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# THE MACROLEPIDOPTERA OF THE WORLD

A SYSTEMATIC DESCRIPTION OF THE  
HITHERTO KNOWN MACROLEPIDOPTERA

IN COLLABORATION WITH WELL-KNOWN SPECIALISTS

EDITED BY

DR. ADALBERT SEITZ, PROFESSOR



DIVISION I: FAUNA PALAEARCTICA VOL. 1—4  
WITH SUPPLEMENT — VOL. 1—4

DIVISION II: FAUNA EXOTICA VOL. 5—16  
PALAEONTOLOGY, MORPHOLOGY, BIOLOGY AND GEOGRAPHY  
OF THE MACROLEPIDOPTERA — VOL. 17



SUPPLEMENT TO VOL. 2.

ALFRED KERNEN, PUBLISHER, STUTTGART

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THE  
PALAEARCTIC  
BOMBYCES AND  
SPHINGES

WITH 16 PLATES



SUPPLEMENT



ALFRED KERNEN, PUBLISHER, STUTTGART

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Printed by H. Laupp jr, Tübingen.



## Preface.

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The 2nd Volume of the Supplementary Series, which is now ready for publication marks a further step in our task. It denotes the collating of all the information in regard to the palaearctic *Bombyces* and *Sphinges* that has been published since the issue of the Main Volume 2, about 20 years ago. Our object has been to give an abstract of all knowledge that has become available and to present same in such a way that it complements and amplifies the particulars given in the original Volume.

It will be observed that this Supplement contains and defines almost the same number of names as the corresponding Volume of the Main Series, which dealt with all the matter known up to the year 1912. This circumstance might lead one to think that in the last two decades a great number of new discoveries have been made. It is quite true that, especially so far as concerns Japan and the Far East, many new forms have been made known to science and our knowledge of palaearctic N. Africa has been considerably enlarged by the activities of HAROLD POWELL, OBERTHÜR and LORD ROTHSCILD. But the main increase in the denominations over the period under review has been by the giving of names to any slight variation from normal type. This obsession of denominating such specimens and claiming the right of priority for the author of every new denomination, has become almost intolerable.

In Volume 2 of the Main Series the editor had indicated in his diagnosis of the Genus *Zygaena* (on p. 18) certain definite directions of variation. This was intended to eliminate the naming of each of these varieties, especially as same are not limited to any particular species, but apply to the entire Genus. It was mentioned there that the red-belted species of *Zygaena* may occur exceptionally without belts, that the red forms may be found with yellow colouration, that six-spotted species may develop but 5 spots and the inverse. To have recognised these facts would have prevented the almost innumerable denominations of "*cingulata*", "*flava*" etc, or at all events would have set a limit to such a procedure. No success attended this attempt at rationalism. The inclusion and description of all these aberrations of the one Genus *Zygaena* comprises 73 pages and over 300 illustrations, i. e. one quarter of the entire Volume.

Some method must be found of preventing the small number of indispensable and scientifically valuable names being submerged by this flood of dispensable denominations. The jurisdiction in such a matter cannot however be effected in a work of reference such as the present one, that is limited to space and consequent brevity. As stated in the Preface to the 1st Volume of the Main Series one of the main objects of this Work is to enable collectors to find a definition and description of every name that may be found in literature, in any Museum or private collection, in descriptions of fauna or in any trade offer relating to same. For such a purpose it is actually quite immaterial, whether the result be a negative one (viz. that the form in question is a valueless freak of nature) or a positive one (i. e. that a first class rarity is concerned). The editor was forced, from the commercial aspect, to consider the wishes of his subscribers and disregard the strictly scientific standpoint, which would have appealed to only about 5% of his readers. The other 95% that study entomology as a matter of sport, or as a hobby, frequently take more interest in a denominated aberration of some local indigenous species than in an exotic rarity from far off lands.



Our readers will best be able to judge the attitude of this work towards the methods of denomination, from the fact that whilst the index embraces some 5000 names, barely 100 denote new denominations that have been made in this Volume. Of these a number represent re-denominations that had become nomenclaturally necessary.

Just as in the case of the text, we have endeavoured in the plates of the Supplementary Volume to bring everything up to date. Such illustrations that had not turned out satisfactorily, have now been replaced by better ones and in other cases, where 20 years ago only a description could be given, we are now able to supply the illustration. A comparison of the new plates of the *Zygaena* and those in Volume 2 of the Main Series will show the improvements and advances in technical art during the last 2 decades.

In regard to the illustrations, it has been possible by carefully utilising the space at our disposal to concentrate same on to 16 plates. The editor has sought to achieve the golden mean between the professional zoologists, who would prefer to have no coloured illustrations at all, or only a very minimum of same, and the "magazine enthusiasts", who would like a fresh illustration to show every minute variation. Experience has shown, that so far as Lepidoptera are concerned unillustrated works of reference scarcely serve their purpose; on the other hand such works that go to the opposite extreme, as for instance VERITY's magnificent work, "*Rhopalocera Palaearctica*" have proved to be impracticable; it had to be abandoned on completion of the *Papilionidae and Pieridae* and after the final 20 plates had been issued in black and white, i. e. uncoloured. Illustrations on such a comprehensive scale would also not have been feasible in our Work. A simple calculation shows, that had we proposed to give a similarly extensive number of illustrations as VERITY, we should have required at least 1500 plates for our palaearctic Volumes, whilst actually we have compressed the illustrations of same, including the Supplementary Volumes into abt. 300 plates. Thus through its moderate cost and our system of instalments, we have made our Work available to every small club, every Institute and Scientific College and besides to the great majority of private collectors.

As to the illustrations themselves, it has never been our intention to make a work of art of them. I therefore pass over such criticisms as that the shaft of the antennae is too thick, or the club of same too compact, or that the head is not quite the right shape and many other minute differences. There is a limit to the exactitude of reproduction and quite apart from the cost, it seemed more important to expedite the completion than to delay same by a pedantic insistence on trifling corrections. The greatest possible care was exercised to reproduce natural typical specimens and only very few of our illustrations are made from copies or sketches, as in such cases we were unable to control as to whether same were true to nature. In reproducing specimens by means of photography, as we have done wherever it was possible, one cannot avoid transmitting small changes in the shape (as for instance if a specimen has been rather too tightly compressed in its paper transport wrapper) and these cannot always be corrected in an illustration. We consider such irregularities to be unavoidable and are certain we may count on the indulgence of our readers, who will appreciate the general execution of our illustrations and their trueness to nature, both in regard to drawing and colouration. May we ask those that feel induced to criticise, to consider, that in a work with more than 50 000 illustrations, it is impossible for every single figure without exception to be perfect.

In regard to various other points that would help our readers to understand the difficulties of planning and publishing the *Macrolepidoptera*, I would refer to the Prefaces of the previous Volumes already completed. We are constantly being reproached that the compilation of the individual paragraphs does not in some cases cover the entity of an individual species. Often this seems to be merely an attempt to demonstrate some immaterial inexactitude or to establish the superior knowledge of our critic. The question of the relationship of forms and species to one another, with our insufficient knowledge of the exact biology in so many cases, is one that still requires much elucidation. It would often be actually impossible to make a definite assertion in these matters and to enter into an argument on such a subject in a work of this nature, would have been a digression that would have served no purpose. Our object is to make our work as complete as possible and to give all material details and references in the most succinct and concise form.

It has been an anxious task for the editor to succeed in publishing the 48 parts, that have been issued during the year 1933 in accordance with the original scheme. Thanks to the untiring efforts of the publishers, this has been achieved and this is all the more creditable, as the difficulties that have been encountered seem to have grown almost from day to day. The desperate state of affairs in the world of finance hinders the smooth liquidation of international commercial obligations. The interchange of goods between one country and another is now so difficult that trading has almost been brought to a standstill. The chaos in the exchanges is equally harmful to all nations and obstructs all progress. Even the necessities

of life can now no longer be interchanged and all people and states are suffering in consequence. The war and also the effects of same in the post-war period, have adversely influenced the study of natural sciences and the pursuit of science as a hobby. It is satisfactory to record that just of late one can observe the first signs and symptoms of a revival of interest in these matters. After a period of stagnation lasting about a decade, this change is to be welcomed and it is no doubt due to the unabated enthusiasm of the old brigade of nature lovers, naturalists and collectors, as well as the old established entomological societies and clubs that this has been brought about. In spite of the craze for sport, it is necessary to interest and attract youth and secure fresh recruits as students of entomology. It is to be hoped that from now onwards we shall see an ever growing interest in science.

The gratifying reception accorded to these Supplementary Volumes and the steady progress of our Work give us confidence and courage to continue our task from the completion of which nothing can now deflect us.

Darmstadt, December 1933.

DR. ADALBERT SEITZ.





## Phalaenae, Moths.

The relationship of the *Phalaenae* (the designation of which in the main is the same as that of the *Heterocera*), to the considerably more homogeneous "*Diurna*", is still viewed in the same way as 20 years ago when the relative paragraph of page 3 of the main Volume was written. The new denominations for Vol. 2 of the supplementary work are not so numerous as for Vol. 1 and the reason for this may be that the collecting of *Heterocera* is more the inclination of scientific than merely sporting collectors. Our knowledge of the details of the life history of the *Bombyces* and *Sphingides* has therefore considerably increased, whilst the purely sporting mania of denominations is less prominent; only the single group of *Zygaenidae* has had an inundation of names for constantly recurring aberrations, whilst a similar flood is setting in for other favourite groups, such as the *Syntomidae* and *Arctiidae*.

### I. Section: *Bombyces*.

As already mentioned in the main Volume, we have included under this heading in our "Macrolepidoptera of the World" all those *Heterocera macrolepidoptera* which are contained in Vol. 2 of KIRBY's Catalogue and in addition thereto a few moth Families, such as the *Aegeriidae* and *Thyrididae*, which are held by many people to be "*Microlepidoptera*". Because the *Sphingidae* (which are much more closely allied to the *Notodontidae* than to any other Lepidoptera) are placed between the families of the *Bombyces*, it is apparent that this conventional classification does not represent a final definite systematic grouping. It would be incorrect to attribute any such significance to the retention of this grouping in the supplementary Volume and as expressed in the closing sentence of the main Volume when dealing with this section.

