yellowish grey. Hindwing beneath darker, with the spots much more distinct. **A. similis** *Leech* (88 b). Likewise from West China.
- bouddha*. 5. With three very distinct yellow dots, of which the two inner ones are near each other. Base of
consors. costa dull reddish yellow on forewing. Stigma black. **A. bouddha** *Mab.* (88 b). — ab. **consors** *Leech* (88 b) is a ♀ in which the spots of the hindwing are white, not reddish yellow.
- Stigma black, with a white central line. Base of costa of forewing of a more pronounced reddish yellow. Underside of hindwing without silver spots and without black margin . . 6.
- brahma*. 6. Expanse 33—35 mm. **A. brahma** *Moore*. North-West Himalayas.
crateis. „ 42—47 mm. **A. crateis** *Leech* (88 b, c). West China.
- ochracea*. 7. Size smaller. Forewing pointed, margin dark yellow beneath. **A. ochracea** *Brem.* (88 c).
rikuchina. The var. **rikuchina** *Btlr.* is a blackish form in which the wings have a broad black border, while the rest of the surface is much darkened. The ♀♀ are not more black and have 2 yellow dots in the cell and a subterminal row of much reduced pale spots. The underside of the wings is blackish, dusted with yellow scales. The veins are always more black than the ground. Amur, Corea, Japan.

36. Genus: **Erynnis** *Schrank*.

Antennae less than half the length of the costal margin; club with distinct thin point, Stigma of forewing (♂) completely covering the angle before vein 2. This genus contains only a single, very variable Palearctic species, the Japanese form being in our opinion hardly maintainable as a distinct species.

- comma*. **E. comma** *L.* (88 e). Forewing brown with pale costal margin and pale dots or spots, which are arranged as follows: 3 apical dots, 2 more very close to the margin between veins 2 and 6, separate from an oblique row of 3 more dots between veins 4 and 1. Hindwing with a dot at the base of the cell and a continuous row of 4—5 pale spots. Underside of hindwing reddish grey; 3 spots at the base below the cell and 6 more in a semicircle. ♀ with the same dots and spots, which however are much darker. Throughout Europe and Asia to the Amur; in July and August, abundant everywhere.

A number of aberrations have been named; *TUTT*, for instance, called very light specimens ab. *clara*, dark ones with ochreous spots ab. *suffusa*, others with only a dark edge ab. *intermedia*, dark specimens with reduced spots ab. *extrema*, with confluent spots on the underside ab. *conflua*, with whitish spots *pallidipuncta*, etc. etc. We consider the following insects local forms of the type described above, with the exception of *florinda*, which might be regarded as a distinct species, as will be seen from the description:

- catena*. — **catena** *Stgr.* (88 d). Underside of hindwing green, with the spots more whitish and edged with black.
pallida. North Europe, Lapland, Sweden, summit of the Alps. — **pallida** *Stgr.* Paler, especially beneath. Some
mixta. of the veins of the hindwing white. Sicily, Greece, Syria, Taurus, Pontus, and Kurdistan. — **mixta** *Alph.*
dimila. Wings darker. Underside of the hindwing with the spots greenish, white and glossy. Tian-Shan, Fergana,
alpina. Pamir. — **dimila** *Moore* (88 d). Very close to *mixta*, from which it differs in the very dark hindwing and also in the spots of the hindwing beneath being white, not emarginate and not bordered with black.
alpina. North-Western Himalayas. Ta-t sien-lu. — **alpina** *Bath.* Wings of the ♀ black, slightly reddish. The spots of true *comma* are present in *alpina*, but small and yellowish: 3 apical dots, a double spot in the cell and 5 others in an oblique row between the branches of the veins, the upper 2 of them separated from the lower 3 and placed much out of line with them. Hindwing with a central dot, and 3 others in a transverse row, hardly visible. Underside of forewing dark greenish grey at the costa, apex and outer margin; centre of wing very black. Hindwing very dark grey-green, all the spots white bordered with black. This form is similar to *catena*, but differs much in its darker colouring, which approaches black. From the high Alps.