### 1. Family: *Zygaenidae*, Burnets.

In dealing with the family of *Zygaenidae* in the main work (Vol. 2, p. 18) stress was laid on the fact that in this family certain variations probably can occur in all species in one and the same direction. For instance species with 6 spots can exceptionally bear only 5 spots and further species with 5 spots are frequently observed bearing a sixth. Then again the spots of the forewings can be confluent in pairs or groups or all together. Finally in the red-belted *Zygaena*, the red abdominal belt can be exceptionally absent and in other species, where normally absent, may exceptionally occur. This may characterise a subspecies or may be purely aberrative of a single individual specimen. Therefore certain denominations of sub-forms of a definite type of variation constantly recur, such as *sexmaculata*, *confluens*, *cingulata*, *interrupta*, *flava* etc. The discovery of such specimens is purely a matter of chance and it might be more important to ascertain which species do not vary in these ways, than to multiply the number of names year by year, when applying a denomination for each variation to further species. Already in the main Work dozens of "*confluens*" and "*cingulata*" have been registered in relation to *Zygaena* and it seems only a question of the immediate future when the same names will be applied to those species in which so far they are absent. When the question of a reduction in the innumerable names in Entomology is seriously approached, a decision will have to be taken as to whether such separate denominations cannot be dispensed with (i. e. when the forms of variation are almost universal and when this can be mentioned when describing the Genera). Some may claim justification for the names by referring to the old Classics, who had already allotted them, but in opposition to this, one can contend, that in those days insufficient material had been collected to give a decisive answer to such a question as this. The subsequent classification in this work does not vary from the rules observed in the original Volumes. No alteration is possible until some definite ruling has been made in authoritative quarters, applicable to the entire Zoology, in regard to the question of denominations of individual forms.



A. Subfamily *Phaudinae*.1. Genus: **Neopryeria** Mats.

Differing from *Pryeria* Mr. by the almost naked abdomen, which has 2 upright tufts of hair on each side of the last segment.

*jezoensis*. **N. jezoensis** Mats. (1 a) ♂, head and thorax black, antennae dark brown, the shaft slightly glossy, head and tegulae sparsely haired with dark brown, scapulae golden yellow. Thorax glossy with a few hairs on the 3rd thoracic segment. Wings almost like *Pryeria sinica*. Abdomen pale vermilion red with 5 somewhat darker longitudinal streaks, a few gold-yellow hairs along the anterior half of each segment, a black spot on the posterior part of the stigmata, a tuft of hair on the last black segment. Legs brown with brown hairs. — Hokkaido (Sapporo) — Mount Moiva — in September.

2. Genus: **Dieida** Strd.

Proboscis not visible, either quite absent or rudimentary. Palpi thin, short, pointed, porrected, with fairly long erect hairs beneath. Clypeus densely covered with hair scales and therefore appearing conically truncate. Antennae pectinated overall fairly equally long and up to the tip. Pectinations thickened at the ends, sparsely haired throughout and finely separated. Legs short and weak; hind tibiae without middle spur but with short end spur, front tibiae with middle spur but without end spur. Claws with a blunt protuberance at base, but without a prong. Body sparsely haired. The scant scaling of the wings, which for the greater part are hyaline, is coarse and consists partly of long hair-like scales. Frenulum is present. Vein 1 c present on both wings. On forewings vein No. 5 is closer to vein 4 than to vein 6, no areola, the cell is narrow in the basal half as in *Pryeria*, but the subcostal and median do not touch, the costal is not conjoined distally by veins with the margin. The cell of all wings intersected. Hindwings with only 7 veins (No. 6 missing), costal merges with the cell immediately at base, discocellular weakly developed and deeply angulate, the anterior corner does not project, more than the posterior corner as in *Pryeria*, rather the reverse. Discocellular of forewings approximately rectangularly interrupted, apex slightly elongated, margin oblique, curved and considerably longer than hindmargin. Hindwings not much more than half as long as forewings. Abdomen long and thin, extending far beyond the hindwings.

*persa*. **D. persa** Strd. ♀. Wing expanse 26 mm. The hyaline forewings have golden yellow hairy scaling in the basal area and on hindmargin and costa, scarcely reaching to the apex and which is somewhat darker in the apical half of the costal band than at base. Veins sparsely dusted with black in the hyaline area. Fringes black. Hindwings as forewings. Body black, head, collar and back of thorax with golden yellow hairs; abdomen with 5—6 narrow, golden yellow, partly indistinctly separated transverse bands of hairs. Legs black with yellow tibiae and tarsi. Antennae and their pectinations black, palpi golden yellow. Persia.

3. Genus: **Pseudopsycha** Oberth.

*endoxantha*. **P. endoxantha** Püng. (1 a). ♀. Wings semi-transparent, sparsely dusted with black, veins blackish, marginal line blackish, fairly heavy, fringes black-grey. Forewings narrow and elongated with oblique margin, fairly heavily scaled with bright yellow to the middle of the cell, then darkly dusted in band formation; hindwings sparsely dusted with yellow in basal area, inner margin dark, anal angle rounded not projecting. Underside paler than upperside, faintly dusted overall with yellow. Body a lively yellow with long hairs, palpi dark with long hairs, antennae thin and serrated, yellowish, pectus dark. Legs yellowish, abdomen short. Probably belongs to a new Genus, which however cannot be definitely ascertained until we have knowledge of the ♂. Amur territory, Kasakewitseh. At end of May. The specimen illustrated is from the Berlin Museum.

B. Subfamily *Chalcosiinae*.4. Genus: **Aglaope** Latr.

*labasi*. **A. labasi** Oberth. (1 a) entirely different from *infausta* by the rose border close to the margin of the forewings and the extension of the rose colour on the hindwings, so that only a narrow blackish border is left. The apex of hindwings has a heavier black margin towards the costa. Body and antennae black with red collar. Head of ♂ black, in the ♀ there is a tuft of earmine red hairs between the eyes. Antennae of ♂ serrated, of ♀ setiform. Djebel Tisdadine, Morocco at an altitude of 2400 m in July. It was found in fairly considerable quantities near the peak of the mountain. Illustration according to OBERTHÜR.

5. Genus: **Procris** F.

## a. Species with setiform antennae.

**P. pekinensis** Draes. (1 a). ♂ is very similar to *P. elegans* Pouj. (Vol. 2, plate 1 d) however easily *pekinensis*. differentiable by the yellow hairstreaks on both sides of abdomen. Peking. The type is illustrated from a specimen in the Dresden Museum.

*P. tenuicornis* Zell. var. **minutissima** Oberth. is a small race from Géryville and Aflu in Algeria. — Larvae *minutissima*. of the algerian *tenuicornis* in May: head small, black and glossy, it can be withdrawn into the prothorax on which is a thick rounded scutellum which is black and pointed anteriorly and which one might consider to be the head when same is withdrawn. Colour dark grey, the skin sprinkled with quite minute black dots. On the back of each segment there is a black-brown triangular spot. The dorsal line is bordered by a whitish slightly undulating line. The grey-brown warts have short white-grey hairs.

**P. anatolica** Naufock (1 a). Shape and wing contour fairly similar to *chloros* but forewings more truncate *anatolica*. at apex, densely scaled, brownish-olivegreen with dull gloss. Hindwings with shorter inner margin than *chloros*, apex of forewings rather narrower. They do not appear to be so triangular as *chloros* in shape, being blackish with denser scaling in anal fold and at margin. Fringes blackish. Head and thorax glossy gold, abdomen blackish on underside glossy bronze, more robust in the ♀ than *chloros*. Tips of antennae in the ♂ more truncate, the last 3 joints of the pectinations often grown together; in the ♀ somewhat more robust than in *chloros*, not appearing weaker at base and serrated throughout. Genital apparatus with simple clasping flaps without any tooth or thorn. The last abdominal segment of the ♂ has ventrally a very wide chitinous belly plate, that projects strongly over the genital aperture, which is fairly well rounded at the upper corners and indented in the middle. The vaginal segment of the ♀ is not withdrawn as in *chloros* before the vagina, leaving same uncovered, but is an almost straight sheath covering same completely. Ak-Shehir (Asia Minor) and Syria at the beginning of June. The specimens illustrated are Cotypes from Ak-Shehir (from NAUFOCK's Collection).

*P. globulariae* Hbn. (Vol. 2, p. 8). VORBRODT describes as ab. **azurea** a larger form with more sparsely *azurea*. scaled forewings with beautiful blue-green shining gloss, from Biasca.

b. In the following Species the Antennae of the ♂♂ have at least 3 joints besides the last joint without free pectinations.

**P. pamirensis** Hmps. (1 b). The ♂ resembles *dolosa* (Vol. 2, plate 1 i) and has similar antennae but it is *pamirensis*. without blue or green on the underside of the wings. Head and thorax are golden green with an inclination to copper colour. Abdomen blackish. Forewings golden green with blackish brown fringes, hindwings blackish-brown somewhat thinly scaled. Alitshur (Pamir). We illustrate the type from the British Museum.

*P. orana* Aust. (Vol. 2, p. 9). Subsp. **algorica** Rothschild. (1 b) from the Province Constantine (Djebel *algorica*. Chelia, Djebel Marcouna, surroundings of Batna in June) is larger and of richer colouration. Forewings have both blue and green as well as golden green dusting. Specimens illustrated are from the Museum at Tring.

*P. statice* L. (Vol. 2, p. 9). ROTHSCHILD has given the name subsp. **prasina** (1 b) to a larger, metallic *prasina*. brassy-green form with long and thick antennae from Ain Draham in June. The specimen illustrated is from the Museum at Tring. — ab. **obscura** Reuss are specimens with blackish-grey wings with a faint bluish sheen instead *obscura*. of the metallic shining green scaling: from Biesenthal (Mark Brandenburg).

**P. jordani** Naufock (1 b) is smaller than *statice*: ♂ very variable in size, very thinly scaled, uniform *jordani*. golden green with a touch of bluish on forewings and brownish grey hindwings. Fringes grey as in *statice*, forewings somewhat narrower, otherwise of the same form and shape. Hindwings not more thinly scaled towards the base, of similar shape to those of *geryon*, but more transparent. Head and thorax golden green, often with bluish gloss. Abdomen glossy, robust and heavy. Antennae shorter than in *statice* and *geryon*, pectinations of the 9 last joints grown together. Anal clasp of the ♂ has in the middle of the lower edge a long spine-like process, that is bent inwards at a right angle like a hook. The belly plate of the 7th segment does not reach the edge of the aperture of the abdomen. The ♀ is not much smaller than the ♂. Form and colouration as in the ♂, antennae distinctly clavate with lamellae weakly serrated and also very short. San Ildefonso, Province Segovia and Sierra Nevada in Spain at the end of June. The Cotypes from San Ildefonso (from NAUFOCK's Collection) are illustrated.

**P. albanica** Naufock (1 b, c). Smaller than *micans* (Vol. 2, plate 1 k). Forewings yellow green, somewhat *albanica*. shining. Scaling not so dense as in *micans*. Contour of wings similar to that of *micans* and *geryon*. Hindwings



dark brown, similar to those of *geryon*. ♂ antennae with 9 joints before the tip grown together, heavier and robuster than in *statices*. The extremity of abdomen of the ♂ when denuded of scales shows the wide truncate ends of the anal clasps in the genital aperture, having a very characteristic wide claw-like, long pointed, thorny prong bending inwards and situate at the lower edge. ♀ antennae spindle-shaped towards the tip, serrated as *geryon*, scarcely perceptible with a magnifying glass and very difficult to differentiate from *geryon* ♀. Pashtrik (Albania) in the 1st half of July. Illustration of the Cotypes from NAUFOCKS Collection.

c. Species with capitate antennae.

*mystrocera*. **P. mystrocera** Püng. ♂ (1 c). Closest to *capitalis* (Vol. 2, plate 11) with narrow wings, densely scaled, hindwings much darker with similar knobbed extremities to antennae, although narrower and longer. Not identical with *duskei*. Forewings lively green, not very shining, fringes black-grey, hindwings black. Underside dark grey, hindwings with sparse green scales in the upper part of the cell. Palpi relatively thick, black. Head and thorax glossy green, abdomen black, legs partly with indication of green. Shakuh (North Persia). The type illustrated is from the Berlin Museum.

6. Genus: **Alloprocris** Her.

The front tibiae without spurs, tongue strong and well developed, antennae of ♂ pectinated on both sides, only dentated at the tip. In the forewings all nervures of the radius, media and cubitus are free of the cell, which itself is reduced at the base, as in *Procris*. Hindwings with complete number of veins.

*draesekei*. **A. draesekei** Her. (1 c). Body black with purple sheen, collar and base of tegulae red. Forewings black-brown, costal, outer and inner margins outlined by a narrow red line, all veins red. Fringes black, separated in the middle, behind that paler. Hindwings black-brown with red central area. On the underside the whole cell of forewings is red, otherwise as upperside, in the hindwings the red central area projects further distally, so that the black-brown outer margin is much narrower. — Omei-shan near Kiating-fu and Sunpanting (in Szechuan). The specimens illustrated are from the Museum at Dresden.

*adusta*. **A. adusta** Draes. (1 c). Similar to the previous species in shape and neurulation, but without the large red discal spot of hindwings, which are quite black. Sometimes on the underside the costa of forewings and occasionally also the outer edge of the hindwing cell are faintly red. Ta-tsien-lu, Omei-shan (Szechuan). The type illustrated is from the Museum at Dresden.

7. Genus: **Eterusia** Hope.

*sugitanii*. **E. aedea** L. (Vol. 2, p. 10, plate 2 c). Subsp. **sugitanii** Mats. is olive coloured on forewings with narrow white spots. Honshu, Japan at the end of August.

*culoti*. **E. culoti** Oberth. (Vol. 2, p. 441, plate 56 k). ♂ with longish wings, ground colour of forewings bright yellow and hindwings orange yellow. On underside the black is almost entirely replaced by blue. Body is yellow underneath. Antennae are black, long and pectinated. Mu-pin, Tien-tsuen and Tay-tou-ho.

*dubernardi*. **E. dubernardi** Oberth. (1 d) from Tse-kou is smaller and blacker almost without blue, otherwise very similar to *culoti*. Illustration according to OBERTHÜR.

*lacreuzi*. **E. lacreuzi** Oberth. (Vol. 2, p. 441, plate 56 k). Ground colour of forewings is bright yellow, shoulder blades and underside of abdomen being the same colour. The costa and outer margin of underside of hindwings white-grey. Tse-kou.

*moerens*. **E. moerens** Oberth. (Vol. 2, p. 441, plate 56 i ♀), the ♂ is unknown.

*lydia*. **E. lydia** Oberth. (1 d). With elongated forewings, cut off at apex almost perpendicularly. Ground colour of forewings olive-brown with bright yellow spots. Hindwings darker yellow. Underside of abdomen yellow-white with black belts. Shoulder blades yellow. Siao-Lu, Ta-tsien-Lu. The ♂ illustrated was caught at Ta-tsien-Lu and is from the Museum at Tring.

*cecilia*. **E. cecilia** Oberth. (1 d). Upperside of all wings black without gloss and with a sort of fine whitish edging to the apex of forewings, which is more strongly developed on underside. Head and antennae, which are slightly pectinated in the ♂, are black. Collar reddish, body black on top and rose underneath. — Siao-Lu, Mu-pin, Ya-chow. The specimen illustrated is from the Museum at Tring.

8. Genus: **Psaphis** Wkr.

In regard to the entire Indian Genera see Vol. 10, p. 29.

*rehfousi*. **P. rehfousi** Oberth. (Vol. 2, p. 441, plate 56 k). Underside is about as the upperside illustrated. Underside of body straw-yellow. Siao-Lu.

9. Genus: **Pidorus** Wkr.

**P. reverdini** Oberth. (1 d). Blackbrown, Vertex red, band on forewings flesh-coloured with admixture *reverdini*. of orange. Siao-Lu. The specimen illustrated is from the Museum at Tring.

10. Genus: **Herpa** Wkr.

**H. elongatissima** Oberth. (1 c). The wings are more acute than the other known species of this Genus, *elongatissima*. body and wings pale yellow. On the forewings the veins are finely indicated by black. Antennae black, very plumose in the ♂. Tse-kou. The ♀ illustrated is from the Museum at Tring.

OBERTHÜR considers *H. ochracea* Leech (Vol. 2, plate 2 d) and *H. luteola* Leech (ibid.) to be ♂ and ♀ of one species.

**H. eleonora** Oberth. (1 d). ♂ distinctly larger than *basiflava* Oberth. (Vol. 2, plate 2 d). Forewings darker, *eleonora*. hindwings brighter yellow. On underside the black neuration is finer and less extensive than on upperside. Body completely indigo-black. Shoulder blades and pectinated antennae black. Ta-tsien-Lu. The type illustrated is from the Museum at Tring.

11. Genus: **Campylotes** Ww.

**C. philomena** Oberth. Similar and only slightly larger than *minima* (Vol. 2, plate 2 f). Ground colour *philomena*. on upperside black-brown, bestrewn with Nanking-yellow spots, hindwings orange-yellow, intersected by the black-brown markings along the veins. Thorax blackish on upperside, scapulae Nanking-yellow; abdomen blackish with orange-yellow belts. Antennae black and pectinated. Underside of forewings with enlarged yellow spots. Ta-tsien-Lu.

12. Genus: **Agalope** Wkr.

**A. lucia** Oberth. is a palaearctic boundary form from Tse-kou, of which I could not obtain a specimen *lucia*. for illustration. It is very close to the south chinese *A. aurelia* Oberth. from Yunnan, Bahand, but paler and with fainter and slightly altered marking. Ground colour of forewings pale yellow, neuration brownish; hindwings whitish with darker veins. From the costa of forewings obliquely through the middle of the cell and from there at an acute angle almost to the inner margin there is a dark stripe. At apex and base the forewings are more darkly scaled, also the hindwings. Thorax and abdomen red-brown, the latter laterally with yellow. The antennae are missing from OBERTHÜR's type.

*A. glacialis* Mr. subsp. *angustifasciata* Her. (1 e) is very close to the indian *glacialis*. The blackish outer *angustifasciata*. part of the forewings extends more straightly to the inner angle than in Indian specimens. Besides this the whole insect appears lighter. Kwaichow, China. The ♂ type illustrated is from the Berlin Museum.

C. Subfamily *Zygacninae*.

13. Genus: **Artona** Wkr.

**A. sachalinensis** Mats. ♂ differs according to the description from *maerens* (Vol. 2, plate 3 d) by well *sachalinensis*. developed rostrum, 2 pairs of the hindmost spurs are long. Underside of hindwings grey and of the same colour as underside of forewings. Connexivum of abdomen orange-yellow. Larger than *tokyonella* subsequently described and without the pale grey underside of abdomen. Sachalin (Toyohara) in August.

**A. tokyonella** Mats. ♂ differs according to the description from *funeralis* Btlr. (Vol. 2, plate 3 d) by the *tokyonella*. much wider forewings and opaque hindwings. Forewings blackish-brown and opaque; hindwings and fringes of both wings paler; head, thorax and abdomen with a faint purple gloss. Underside of body and legs pale grey. Expanse 9 mm. Honshu (Tokyo), Mount Takao in July.

14. Genus: **Illiberis** Wkr.

**I. laeva** Püng. (1 d). Head and thorax blue-green, abdomen and legs blackish with blue-green sheen. *laeva*. All wings faintly transparent, somewhat glossy with darker veins, forewings blue-green with rounded apex. hindwings grey-black. Underside grey, more glossy. Antennae with stout greenish shaft and medium-long black pectinations becoming shorter towards the tip. China, South Shantung, Jenchow, middle of August. The type illustrated is from the Berlin Museum.



*heringi*. **I. heringi** *Draes.* (1 c). Wings of ♂ and ♀ brown-black, semi-transparent, fringes of same colour, thorax and abdomen black without metallic sheen. Antennae of ♂ pectinated, of ♀ dentated. Ta-tsien-Lu (Szechuan). The type illustrated is from the Dresden Museum.