- florinda*. **E. florinda** *Btlr.* (= *micado* *Mab.*) (88 d). Wings broadly bordered with black in both sexes. Hindwing beneath dull yellow or greenish, with small pale spots. The spots of cellules 4—6 hardly out of line with the others. This character, which it has in common with *sylvanus*, makes us hesitate to treat *florinda* as a variety of *comma*. The very dark ♀ has only 3 spots on the underside of the hindwing, one between 6 and 7 and two between 2 and 4, the other spots being entirely absent, excepting the one in the cell. This ♀ therefore resembles the *sira*-group as well *Augiades subhyalina*. But the ♀ which I received as *florinda* is certainly that of the present insect. Japan.

37. Genus: **Gegenes** Hbn.

Antennae short, hardly reaching one-third of the costa; club strong, ovate, with a short point. Hindtibia with 2 pairs of spurs. ♂ without stigma.

G. nostradamus F. (88 e). Blackish brown, ♂ without any spots. Underside of the wings ashy ^{nostradamus} grey. Base of hindwing blackish. Between veins 2—4 two small pale dots which are hardly visible. ♀ larger, paler brown, with whitish apical dots and an oblique row of 4 pale yellow, elongate spots between the veins.¹⁾ Moreover, there are sometimes 2 light dots between 5 and 6 in the cell. South Europe (France, Italy, Spain), Algeria, Asia Minor and in the North-Western Himalayas.

G. lefebvrei Ramb. A small species, which is darker and has usually no light dots. Sicily. ^{lefebvrei}.

38. Genus: **Eogenes** nov. gen.

Hindwing with rounded distal margin, especially in the ♂, the anal angle being effaced. Vein 2 of the forewing towards the middle of the cell. Antennae with ovate club, which is elongate and has no pointed tip. Third segment of palpi prominent. ♂ without stigma.

E. alcides H.-Schäff. (88 e). Wings brown. Forewing with 3 apical dots, near which are placed *alcides* beneath two more smaller ones. In the cell a large pale yellow spot, and there is a straight row of 3 spots between veins 3 and 1, the posterior spots being the largest. In the ♀ the spots are larger and there are, moreover, 3 small pale spots below the cell of the hindwing. This wing is uniformly pale ash-grey beneath. We separate this species from *Parnara*, as its characters do not agree with that genus. Asia Minor, Armenia. — The form **arkhimani** Christ. (88 e) differs from true *alcides* only in its smaller size *arkhimani* and the larger spots of the wings. Turkestan, near Bucharra, Karategin.

39. Genus: **Parnara** Moore.

A very large genus whose species are found throughout the Old World with the exception of Europe. It is composed of several rather sharply defined sections which may be considered as subgenera. The following key gives the distinguishing characters. On the whole the genus is recognizable by the rather long antennae with their moderately strong club, whose curved tip is pointed and twice the length of the diameter of the incrassate part. The hindtibia has 2 pairs of spurs.

1. Basal half of hindwing with a hairy, black spot. **P. leechi** Elw. (88 f). This species differs *leechi* from *oceia*, which is widely distributed in India, in the underside of the hindwing being greenish and not blackish. Central and West China.
Hindwing without pilose or hairy spot 2.
2. Forewing of ♂♂ with black stigma striped with grey, which extends from vein 3 to the centre of cellule 1 a 3.
Forewing without stigma 6.
3. Stigma constricted in the middle. **P. nascens** Leech (88 f). Central China; June, July. ^{nascens}.
Stigma straight, of even width 4.
4. Hindwing above with a row of 4 white dots, one each in cellules 2, 3, 4 and 5, 6. Underside of hindwing blackish, with the spots as above and an additional one in the cell. **P. sinensis** ^{sinensis} Mab. (= *prominens* Moore) (88 f). Kangra: Central China. — The form **similis** Leech has the ^{similis} dots small and very white, but is hardly a different species from *sinensis* Mab.