*distinctus*. **I. distinctus** *Kardakoff*. Similar to *sinensis* (Vol. 2, plate 3 e) but somewhat larger, wing expanse 29½ mm in ♂, 28 mm in ♀. Antennae black. Thorax dull dark grey, abdomen glossy greenish in ♂, bronze coloured in ♀. Wings glossy, especially the hindwings hyaline. A faint brown dusting in costal area and at inner margin of forewings. Veins on both pairs of wings very distinctly dusted with rich dark brown. Fringes brown. A faint thin dusting partially on outermargin of forewings. From the neighbourhood of Vladivostock at end of April.

*aomoriensis*. **I. aomoriensis** *Mats.* ♂ differs according to the description from *hyalina* *Stgr.* as follows: Processes of antennae thicker towards the tip, somewhat shorter, rostrum yellowish; forewings narrower, discoidal cell also narrower, subcostal and median nervures do not touch in the basal area, the long nervure is separate to the base; hindwings without white scaling. Resembles also *psychina* *Oberth.* (Vol. 2, plate 3 e) but has no green colouration of abdomen and no spine at anal clasp. Expanse 20 mm. Aomori (Honshu) in June.

*coreana*. **I. coreana** *Mats.* ♀ resembles in shape *tenuis* *Btlr.* (Vol. 2, plate 3 f) but has quite different markings on wings. Forewings semi-transparent, whitish, faintly rosy-red towards the apex and somewhat pale yellowish towards the base, the margin, fringes, veins and spots blackish brown. Hindwings of same colour as forewings with whitish scales in the upper half of cell, margin, fringes and veins blackish brown. Body metallic bluish-green, rostrum yellow, head and thorax dark blue in the middle, legs similarly. Expanse 28 mm. Corea (Suigen) in April.

*fujisana*. **I. fujisana** *Mats.* ♂ and ♀ forewings transparent with a few black scales, the costal above the median nervure and the veins black, both corners of the discocellular nearly at the same level. Hindwings blackish brown, partly hyaline; antennae blackish-brown, in the ♂ 3 joints thickened, in the ♀ dentate up to the tip with somewhat bluish sheen. Body and legs blackish-brown with slight purple sheen. Genital organ of the ♂ covered with dense hair. Expanse 23 mm. Honshu (Mount Fuji) at end of June.

## 15. Genus: **Clelea** *Wkr.*

*microphaea*. **C. microphaea** *Hmps.* ♂ head, thorax and abdomen dark brown with faint purple sheen, legs and underside of abdomen paler brown. Wings completely dark red-brown, similarly with faint purple sheen, expanse 14 mm. Gensan (Corea).

*syriaca*. **C. syriaca** *Hmps.* ♂ (1 c). Forewings completely dark reddish brown with faint coppery gloss. Hindwings more inclined towards grey-brown, fringes of both wings whitish except at base. Head, thorax and abdomen coloured as forewings, palpi paler. The type illustrated is from the British Museum. Shar-Deresy (Syria).

## 16. Genus: **Zygaena** *F.*

It has to be added to the general biology, that the development from egg to perfect insect rarely takes place without hibernation, generally once or twice and in rarer cases 3 or even 4 hibernations. For each hibernation a special colourless winter skin is formed, in which the larvae are unable to take solid food. The 1st hibernation skin is generally the 3rd or 4th, the second hibernation skin may be the 5th, 6th or 7th, the third hibernation skin may be the 8th or 9th moult. *Z. filipendulae* develops fully in cases of one hibernation with 5 moults + winter skin, of two hibernations with 7 moults + 2 winter skins and of three hibernations with 7 moults + 3 winter skins. A repeated copulation of ♂♂ and ♀♀ occurs more or less frequently. Copulation of various species among each other is frequently mentioned in literature. I myself have a copulation of *Procris statices* ♂ with *Z. filipendulae* ♀ in my collection, which was not dissolved even in killing. STAUDER has described and named a large number of hybrid forms, which first should be checked and proved by breeding experiments.

Note: In dealing with this Genus I have taken as a basis the newly edited catalogue of Prof. Dr. BURGEFF published in 1926 and I have supplemented same wherever necessary by the latest literature, that was not available when the catalogue was issued. The complete new classification of the *Zygaena* and the subdivision of the Genus into 12 Subgenera made it essential to enumerate again every species, subspecies or main race, as well as the varieties or races in the new classification in the Supplement. The addenda to Vol. 2 (p. 441 etc.) also had to be recapitulated for the same reason, not alone in order to give further particulars of the descriptions which were mostly only briefly sketched there, but also to ensure their inclusion in the



register of original descriptions. Otherwise same would have been incomplete and not synoptical. As far as aberrations in Vol. 2, p. 18—31 have already been described as “ab.” and as belonging to a type race of any specific species, they are not mentioned again here, but merely referred to in the text. With the exception of *epialtes* the aberrations are mentioned in the text with the main races and races to which they belong. In giving the particulars of denominations of aberrations, such as “ab. *flava* (Oberth.) Bgff.” it is intended to convey that the new author BURGEFF intends the name *flava* Oberth. to be used for the yellow form also of a new subspecies, instead of giving this form another name, which would of course be permissible. — An indescribable chaos prevails in literature in regard to the denominations of aberrations. Names for intermediary gradations in the development of the markings of insects should therefore be excluded. For reasons of lucidity it has been necessary to leave out even a summary of the names of these excluded forms. In regard to the descriptions of races I am of the opinion that one has often gone too far in this respect. Ways and means should be found of avoiding inundating nomenclature with denominations of minute and unimportant variations of the various strains among themselves. It should suffice to establish a larger main race, to describe the distinct variations from neighbouring main races and then to give same a subspecies name of its own. Should anyone desire a further division of such a subspecies, they can indicate the particulars, such as indication of locality, altitude etc. below the name on the label. It should be mentioned here that on the question of subspecies certain Varietates (Races), which are easily separable, may be classified separately and also denominated. As a comparison of the variability of the separate strains (as already practised by VERITY) it should be possible to arrange for combinations of name diagnoses, which would not be counted as denominations in a systematic sense. In this way at least the separation of so many small races and the naming of many aberrations would be eliminated.

### I. Subgen. *Mesembrynus* Hbn.

**Z. rubicundus** Hbn. (= *erythrus* Bsd.) in Vol. 2, p. 18. Of this generally very constant species VERITY *rubicundus*. has described ab. **polygalaeformis**, which is like ab. *rubropecta* in *purpuralis*, and ab. **erythraeformis**, which is *polygalae-* marked on the forewings like *erythrus*. The ♀ of *rubicundus* is illustrated (1 e). — According to OBERTHÜR'S *formis*. illustration the larvae when full grown are of grey ground colour mixed with yellow, with a wide dorsal stripe *erythrae-* of darker grey and on this dorsal stripe at the edges on both sides behind each segment heavy grey-black spots *formis*. pointing towards the dorsal stripe. The head is black. The larvae are fullfed in April and May and feed on *Eryngium amethystinum* L., pupating in a longish straw yellow cocoon. The period of pupation lasts abt 20 days.

**Z. erythrus** Hbn. (= *minos* Bsd., *saportae* Bsd.) (Vol. 2, p. 18). The yellow form has been named by *erythrus*. OBERTHÜR ab. **citrina**; in ab. **verityi** *Stefanelli* the streak spot 3—5 is intersected with black; the ab. **cingulata** *citrina*. REISS has a faint red abdominal belt. The type race from Florence is taken. — As special races we have *verityi*. to mention: The var. **actae** Bgff. (1 e) from the coast and coastal valleys of the Riviera di Ponente (Mentone, *cingulata*. Bordighera, Camporosso, Pigna etc.). It is the largest race of *erythrus* with wing expanse up to 40 mm in the *actae*. ♂ and up to 42 mm in the ♀ and with narrower very acute wings. The red is less brilliant than in the type race, expansion of spots is very regular, spots narrow, streak-spot 3—5 more extended outwards than in specimens from Florence. The black areas of wings also in the ♀♀ are without silvery grey scaling, also legs, scapulae and necklet with scarcely perceptible grey sheen. The ♀ illustrated is from BURGEFF'S collection. — The var. **miserrima** Vrtz. from Mount Mousiné near Turin is small (wing expanse abt 28 mm) thinly scaled, red wing *miserrima*. spots extended and confluent as in ab. *irpina* Zickert (Vol. 2, p. 18). — Var. **pedemontana** Rocci from the Alps *pedemon-* of Piedmont comes between the ligurian *erythrus* and *miserrima*, besides which the axe-like mark of forewings *tana*. is reduced in length. — Further var. **irpinoides** Bgff. (1 f) a brilliant red mountain race from Mount Sirente and *irpinoides*. Gran-Sasso (Abruzzi Mountains). The spots are enlarged in the ♂ and still more so in the ♀; ♀ normally dusted with golden grey with a similar coloured collar, scapulae and legs. The ♂ illustrated is from Mount Sirente. — The form *magna* Seitz (Vol. 2, p. 18, plate 4 a) could be placed with this race, if the characteristic of the especial size tallied and therefore same could be considered synonymous. — Finally the var. **albipes** Vrtz. (= *minos* *albipes*. *Ragusa*) (1 e) from Sicily with brilliant colouration, both sexes sometimes with whitish legs, the ♀♀ besides with pale silvery sheen on the forewings. The ♀ illustrated is from Le Madonie, Sicily (500 m). Larvae are found on *Eryngium campestre* and immediately on the seaboard on *Eryngium maritimum*.

**Z. purpuralis** Brünnich (= *pythia* F., *pilosellae* Esp., *minos* Hbn.), Vol. 2, p. 18, 441 described from *purpuralis*. Denmark (Zealand Isle) occurs in Europe excepting in the Pyrenee Peninsular, in England, Denmark, Scandinavia, Caucasus, Asia Minor, Armenia, Achal-Tekke, Sarafshan, Ala-Tau, Tien-Shan and Altai. Specimens in which the middle of the red streak-spots on the forewings is regularly and completely the same width are called ab. **plutonia** Vrtz. (= *plutoides* Reiss, *boursini* le Charles). Further I enumerate: ab. **quinquemaculata** *plutonia*. Bgff. with 5 spots on forewings quite separate from one another; ab. **paupera** n. ab. (4 m) from Montabaur, *quinque-* Wester Forest in which the whole forewing except spots 1, 2 and 5—6 is suffused with the ground colour; *maculata*. 3 ♂ 1 ♀ in my collection; ab. **rubropecta** Vrtz.: the red covers nearly the entire forewing; ab. **cingulata** Bgff. *paupera*. (Vol. 2, p. 19); further ab. **rubrianata** Bgff., ab. ♀ **grisescens** Bgff. both in Vol. 2, p. 441. Besides ab. **nigra** Reiss *rubropecta*. (from Ulm) without any red. The name *lutescens* Tutt (Vol. 2, p. 441) may be deemed synonymous. The *rubrianata*. forms already mentioned as aberrations in Vol. 2, p. 18/19 are to be added; *grisescens*. *marginata* Bgff. and *dilatata* *nigra*. Bgff. (Vol. 2, p. 441) are not systematically justified designations. Ab. *grossmanni* Rühl (1 f) from the neighbourhood of Ulm on the Danube is illustrated, as also is ab. *seamaculata* Bgff. (Vol. 2, p. 19) (4 m) from the



- normanna*. same locality as ab. *paupera*. — The races to be mentioned are: var. **normanna** *Vrty.* (= *purpuralis* *Oberth.*) (1 f) from North France (Eure, Pont de l'Arche) one of the smallest races, ♂ with slight blue sheen, ♀ with slight silvery sheen on forewings, streak-marks separate and short. The ab. *interrupta* *Stgr.* is not rare. A ♂ from
- incisa*. Pont de l'Arche from VERITYS collection is illustrated. VERITY defines as ab. **incisa** of this race specimens in which the red at the end of the middle spot of forewings is extended in a long streak almost to the outer margin. —
- jurae*. Then var. **jurae** *Vrty.* from the Swiss Jura (Dombresson at 1000 m) wings very narrow, with acute apex, outermargin almost perpendicular. Scaling very sparse, gloss of wings dark greenish in ♂ and silvery in ♀.
- rubrofimbriata*. Size varies considerably. Very variable. The ab. **rubrofimbriata** *Vrty.* has pale red fringes to hindwings. —
- reissiana*. The East Prussian race (Osterode) is var. **reissiana** *Bgff.* (= *reissi* *Bgff.*, *heringi* *Reiss*) (1 f) with slenderer antennae, distinct superficial gloss and a brighter red than *purpuralis*. The middle axe-shaped mark approaches closer to the margin on the somewhat wider forewings. Abdomen more heavily haired. The ♀ type is illustrated. — The name *heringi* *Zell.* (Vol. 2, p. 19) is withdrawn as it was chiefly based on a variation in the colour of the
- grossmanni*. larvae. — Var. *nubigena* *Led.* (Vol. 2, p. 19) is limited to the high Alps. Here must be enumerated: ab. **grossmanni**
- plutonia*. (*Rühl*) *Bgff.* and ab. **plutonia** *Vrty.* — In lower Austria and Hungary we find var. *pluto* *O.* (= *pythia* *Hbn.*, *minos* *Vrty.*) (Vol. 2, p. 19). — VERITY has designated the race from the high Pyrenees (Gèdre, 1000 m) as
- magnalpina*. var. **magnalpina**. It is fairly large, intensively coloured, ground colour very dark without gloss. The spots of
- parvalpina*. forewings especially the middle one are reduced; hindwings with narrow black margination. — The var. **parvalpina**
- taurinensis*. *Vrty.* (1 f) from the Maritime Alps of Piedmont (Valdieri) is a small race with smaller spots on forewings than former. The black margin of hindwings is narrow in most ♂♂ but distinctly visible. A ♂ from VERITY'S collection is illustrated. — The var. **taurinensis** *Rocci* from the hills around Turin is larger than the former and more weakly scaled. The spots of forewings are larger than in the two previous races and the black marginal band of hind-
- isarca*. wings is only faintly indicated. — The Southern Alpine Valleys (Isarco Valley) are the habitat of var. **isarca**
- rocciana*. *Vrty.* (= *pythia* *Fuessl.*) which are larger than *magnalpina* and very brightly coloured. The red spots of forewings and especially the axe-shaped mark are larger. The red is bright carmine with a touch of yellow. — The race
- from the ligurian Apennines var. **rocciana** *n. nov.* (4 m) (= *viridescens* *Bgff.*) of which *viridescens* *Rocci* is the green shiny form, is remarkable. It is densely scaled with brilliant red, the black ground colour is slightly shining blue-black. The hindwings have narrow black borders. The specimen illustrated is from Genua. It
- rubrotaecla*. inclines to form ab. **rubrotaecla** *Vrty.* (= *poligalae* *Rocci*); **erythrusesoides** *Rocci* is a transition form. The ab.
- erythrusesoides*. **apicefusca** *Rocci* has a heavy black margin at the apex of hindwings. — To be named still is: var. **fiorii**
- apicefusca*. *Costantini* from the Emilian Apennines with enlarged forewing spots, hindwings have a margin that is parti-
- fiorii*. cularly widened at the apex. — The race from Calabria, San Fili, Cosenza, 900 m, is named by VERITY var.
- mirabilis*. **mirabilis** (1 f). It is larger and brighter in colour than the former, the spots of forewings are large and very expanded. VERITY calls this the finest known race of *purpuralis*; a ♀ from VERITYS collection is illustrated.
- bosniaca*. — A very characteristic race from the Bosnian Mountains (Vlasic Mountains, 1800 m altitude) is var. **bosniaca**
- carsica*. *Bgff.* (4 n). It is allied to *pluto* *O.* but is larger than this race, very densely scaled and of dusky appearance. The middle spot of forewings in contrast to *pluto* is always extended at end towards the margin. The wings are generally very wide, hindwings sometimes acute towards apex and with a more or less wide black margin in the ♂. The ♀♀ have grey dusting. The specimen illustrated is from BURGEFFS collection. — *Rocci* describes from
- dojranica*. Karst the var. **carsica** which according to the description resembles *bosniaca* in general appearance, but it appears to be duskier and the black margin at apex of hindwings is 3 mm wide and also the anal edge of
- hindwings has a narrow black margin. — The var. **dojranica** *Bgff.* from Macedonia (Nicolie on the Dojran lake, Plagusha Planina, Nicola Valley near Hudowa, Babuna) is a small rosy-red, finely scaled race, especially diaphanous in the ♀. The ♂♂ with decided black margination to hindwings, the ♀♀ always dusted with yellowish white on the forewings and shining bronzelike, very transparent. Both sexes are fairly heavily haired, the ♀♀ more or less grey-yellowish on the thorax according to the degree of the yellowish-white dusting of the forewings. Similar to mid-european specimens in the formation of the spots, only slightly variable. Rarely we have here
- rubrianata*. ab. **rubrianata** *Bgff.* — Instead of *graeca* *Tutt*, n. praeocc., (Vol. 2, p. 441) from Greece var. **hellena** *Bgff.* must
- hellena*. be substituted. — The var. *sareptensis* *Stgr.* in Vol. 2, plate 4 b, originates from Sarepta (South Russia).

Of the asiatic races we have to name: From the armenian high plateau and the surroundings of Achalzich

*villosa*. (Chambobel) var. **villosa** *Bgff.* (4 n) from a considerable altitude. The black hairs on body and other parts, for instance between the eyes on the head, are longer and at the same time denser than in *nubigena*. The forewings which are very densely scaled for *purpuralis* have normally formed, brilliant red spots and in many specimens have a considerable green or blue superficial sheen. The ♀♀ are dusted with grey. A specimen from the

*ingens*. collection of BURGEFF is illustrated. — Very large specimens from Tiflis are named by BURGEFF subsp. **ingens** (1 g). The antennae are dainty, scarcely larger than in the type form. The red spots of forewings narrow 1, (3—5—6), (2—4) separated by the main nervures. Middle spot abruptly cut off outwardly, the part approximating to spot 6 projecting and well developed. The hindwings with narrow black margin at the apex. The

Note: Ab. *polygalae* *Esp.* (Vol. 2, p. 19) is not an aberration of *purpuralis*, but of *filipendulae* with forewings almost completely suffused with red. — Vide *filipendulae* —.



red is a pale carmine, almost carmine rose which is rather brighter on the forewings than on hindwings. The black areas of the wings almost without gloss, legs black also in the ♀. A ♂ from the collection of BURGEFF is illustrated. — subsp. **barthai** Reiss (1 g) is a race from the mountains of Sultan-Dagh in Asia *barthai*. Minor occurring at an altitude of about 2000 m. Flying at the end of July they remind one in their conduct strongly of *Z. exulans* from the Alps. They are much smaller than subsp. *diaphana* Stgr. (Vol. 2, p. 18/19, plate 4 c) from the Taurus, antennae especially in the ♂ are strikingly longer than in same in comparison to the size. Thorax and abdomen fairly heavily haired. A considerable extension of the red axe-like mark of the forewings is not rare. The ♂ type is illustrated. — subsp. **rosalis** Bgff. (= *rosea* Bgff., *praeocc.*; *rosalis*. *polygalae* Stgr.) from Malatia (middle of May) is rose coloured and of very dainty build. The spots are confluent and extended. — subsp. **clavigera** Bgff. (1 g) from Akbès (Syria) varies considerably from *pur-clavigera*. *puralis*. It emanates probably from the spurs of Lebanon and from high altitudes. It differs in the first instance by the brilliant red of the spots and the hindwings. Scaling is appressed and very fine, the hair scales are very short. The constant characteristic that strikes one most is the unusually thick club antennae which are considerably heavier than those of the European *purpuralis*. The average size is somewhat smaller than same. The hindwings as in var. *bosniaca* show a more or less wide black margin in the ♂, with only an indication of same at the apex in the ♀. The ♀♀ are sometimes faintly dusted yellowish. A cotype is illustrated. — Finally subsp. **tianschanica** Bgff. (4 n) has to be mentioned. It is the same size as the name form. The wings *tianschanica*. are very truncate at the apex, clubs of antennae are heavier but not so heavy as in subsp. *clavigera*. The red spots of the forewings are confluent in a great number of specimens, forming a large patch rounded off distally but of a different shape to ab. *rubrotecta* Vrtz. The red is a very dark shade of bright carmine red with a slight inclination towards vermilion: the black parts of the wings have a bluish or greenish gloss, in the ♀♀ suffused with yellowish-grey. The legs in both sexes have yellowish hairs inwards. In a series of somewhat varying populations (races?) from Aksu, Kuldja, Tian-shan. The illustrated ♂ is from BURGEFF's collection. Specimens of this main race are often erroneously offered by dealers as *smirnovi* Christ. — Further we can mention here ab. **flava** Dziurz. (Vol. 2, p. 441) which is the yellow form of an eastern *purpuralis* race from Issy- *flava*. Kul. — The var. **naryna** Bgff. from the neighbourhood of Naryn which is placed here as a race, is very close *naryna*. to *tianschanica* in regard to size, marking and colouring, whilst the contour of the wings approaches more to the normal *purpuralis*.