Hindwing above usually without white dots; on the underside, however, there are 7 white, small dots between veins 3—7 arranged in a semicircle. Another small dot at the base of the cell. ♀ somewhat larger than ♂, with an additional white dot on the forewing in cellule 2. **P. mathias** F. (= *thrax* Led.) (88 f, g). South and Central Asia and Africa, nearly everywhere ^{mathias} abundant, in the south throughout the summer.

Larger (♂ 37 mm, ♀ 42 mm). Wings delicate, broader. Hindwing more prolonged from veins 4—7; with the spots the same as in *mathias*, but smaller. On the underside the costa and apex of the forewing dirty yellow. Hindwing of the same yellow colour at the base; cellules 1 and 1 b yellowish white; dots very small and in a straight line from 2—6. Palpi and underside of abdomen whitish grey. ♀ somewhat more grey, with distinct white dots on the upper-

¹⁾ The row of spots is too oblique in our figure and the apex and anal angle of the fore- resp. hindwing are too pointed.

side of the hindwing. These characters, taken from a fine pair from China, have induced us to treat the present insect as a distinct species, since it differs from all the forms of *mathias*. **P. mencia** *Leech* (88 g). From the Himalayas to Central China.

mentia.
caerulescens.

5. Hindwing beneath with a subterminal row of small, glossy blue spots from 1 b to 6. **P. caerulescens** *Mab.* (88 g). West China, abundant in June and July, up to 6000 ft.

Without blue spots 6.

bromus.

6. Hindwing beneath with a small white dot towards the centre of cellule 2. In cellule 1 a of the forewing 2 light spots, of which one placed near vein 2 is a mere dot. **P. bromus** *Leech* (89 h). China.

Hindwing with transparent white dots on both surfaces 7.

Hindwing without white dots or with only 2 small obsolescent dots which are hardly visible 9.

guttatus.

7. The white dots of the hindwing in a straight line, which becomes obsolete towards the apex. **P. guttatus** *Brem.* (= *fortunei* *Fldr.*) (88 g, h). China, in June and July, and Japan, here again in the autumn; also in Kashmir and at the Amur, and in distinct forms also in the Malay Archipelago.

The white or yellowish dots not in a straight line 8.

pellucida.

8. Hindwing beneath greenish ochreous; transparent dot of cellule 2 the same as the spot in cellule 4. **P. pellucida** *Murr.* (88 a). At the Amur and Ussuri, in Central China and Japan.

jansonis.

9. Hindwing beneath with a large white dot in the cell; near *pellucida*. **P. jansonis** *Btlr.* (89 h). Japan.

Hindwing without such a spot 10.

cahira.

10. Expanse 46 mm. Forewing above with a whitish spot towards the middle of vein 1 a, beneath with a diffuse whitish spot in the same place. **P. cahira** *Moore.* India and China, but more in the south.

Expanse 37—41 mm. Costal and apical areas of the forewing beneath of the same colour as the disc of the hindwing, namely reddish brown. Cell of forewing with 2 white dots.

austeni.

P. austeni *Moore.* West China, in July, not rare.

Of lesser size: 25—27 mm 11.

zelleri.

11. Hindwing beneath with a postmedian row of 4—5 small white spots which are placed in a diffuse blackish area. **P. zelleri** *Led.* (89 f). Syria, North Africa.

Dots not surrounded with blackish or altogether absent 12.

bevani.

12. Forewing beneath with a light dot in cellule 6. **P. bevani** *Moore* (89 e). Northside of the Himalayas; also in India and the Malay Archipelago.

40. Genus: **Halpe** *Moore.*

Club of the antenna elongate, with a short curved tip. Palpi porrect. Hindwing with vein 5 obsolete; vein 7 curved at its base and so strongly bent back that it touches the discoidal cell. Stigma straight and thick, extending from the point of origin of vein 3 to vein 1, terminating at this vein or reaching even beyond it. All authors appear to ascribe no stigma to most of the species of this genus. But the contrary is the case, as we have been able to ascertain in 14 species examined by us. We have found only a single species, *astigmata*, in which the stigma is absent.

bivitta.

1. Hindwing beneath with several glossy silver-streaks or stripes. **H. bivitta** *Oberth.* (89 e). West China; May until July, not rare; also in Yunnan.

Hindwing without silver-markings 2.

sub-
maculata.

2. Hindwing beneath with 3 transparent spots. **H. submaculata** *Leech* (89 e). Central China, June, July.

Hindwing without transparent spots 3.

subflava.

3. Hindwing beneath shiny yellow with a small black dot each in cellules 2, 3, 7, and a white streak on 1 b. **H. subflava** *Leech* (89 e). West China, in July.

Hindwing beneath without these markings 4.

4. Hindwing beneath without light median band 6.

Hindwing beneath with a band of white or yellowish white spots 5.

5. Blackish brown. Stigma terminating on vein 1; a long yellowish white spot each in cellule 3 and 4; two apical spots, of which the lower one is very long. Hindwing above with a yellowish central area. Underside of forewing with 2 dull yellowish stripes, one on the costa, the other in the cell, above them 2 dots; moreover, a small dot in cellule 6, and 3 elongate apical dots, of which the uppermost is nontransparent; and lastly, a marginal row of 2 to 7 small yellow spots; cellule 1 entirely blackish brown. **H. luteisquama** Mab. West China. — *luteisquama*. We have described this species so minutely, because it is very closely allied to the southern form *H. sulfurifera* H.-Schäff.

Light brown or somewhat yellowish. Forewing above with 3 almost round apical dots, a double spot in the cell and two other small and almost square spots in cellules 3 and 4; these two spots are longer than broad in *beturia* Hew., *sulfurifera* H.-Schäff., and *luteisquama* Mab., which species are closely allied to one another. Hindwing brown, with a diffuse yellowish streak in the cell. Underside of forewing reddish brown, with the spots of the upper-side very distinct and a subterminal row of 8 yellowish white dots between the veins, *beturia* bearing only 6 dots. Underside of hindwing with a row of 6 white spots which form a regular median band; distally to the spots of the cellules 3 and 4 no minute whitish dots; lastly, there is a subterminal row of 4 white dots. Body and palpi blackish beneath. **H. porus** Mab. *porus*. West China. — This a little known species, closely related to *beturia*. It does not appear to have been found again since Abbé DAVID was at Mupin. The stigma of *porus* extends below vein 1 to the hindmargin.

6. Rather large. The basal half of cellules 4 and 5 yellowish. A light dot in cellule 8 of the forewing. Disc of hindwing clothed with brown hairs. **H. nephele** Leech (89 f). West China, *nephele*. in June and July.

Without light band, on the underside of hindwing either with separated spots or without spots 7.

7. Underside of hindwing black. Veins distinctly contrasting with the ground, which is dusted with yellow scaling. Cell-spot of forewing divided. **H. varia** Murr. (89 f). Japan. *varia*.

Veins on underside of hindwing concolourous with the ground 8.

8. Underside of hindwing without spots, dusted with black and variegated with minute yellow specks. Stigma terminating at vein 1. Upperside of forewing with large pale yellow spots, of which the one in the cell is double. **H. latris** Leech (89 f). West China, in July, apparently rare. *latris*.

Underside of hindwing with a row of indistinct dots or spots 9.

9. Cell of forewing with a double spot. Hindwing prolonged and beneath with a median series of 4 black dots. **H. lucasii** Mab. West China. *lucasii*.

Without this row of dots 10.

10. Hindwing beneath brown, covered with ochreous scaling, which forms an indistinct, diffuse sub-terminal band. **H. blanchardi** Mab. (89 f). West and Central China. *blanchardi*.