The larvae of *purpuralis* occur in mid Europe on *Thymus serpyllum* L.; grass and clover are not acceptable.

**Z. smirnovi** Christ. (1 g) (Vol. 2, p. 19) differs considerably from *purpuralis* in the genitals. Pure *smirnovi*. *smirnovi* occur at Achal-Tekke (Nuchur), they differ superficially, especially by the rose-red of the spots of the forewings and hindwings, the considerable constriction that occasionally occurs of the round part of the axe-like end of the longitudinal band of spots 5—6 which sometimes leads to its complete separation, the narrow black edge at the apex of the hindwings and the relatively longer feelers and wings in the ♂. A ♀ from BURGEFF's collections is illustrated. — The var. **persica** Bgff. (1 g). — ♂ specimens from Tancre in North *persica*. Persia differ by the unusually finely scaled transparent wings and the separation of the spots, that are confluent in the name form. The unknown ♀ may however nevertheless have confluent forewing spots. A ♂-cotype is illustrated from the collection of BANG-HAAS.

**Z. brizae** Esp. (1 g) (Vol. 2, p. 19) from Lower Austria, Hungary (the type-race), Balkan Peninsular, *brizae*. Crete with ab. *interrupta* Hirschke, ab. *cingulata* Dziurz. ad ab. **rubrianata** Bgff. (Vol. 2, p. 441). We illustrate *rubrianata*. here a specimen from Galyn Alö in Hungary, as the figure in Vol. 2 (4 c) is not very characteristic.

**Z. erebaea** Bgff. (1 h) (= *erebus* Stgr., Vol. 2, p. 19, n. *praeocc.*; *brizae* H.-Schäff.) from the Caucasus *erebaea*. (Achalzich), Armenia is more robust than *brizae*, it has brighter red which is sometimes considerably mixed with yellow, the dark edge of the hindwings is wider in the ♂, a narrow border is present also in the ♀. The fringes are longer, body heavily haired. The specimens illustrated (from the collection of BURGEFF) were captured by KORB near Achalzich (Chambobel) and in the Adjara Mountains.

**Z. corycia** Stgr. (Vol. 2, p. 19) from Lydia, Taurus and Syria; typical from Manissa. The var. **brussensis** *corycia*. *brussensis*. Reiss is based on specimens from Brussa, somewhat larger than typical *corycia* and in its whole appearance between *brizae* and *corycia*. — In subsp. **adanensis** Reiss (1 h) from Hadshjin (Vil. Adana) the red of the stripes *adanensis*. in the forewing is increased so that one has the impression of a uniform red surface. Antennae almost without clubs (like *scabiosae*). The type of the ♂ is illustrated.

*Z. brizae* Esp., *erebaea* Bgff. and *corycia* Stgr. form a group of closely related species. *Erebaea* and *brizae* show important differences in the genitals. *Brizae* like the majority of *Zygaenidae* has an additional pair of spurs, besides the usual 2 end spurs. They are slightly higher below the middle of the tibiae of the hindmost legs in both sexes and are absent in the ♂ of *erebaea* and in both sexes of *corycia*.

**Z. gallica** Oberth. (1 h) (Vol. 2, p. 19) from Digne and the ligurian Apennines (according to Rocci) *gallica*. which was only mentioned in the text in Vol. 2, is now illustrated (according to OBERTHÜR). — Here we must place subsp. **giesekingiana** n. nov. (1 h) (= *interrupta* Boursin, n. *praeocc.*) from the Maritime Alps (Vence). *giesekingiana*.



This highly interesting *Zygaena* from the Maritime Alps was discovered in 1910 by Dr. GIESEKING and his son. The chief characteristic is the completely interrupted streak of spots 3—5. The forewing spot No. 3 is quite small on the upperside, streak-like, spot No. 5 large and almost round: on the underside spots 3 and 5 are narrowly confluent. Hindwings quite regularly widely margined with greyish-black to the inner margin.

## II. Subgen. *Silvicola* Bgff.

*chaos.* **Z. chaos** Bgff. (= *erebus* Romff.) (1 h) is scarcely larger than *erebaea* Bgff. The antennae are club shaped, bluntly truncate or quite shortly pointed. The wings are narrow, pointed at the apex, the point itself however rounded. Forewings with more or less interrupted apical marks (spots 3—5). The margin of the hindwings is about 1,5 mm wide at the apex; the bodies are heavily haired as in *erebaea* and the wings with long fringes but more sparsely scaled than this species. The genitals are considerably different from *scabiosae* but nevertheless show relationship with it. Quite different from *erebaea* with which *brizae* is very similar. Georgia (Bethania), Achalzich. The illustrated ♂ emanates from Achalzich (from the collection of BURGEFF).

*scabiosae.* **Z. scabiosae** Schev. (Vol. 2, p. 19/20 and p. 441) is an extraordinarily interesting species on account of its position in evolution. Its variability is morphologically so considerable that within the boundaries of its geographic distribution the extremes would without a doubt be held for separate species if the many transition races did not unite same together. The type race is presumed to occur in the Frankish Jura and including in the widest possible sense the other races through mid-Germany, as far as they do not vary as stated below. The species occurs in the Pyrenees, middle and eastern Europe (with the exception of Great Britain), Scandinavia, Finland, Siberia, Pontus, Armenia, Italy, Sicily and the Balkans. The following aberrations in the type race have been named: ab. **divisa** (Stgr.) Bgff. (= *interrupta* Reiss, trans.): both streak-like spots widely interrupted by black; ab. **confluens** Spul. with confluent forewing spots; the pale yellow form is ab. **flava** Dziurz. (= *citrina* Spul., *flava* Pieszczyk in Vol. 2, p. 19). — A larger race occurs in East Prussia (Osterode): var. **osterodensis** Reiss (1 i) with deep black ground colour, densely haired abdomen and reduced red on the forewings. The upper streak-like spot is generally constricted or interrupted by black. The ab. **divisa** (Stgr.) Reiss occurs fairly commonly. A ♂-cotype of *osterodensis* is illustrated. — Much more dainty is the type race mentioned already in 1789 by BORKHAUSEN from Rhenish Hessen, which has been found again at Ingelheim and Heidesheim in the Rhine Valley. Its chief characteristic is a faint bluish gloss in the ♂♂: var. **hassica** Bgff. — At Klingenstein near Ulm, Pfullingen, Lauter Valley near Herrlingen, Neuffen in the Swabian Alb we find a larger race (15—15,5 mm length of forewings) more densely scaled and in both sexes with a more or less brilliant red colour: var. **valida** Bgff. — Still larger but with paler colours are the *scabiosae* from the Rhone Valley in Valais: var. **validior** Bgff., which in the ♀ sex inclines towards ab. **divisa** (Stgr.) Bgff. (= *mediointerrupta* Vorbr.); length of forewings 16—17 mm. Here we interplace ab. **analiinterrupta** Vorbr., see later. — Easily differentiable is the var. **curvata** Bgff. from Styria (Thörl, from the Hochschwäb. region) occurring there in masses. It is considerably more densely scaled than the type race and has consequently brighter coloured spots on the forewings and hindwings which incline towards vermilion. The wings are less pointed at the apex, the costal margin of the forewings in the ♂♂ is decidedly convex, scarcely ever concave or straight as in the type race. — Specimens from the Bohemian central mountains (Neuhütten, Karlstein) have again much more narrow, partly exceedingly narrow wings with less heavy scaling, but they show nevertheless the same outwardly curved costal margin: var. **tenuicurva** Bgff. — Specimens from the neighbourhood of Vienna (Fischamend) stand between *curvata* and *tenuicurva*. — There are a series of rather different races occurring in Hungary which cannot be completely classified as yet. The var. **matrana** Bgff. from the Matra Mountains (500—800 m) in the middle of June, is very regularly densely scaled and of a dusky red with a wide margin to the hindwings. All specimens incline to have the streak of spots mark 3—5 separated. The ab. **divisa** (Stgr.) Bgff. and ab. **quinquemacula** Bgff. occur here, the stripes of the forewings are subdivided into 5 spots in the latter.

*asiatica.* The subsp. **asiatica** Bgff. distributed from the Urals to the Kentei Mountains has as a general characteristic the obtuse club-like antennae. The type race from the Urals (Sojmonowsk) is considerably more densely scaled and brightly coloured than the subsequently described *kenteina*, especially the ♂♂ have bright red spots on the forewings in a dull black. The specimen illustrated from the Urals (1 i) is from the collection of BURGEFF. — *kenteina.* The var. **kenteina** Bgff. from the Kentei Mountains, north of Urga in Mongolia, is a more transparent race. The colouring is a delicate rosy red without the usual admixture of vermilion. The hindwings are almost uniformly widely margined. STAUDINGER described from specimens of this race ab. **divisa**. — We have to add here the *caucasi.* var. **caucasi** Bgff. (= *caucasica* Spul. n. praeocc.) (4 n) from the Caucasus, Adjara Mountains in Georgia with the following characteristics: the antennae with a smooth, stumpy rounded club that arises more suddenly than in *scabiosae* and is more capitate. Apex of forewings somewhat rounded, spot 1—3, 2—4 narrowly conjoined, the hindwings with very wide margin of black-grey reflected through. A ♂ from the collection of BURGEFF is illustrated.