Hindwing beneath irrorated with yellow scaling, the margin of the wing being greenish grey; a weak, grey dot each in cellules 2, 3 and 6. **H. gupta** Nicér. West China, in July. *gupta*.

Black. Stigma extending to hindmargin. Cell-spot of forewing divided. Underside of hindwing blackish, with a small, obsolescent, light spot in cellules 2, 3 and 5. **H. caenis** Leech *caenis*. (89 g). West China, in August.

41. Genus: **Padraona** Moore.

♂ without stigma. Club of antennae ovate, with a short, sharp crook, which is curved in the shape of an obtuse angle. Vein 5 of the forewing curved at its base and situated close to 4.

P. dara Koll. (89 g). 29—30 mm. Wings black, in the cell and at the costa with a pale triangular *dara*. patch whose apex is directed basad, there being also a band of the same colour united with the apical spots and terminating at vein 1; in cellule 1a a large pale streak. Hindwing black, with a postmedian band and two pale basal dots. Underside of forewing yellow ochre, inner area black, forming two short bands which are obsolescent costally. Hindwing ochreous, with the markings of the upperside bounded by a row of black dots. North-West Himalayas, Kashmir, and in partly but little different local forms throughout India, Indo-China and on the Malayan islands.

P. flava Murr. (= *japonica* Mab.). Larger, 32 mm. Markings the same, but the colour deeper and *flava*. brighter; margin of hindwing orange. On the underside of the forewing a dark band extending to the costa. The ground of the hindwing beneath blackish, the postmedian band pale, bordered by heavy black dots. This species, which is united with *dara* by several authors, occurs only in Japan and does not appear to vary.

42. Genus: **Telicota** Moore.

Close to *Padraona*, differing from that genus by large size and the broader costal edge of the forewing, the forewing being usually narrow with the apex prolonged. Many species have a stigma.

bambusae.

T. bambusae Moore (= *pythias* Mab.). Forewing black; costa and cell pale yellow, a band of the same colour commencing a little before the apex, including the apical spots and ending at the hindmargin; the 2 last spots of the band are emarginate and anteriorly produced along the veins. The hindwing bears a short pale band and a concolorous basal spot. Underside of hindwing yellow; band pale reddish yellow, bordered with small black dashes, which are often obsolete. Stigma of ♂ black, broad, with an ash-coloured stripe in the centre. Chang-Yang, in June.

43. Genus: **Actinor** Wats.

This genus is closely related with *Halpe* and *Padraona*. It differs from the former in the absence of the stigma and the position of vein 2, which originates at one-third of the cell, and is distinguished from *Padraona* by the shape of the hindwing and its markings.

radians.

A. radians Moore. Reddish brown. The forewing bears a triangular cell-spot and a subterminal band, which is dentate distally, each tooth being prolonged to the margin; the tooth in cellule 2 interrupted and then supplemented by an isolated spot; all the teeth yellowish white. Hindwing similar, with pale base. Body dull reddish yellow. North-Western Himalayas.

44. Genus: **Lotongus** Dist.

Antennae equalling two-thirds of the costa; club thin, with the curved tip almost as long as the incrassate portion. Palpi erect. Vein 5 of forewing nearer to 4. Hindwing with 2 pairs of spurs.

sarala.

L. sarala Nicér. (84 d). Large. Forewing black, with 2 long spots, which are continued in the cell. In cellules 2, 3 and 4 three oblique spots, of which the lowest is almost reniform and the smallest; all the spots yellowish white. Hindwing with a broad yellowish spot at the base, to which correspond two yellowish streaks on the abdomen; anal angle bordered with orange. Hindwing beneath with a broad yellow band, which reaches from the costa to the abdominal margin and is interrupted at 1b. West China; Khasia Hills in Assam.

45. Genus: **Pithauria** Moore.

Forewing narrow and long. Antennae half the length of the costa; club small, with the curved tip half as long as the incrassate portion. Palpi erect. Vein 5 of forewing very close to 4. Margin of hindwing angulate at veins 1 and 2; vein 5 absent; disc densely clothed with scale-like hairs.

stramineipennis.

P. stramineipennis Wood-Mas. & Nicér. Wings black-brown. On the forewing two small apical dots and a spot each in cellules 3 and 4; the spots yellowish white. The base of the forewing and the disc of the hindwing densely covered with very light, whitish grey, scale-like hairs, which often have a slight greenish sheen. Underside ochreous-grey. Forewing with a light patch in the cell, which is rarely visible above. Margin ashy grey. Sikkim and Himalayas.

46. Genus: **Notocrypta** Nicér.

Antennae long; club moderate, with short curved tip. Vein 5 close to 4. Hindwing rounded. Body robust; thorax convex and very hairy. All the forms which belong to this genus are so closely allied that ELWES united them under the name *feisthamelii*. The general description of this type applies to all the species of our fauna. We consider it sufficient to mention only those characters by which the Palearctic forms can be separated:—The wings deep black. Forewing with a short band in the centre which is either curved or straight; 1—3 small apical dots, and some other dots between the apical ones and the band; all these markings pure white, semitransparent. On the underside the hindwing and the apex of the forewing sometimes partly lilac grey.

1. White band of forewing beneath continued to the costa by a white or yellowish diffuse spot 2.
White band not continued to the costa 3.

2. Size variable, but as a rule large. The white band curved, deeply angulate on vein 2. Between the apical spots and the band 1—3 dots. Hindwing beneath with a short median band and a marginal one, which is broadly lilacine grey. **N. feisthamelii** Bdr. This nomenclatorially oldest form is described from the Moluccas.

feisthamelii.

White band almost straight, the angle on vein 2 being hardly perceptible; 4 small apical spots and 2 other dots between the former and the band. Underside of the hindwing black, with a small divided dot at the apex of the cell and a very weak, broad, lilacine grey, small terminal band. *N. rectifascia* Leech (84 g). West China. This species may possibly be a *rectifascia* form of the preceding.

3. Forewing beneath with 2 white or yellowish stripes in cellules 10 and 11, which are situated between the apical spots and the costa. Underside of hindwing marked with lilacine grey as in *feisthamelii*. The forewing with 3 apical dots very close together, and between them and the band 2 or 3 more dots, which are a little larger. *N. curvifascia* Fldr.

curvifascia.

Without white or yellowish stripes; the white dots in the apical area well developed or absent. *N. restricta* Moore. The last two species occur at the western frontier of China.

restricta.

47 Genus: *Udaspes* Moore.

Club of antenna with acute point and two-thirds the length of the incrassate portion. Palpi porrect. Vein 5 of forewing near 4. Hindwing broad and rounded. The cell short. The hindtibia with 2 pairs of spurs. No stigma.

U. folus Cr. Forewing black, with a short white median band of 3 spots, angulate on vein 2, *folus*, and another, postmedian band which includes the apical spots and is composed of 2 united spots; in cellule 4 a third, isolated, band. Hindwing black, with a broad white central spot which is dentate and on the underside is narrowed between two heavy black streaks and then continued to the body. In cellule 7 an additional, small spot. North-Western Himalayas, but also distributed over India, Indo-China and the Malay Archipelago.

U. stellata Oberth. (89 g). Close to the preceding, but differs in the white spot of the hindwing being *stellata*, rhomboidal and very distinct, and in cellule 3 bearing a white dot at its base. From Maenia near Ta-tsen-lu.

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Corrections and Additions to Vol. I.

Besides the corrections given in the respective places in the text and at the end of the various chapters (p. 35, 71, 148, 244), the following changes and additions are necessary:

P. 15 under **Papilio sarpedon**:

The Palaearctic form of *P. sarpedon* has lately been separated by FRUNSTORFER, who calls the spring-form *sarpedonides* and the summer-form *nipponus*; from Japan.