To be enumerated with the southern main races and races are: var. **eupyrenaea** Bgff. from the East *eupyrenaea*. Pyrenees (Vernet, Mount Canigou, Col de Jou) which is closely connected with the type race, large, with wide wings, densely scaled with brilliant red. — VORBRÖDT separates from *subalpina* Calb. a more widely distributed main race "*meridionalis*", less often with spots 2—4 separated and with less vermilion shaded red of the forewing spots. The name *meridionalis* has been previously utilised and substituted by subsp. **ephemerina** by *ephemerina*. BURGEFF. The region of distribution is the southern valleys of the Swiss Alps and the Tyrol excluding the upper Etsch and Eisack Valleys. Of this main race VORBRÖDT has established an ab. **mediointerrupta** with the *mediointerrupta*. upper streak-like spot intersected with black and ab. **analiinterrupta** with the lower streak-like spot intersected *analiinterrupta*. with black. — ab. **romeiformis** Bgff. are specimens with widened wings and rounded apex and thickset, short *romeiformis*. obtuse antennae clubs, thus resembling subsp. *romeo* described later on. — The var. *subalpina* Calb. with ab. *conjuncta* Calb. (Vol. 2, p. 19) is limited to Piedmont and the Valais. — var. **koricensis** Reiss (1 i) is denominated *koricensis*. from Bosnia (Maklenpass-Korična). It comes approximately between *orion* and *subalpina* as far as wing contour is concerned. Red is dusky. Upper streak-like mark generally not intersected but constricted, the lower streak mark often constricted. Hindwings with fairly heavy black margins, only very narrow at inner margin. Thorax and abdomen fairly thickly haired. The ♂ type is illustrated.

To the groups around subsp. *romeo* Dup. (Vol. 2, p. 19) (1 i) the type race of Sicily with ab. **analicon-** *analicon-* **juncta** Bgff. with spots 2 and 4 confluent we have var. **orionides** Bgff. (= *orion* Calb.) from Trent and the *juncta*. *orionides*. Adamello region, smaller than the typical *orion* H.-Schäff. and more sparsely scaled than this — var. *orion* H.-Schäff. (Vol. 2, p. 19) from Tuscany (as type) and Marche (Sibillini) with ab. *transapennina* Calb. (Vol. 2, p. 19) in which also the lower streak-like mark is intersected. — A small summer form from the etruscan Apennines (Cutigliano) in August, which is closest to var. *orion* has been named by BURGEFF as *forma aestiva*. *aestiva*. — var. **megorion** Bgff. (= *triptolemus* Freyer): In the Litoral of the ligurian Apennines (as type) and the *megorion*. Maritime Alps one meets with very large, densely scaled specimens with very wide wings, thus of pronouncedly *orion*-type. The ♀♀, strange to say, habitually approach the type race of *scabiosae*, being less densely scaled, five-spotted, partly with conjoined spots 2 and 4. — var. **romana** Bgff. (= *orion* Vrtv.) from Albani-Mountains *romana*. (as type) and the roman Campagna. It is still somewhat daintier than the small *orion* from Tuscany, as compared with *scabiosae*, and with wide black borders to the hindwings, especially in some five-spotted specimens with more acutely pointed wings approaching the *scabiosae* type and which BURGEFF has named ab. **scabiosaeformis**. *scabiosaeformis*. It differs from *neapolitana* by the denser scaling which however does not quite approach the same degree as that of *orion*. — var. *neapolitana* Calb. (1 i) (Vol. 2, p. 19) from Campagna, Province Avellino (as type), Aurunci Mountains. Aberrations mentioned are: ab. **analiconjuncta** Bgff., ab. *hoffmanni* Zickert (Vol. 2, p. 19, plate 56 h), *analiconjuncta*. ab. *nigerrima* Zickert and ab. *flaveola* Zickert, both in Vol. 2, p. 19. — var. **minima** Trti. is a small race (20 mm *minima*. expanse) from Aurunci Mountains and more thinly scaled. — var. **adumbrata** Bgff. (1 i) from Mount Sirente *adumbrata*. (1500—2000 m) is very remarkable. The chief characteristic is the considerable adumbration of the hindwings in a number of specimens, also the forewings show only remnants of red scaling, the former are often quite black. Spot 3 of the forewings is mostly absent. Wing contour is much narrower inspite of truncate apex and thus resembling *scabiosae*. The ♀ illustrated is from BURGEFF's collection. Completely black specimens of this race are ab. **absoluta** Dann. — var. **calberlai** Bgff. (= *orion* var. *Calb.*) from Calabria (Sila, San Fili di Consenza) *absoluta*. *calberlai*. clearly resembles *romeo* from Sicily, with its striking brilliant red. Specimens of this race with simple red belt are ab. **cingulata** Bgff. *cingulata*.

Subsp. *nevadensis* Rmb. (Vol. 2, p. 19) (1 k) from Sierra Nevada. A typical specimen is now illustrated. I have recently received *nevadensis* from Sierra Alta (Aragon) and from the Pena de Francia (S.W. of Salamanca) as well as from Guarda (Portugal). In the latter spots 2 and 4 are more or less confluent; in a ♀ also spots 3 and 5 are faintly conjoined.

The larvae of *scabiosae* feed in mid-Europe on *Lathyrus pratensis*.

### III. Subgen. **Lycastes** Hbn.

**Z. exulans** Hochenw. & Reiner (Vol. 2, p. 24 and p. 443, plate 6 c) from the high Alps, high Pyrenees, *exulans*. Scotland, Norway, Lapland, Abruzzi Mountains, transylvanian Mountains, Balkans and Central Asia is a relic of the Ice periods, that after same withdrew to altitudes of over 2000 m. The distribution carries this out. The local separation on the retrocession of the ice expresses itself in a series of separate races restricted to the various mountains. The races of the Alps are less pronounced. The reason for this is in the relative ease with which this high mountain butterfly with its strong flight can be distributed by storms. *Exulans* specimens have been found in the snow at an altitude of 2900 m whither they could only have been driven by the wind. A second reason for the less pronounced formation of separate races lies in the polyphagy of *exulans* larvae, which alone among the known *Zygaena* probably feed in case of need on a whole series of other allied plants than *Lotus*, *Oxytropis* and other Leguminosae foliage, so that it is not so closely bound to one definite locality.



In captivity *exulans* has been fed on *Lotus corniculatus* L. and *Onobrychis sativa* Lmk. The larvae hibernate once or twice. Wherever the actual food plant flourishes on chalky ground the insect is found every 2 years in considerable quantities, in other places on primeval stone one finds same more rarely but the vegetation there also suffices for its existence.

- Besides the aberrations in Vol. 2, p. 24, the following are denominated: ab. **striata** Tutt (Vol. 2, p. 443) with confluent spots on forewings; ab. **exilioides** Bgff. with extraordinarily wide margin to the hindwings which only retain the red colour in the inner third of the basal area. Specimens similar to subsp. *vanadis* Dalm. (Vol. 2, p. 24) from Scandinavia and Lapland have been named ab. **pseudovanadis** Bgff. The ♀ ab. **flavilinea** Tutt is heavily scaled, veins, head and thorax being dusted with golden yellow. The names *fulva* Spul. (Vol. 2, p. 24), *pulchra* Tutt, *pallida* Tutt, *minor* Tutt and *clara* Tutt (Vol. 2, p. 443) had best be withdrawn. — ab. *dilatata* Strd. mentioned in Vol. 2, page 24, belongs to subsp. *vanadis* Dalm., as also does ab. **dilatata** Bgff. (instead of *dilatata* Vol. 2, p. 24, which is not systematically justified) in which spot 5 expands still more completely towards the outer margin than in *achilleae*. — The var. **pyrenaica** Bgff. from the High Pyrenees (Mount Louis, Mount Canigou) is differentiable from the form of the Alps by the less variable wing contour and somewhat smaller size, further by the sparse golden yellow scaling of the veins in a part of the ♀♀ which in the forms of the Alps occurs much more frequently and is more strongly developed. — In subsp. **subochracea** White (1 k) from Scotland the chief characteristic is the remarkably heavy black margination of the hindwings. The sparser scaling and the pale red colouration approaches *subochracea* of *vanadia* Dalm. The variability resembles the alpine form. The *subochracea* ♂ illustrated emanates from the Museum at Tring. — The subsp. **montenegrina** Bgff. (= *apfelbecki* Schawerda) from the Mountains of Montenegro in July is a small race, half as large as *apfelbecki* Rbl. described later on, which is only known in the ♂ form. *montenegrina* resembles more to subsp. **abruzzina** Bgff. (= *apennina* Rbl., n. praeocc.) (1 k) from the high mountains of Abruzzi (Gran Sasso) but it is not so variable in size as same. The wing contour of *montenegrina* approaches that of *apfelbecki*. The wings are more acute, the club of the antennae narrower and longer, the point more obtuse. The ♀♀ resemble the ♂♂ and are almost without whitish or yellowish dusting on the veins. Whilst in *abruzzina* specimens with confluent spots: ab. **striata** (Tutt) Bgff. are extraordinarily frequent, they are entirely absent in *montenegrina*; *abruzzina* is smaller and with narrower wings than *apfelbecki* and has more truncate wings. I have received quite small *abruzzina* from Mount Sirente. — Caught in June on the mountains of Albania (Schar-Dagh, Ljubeten) *apfelbecki*. REBEL has described the var. **apfelbecki**. It is decidedly more slim and with narrower wings than the specimens of the high Alps, particularly the margin of the forewings and hindwings is distinctly shortened, so that the apex stands out more sharply. The spots are deeper and livelier red and without any trace of the light surround that so often occurs in the high alpine *exulans*. Spot 4 is always separated from spot 2; larger (higher). Length of forewings 13—15 mm. The black hairs of the body show also at the collar no trace of whitish admixture.
- Subsp. **sajana** Bgff. (*Bang-Haas* i. l.) (1 k) has been nominated from the Sajan Mountains (Munko Sardyk and Shawyr) found at 2500 m in June. It is as large as *vanadis*, therefore larger than *exulans*, with wider margin to the hindwings which have black veins. Club of the antennae short, relatively thin, slightly curved. Scaling less dense than in *vanadis*. Wing length more elongated with considerable yellow admixture to the red. Spots 3 and 5 of the forewings incline to be confluent. — Subsp. *exiliens* Stgr. (Vol. 2, p. 24, plate 6 c) is known to occur in the Tarbagatai Mountains as well as in the Altai.