P. 69 row 14 from below:

The reference 27c must be erased behind *taurica* and be put behind *libanotica*.

P. 101 add after *Erebia stygne*:

Er. palarica Chapm., from Northern Spain, resembles *E. stygne*, but is larger and exhibits small differences in the orange-red macular band; the markings on the underside of the hindwing are more distinct; the red-yellow patch on the forewing of the ♀ is continued to the costal margin by a grey or whitish shadow; in July.

P. 228 row 20 from above read *crubescens* instead of *erubescens*.P. 241 row 11 from below read *dives* (70e) instead of *dira* (79e).P. 275 add after *Arhopala ganesa*:

Amblopala avidiena Hew. This species was mentioned as a great rarity from China and North India, where it appeared hardly to reach Palaearctic territory. According to a recent communication by the missionary Herr KLAMPEK the species extends northward to Shantung, where he obtained it repeatedly, though not commonly. The species, therefore, is Palaearctic. LEECH characterizes it as being lilac blue on the upperside at the base, the outer half being dark brown with a forked orange spot; hindwing with a tripartite orange spot, anal lobe large and prominent. ♀ similar, larger. *Appears to be very rare.

P. 279:

The *Cigaritis* from Algeria figured 75i (after OBERTHÜR) as *C. zohra* Donz. is now regarded by OBERTHÜR as a new form and has received the name **C. allardi** (Ét. Lép. Comp. III., p. 402, 1909).

P. 287 add after *C. pavana*:

C. kasyapa Moore (77e). Forewing similar to that of the preceding species; hindwing not black in the basal area. Underside quite different from that of the other *Chrysophanus*, entirely verdigris except for the disc of the forewing; the hindwing without spots or only with traces of them. — In Kashmir, more frequent in the southern districts, but also locally not rare on Palaearctic territory. Widely distributed in western North India.

P. 351 row 10 from above add after *Halpe nephele*:

Halpe majuscula Elw. & Elw. (88c). Similar to *nephele*, near which it must be placed, perhaps only a variety of it. Differs from true *nephele* in the paler and more diffuse markings of the underside of the hindwing. Described from a Malayan specimen, but similar individuals are said to occur also among West Chinese *nephele*.

The errors in the references to the figures have been corrected in the Index.

Misprints on the Plates.

Plate		Plate		Plate	
10b read	krystallina instead of <i>crystallina</i>	49 b read	nemogeni instead of <i>neumogeni</i>	73 d read	rubicundula instead of <i>rubimacula</i>
17 e ..	venata <i>venosa</i>	53 e ..	emodes <i>hylas</i>	73 f ..	langutica <i>torgutica</i>
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29 ..	Acrophthalmia <i>Acroph-</i>	57 d ..	lepechini <i>trivena</i>	78 b ..	filicandis <i>filicanda</i>
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29 e ..	epaminondas <i>epimenidas</i>	63 e ..	charonides <i>canace</i>	80 f ..	candalus <i>caudalus</i>
31 b ..	syrcis <i>gemina</i>	64 e ..	autumnalis <i>j.-album</i>	83 f ..	oreas <i>orcas</i>
31 e ..	trimacula <i>trimaculata</i>	67 e ..	obtecta <i>agar</i>	86 d ..	leechi <i>nigricans</i>
32 b ..	progne <i>progne</i>	67 h ..	iphigenia <i>iphigenie</i>	86 g ..	chinensis <i>sinensis</i>
37 e ..	leucotaenia <i>aethiops</i> U.	70 e ..	dives <i>diva</i>	87 b ..	ornatus U. <i>unicolor</i> U.
39 a ..	taurica <i>syriaca</i>	71 a ..	argyrorrhyses <i>argyr-</i>	88 b ..	buddha <i>boudha</i>
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47 a ..	monotoma <i>monotona</i>	73 a ..	percomis <i>perconius</i>		
49 a ..	howqua <i>howqua</i>	73 e ..	mera <i>mcra</i>		

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