#### IV. Subgen. **Hyala** Bgff.

- Z. zuleima** Pierr. (= *ludicra* Luc.) in Vol. 2, p. 19 and p. 441 (1 k) from Tunisia, Algeria. ROTHSCHILD has named a yellow form ab. **flavescens**. The form in which the spots of the forewings are confluent is ab. **confluens** Dziurz. (Vol. 2, p. 441). A small summer form from Tunis, flying in May, has been denominated by BURGEFF as *forma aestiva*. — The larva has a bluish-green ground colour. It has 2 dorsal rows of black almost triangular spots at the anterior edge of the segments, of which 2 have between them a brilliant yellow spot on the dorsal. The usual yellow vertical spots on the sides are very small. The belly is black, the hairs themselves 0,8 to 1,2 mm long, like bristles, white, sometimes with black tips. The larva feeds on *Daucus carota* L., the common carrot, in Germany. It is probable that *zuleima* feeds in its african localities on *Daucus* plants. The cocoon is boat-shaped with faint ridges, glossy white, preferably secured on a flat surface. Period of pupation 26—28 days.
- Z. loyselii** Oberth. from Algeria and Morocco (Vol. 2, p. 20) is to be considered a separate species. Specimens with confluent spots on forewings are ab. *confluens* Dziurz. (Vol. 2, p. 20). The type race occurs at Lambessa in East Algeria. — As a race is to be mentioned: var. **occidentalis** Bgff. (= *occidentalis* Oberth., n. praeocc.) from Géryville in West Algeria, it has more lively colours, red is brighter and inclines to vermilion. The red spots are expanded and well separated. — From West Morocco and the mountains of the Middle Atlas we have subsp. **ungemachi** Le Cerf (1 k) (Oulmés, Morocco). It is a robust form with distinct red collar and red shoulders but without a red abdominal belt. The specimen illustrated comes from Rabat (Morocco), from



the Museum at Tring. — var. **montana** *Rothsch.* (1 k) of which the ♂-type from the Museum at Tring is illustrated, *montana*. caught at Azrou in the Middle Atlas (Morocco), is duskier and more heavily haired, without red collar and scarcely any traces of same on shoulders, legs quite black. — In the var. **fracticingulata** *Rothsch.* (1 l) from the Great *fracticingulata*. Atlas (Hte Réraya, Morocco) which is fairly similar to *ungemachi* the red abdominal belt is clearly indicated laterally. The ♀-type illustrated is from the Museum at Tring. — Further subsp. **olivacea** *Rothsch.* (1 l) from *olivacea*. Taza (northeast of Fez) in Morocco with olive green forewings and dark carmine red reduced spots. The hindwings are more or less heavily adumbrated. Thorax and abdomen quite black, shoulder blades deep carmine red. The illustrated specimen is the ♀-type from the Museum at Tring.

The larvae feed on *Eryngium campestre* L. They differ from the *favonia* larvae chiefly in that the yellow lateral spots and the red neck segment of *favonia* are absent. The cocoon of *loyselii* is smoother than that of *favonia*.

**Z. aurata** *Blach.* (Vol. 2, p. 31) (1 l) from the Morocco Atlas (Tizi Gourza) I consider as a separate *aurata*. species. It differs entirely from *favonia* flying in the same locality, it is dainty with acutely pointed wings, both on the upper and undersides it has a greenish brassy yellow glossy ground colour and similar collar and shoulder blades, the thorax has similar hairs. The red is a pale carmine; spots very small: 1, 3, 5 and 6 are separate, 2 and 4 faintly conjoined. A very fine but somewhat darker border to the outer margin of the forewings and at the apex. Fringes brassy yellow. Hindwings slightly adumbrated at apex, fringes blackish. Thorax and abdomen blue-black, the latter with red belt on 2—3 segments, which does not meet underneath. The underside of the abdomen and the anal clasps in the ♂ as well as the legs are pure ivory-yellow. Feelers shorter and less clavate than in *favonia*. The ♂ illustrated is from the Museum at Tring. — The var. **opaca** *Blach.* which, *opaca*. according to the description should be placed here, is densely scaled as *aurata*, it has however a darker red and black ground colour with a green sheen. Collar and shoulder blades as in *aurata*, abdomen black underneath with a red belt on 2—3 segments, legs yellow. From the foot of the moroccan Atlas (Amezmiz).

**Z. favonia** *Freyer* (= *cedri Bruand*) in Vol. 2, p. 20 and 441. ab. **flava** *Rothsch.* is a pale glossy yellow *favonia*. form, whilst *powelli Oberth.* (Vol. 2, p. 441) is ochre yellow. Specimens similar to *staudingeri* have been named *flava*. ab. **pseudostaudingeri** (*Rothsch.*) *Bgff.*; ab. *valentini Bruand* (Vol. 2, p. 20) are *favonia* with confluent spots on *pseudo-* forewings. — The type race of subsp. *vitrina Stgr.* (Vol. 2, p. 20) is limited to Constantine; var. *staudingeri Aust.* *staudingeri*. (Vol. 2, p. 20, plate 4 g) is to be classified as the next race, Nemours, Boghari, Oran, Tangiers. — var. **littoralis** *Rothsch.* (1 l) from the atlantic Litoral of Morocco (Mogador) has sooty grey-green ground colour. The red of the spots of the forewings and the hindwings is dark purple to blood red. The specimen illustrated is from the Museum at Tring. — var. **maroccensis** *n. nov.* (intermedia *Rothsch.* *n. praeocc.*) (1 l) from Tizi Goura (moroccan *maroccensis*. Atlas) is somewhat smaller and paler than *littoralis*, the spots are reduced. The body more heavily haired and the legs more yellow. The cotype illustrated is from the Museum at Tring. — var. **borreyi** *Oberth.* (1 m) has a *borreyi*. dull dusky appearance. The carmine colouration of the spots of the forewings and hindwings is darker than in algerian specimens; Morocco (Chabat-el-Hamma, at the end of May). Illustration according to OBERTHÜR. — In subsp. **cadillaci** *Oberth.* (1 m) from Morocco (Azrou in the first half of July) the thorax is black without *cadillaci*. grey-whitish hairs, the spots of the forewings are wider than in *borreyi*. Illustration according to OBERTHÜR.

In subsp. *thevestis Stgr.* (Vol. 2, p. 20) we have an outwardly distinct subspecies which differs both in caterpillar and in the ♀ butterfly sharply from *favonia* and without a transition. This may be a separate species which in the ♂ sex almost resembles *favonia* \*); Géryville, Lambessa, Tebessa, Guelt-es-Stel. It is difficult to capture as it rises unusually rapidly on the approach of a human being within many yards distance.

The ground colour of the larvae of *favonia* is green, of the same shade as the food plant *Eryngium campestre* L. (Umbellifere similar to a thistle) with a somewhat bluish sheen. Fine white lines extend along the back and laterally over the stigmata. The subdorsal rows of spots consist of very small black spots. Each segment bears 2 dots, underneath which laterally there are the usual yellow vertical spots. The hairs are like bristles up to 2 mm length. Belly grey. In some specimens the grey colour between the segments surrounds the larvae so that the light lateral and dorsal lines are interrupted. The larva is to be found full grown in May. It rests with the head upwards on the underside of the leaf and eats the leaf from the inside so that the dried edge with the prickles is left. In contrast to other *Zygaena* larvae, it cannot be easily dislodged from the food plant, even when heavily shaken. The cocoon is widely boat-shaped with coarse raised grooves, brownish-yellow and glossy. The shell of the pupa is yellowish-brown transparent at abdomen. The cocoon is found on smooth surfaces of very kind such as tree trunks, wooden fences, but never found on thin stem-like substances such as the stalks of grass etc. and very rarely found on the food plant.

\*) *thevestis* was by no means considered as an aberration of *favonia* in Vol. 2, but only as a form of the *favonia* group, both can scarcely be deemed to be more nearly related; I have captured all 3, *favonia*, *loyselii* and *thevestis* on the Djebel-Tougourt near Batna at the same spot and without finding transition forms. A misunderstanding arose owing to OBERTHÜR deeming all species dealt with in one paragraph of the "Macrolepidoptera" as belonging to one and the same species. This is by no means the case and stress has often been laid on the fact that different species which are similar or closely related can be grouped together as has been done in numerous cases. The Publisher.



The *thevestis* larva differs from the *favonia* larvae by its whitish colour (instead of green). It feeds in spots in which the ground is particularly warm.

*sarpedon.* **Z. sarpedon** Hbn. (Vol. 2, p. 20 and p. 441) from South France, Spain, Portugal, the Balearic Islands. The races of *sarpedon* are very intermixed or variable. For HÜBNER's type the wrong locality of Italy was given, which he afterwards altered to Languedoc. But as a type race only specimens from Provence can come into question. — The var. **hispanica** Rmb. (1 m) from Andalusia, Castile is not very variable, it has narrow wings with small spots, thinly scaled up to the hyaline unscaled hindwing base. Spot 3 of forewings is absent, hindwings only slightly darker at outer margin. Specimens illustrated are from Grenada. Similar butterflies I have had from Guarda (Portugal). — BURGEFF describes from Catalonia (Barcelona) the var. **variabilis** of which the name expresses the high degree of variability of this race. Spot 3 is absent from forewings, hindwings are red with more or less wide black border or black with red spot on discocellular or with more or less reddened costa, chiefly with black, sometimes with red fold-area. Both forms also occur in 3 various forms of scaling. — The var. *trimaculata* (= *vernetensis* Oberth. Vol. 2, p. 20) occurs at Nîmes in Provence, in the East Pyrenees and in the Maritime Alps. — The var. **carmencita** Oberth. (= *sarpedon* H.-Schäff.) (4 m), Vendée, Morbihan, Lower Loire, Lower Charente, Basses-Alpes, Bouches du Rhone is robust, relatively large in build, fairly densely scaled with enlarged forewing spots. Ground colour of forewings is dark blue-greenish; red bright carmine. Spot 2 and 4 of forewings often conjoined at least along the vein, abdominal belt fainter, in many ♂♂ only traces (Vendée). A ♂ from Vendée is illustrated. Here we have to place ab. *flava* Oberth. (Vol. 2, p. 20).

*balearica.* subsp. **balearica** Bsd. (= *confluenta* Reiss) (1 m): Cadiz, Sierra Nevada, Murcia, Balearic Islands. BOISDUVAL illustrates a specimen from Cadiz. Recently I had specimens sent from Chiclana, which all had a rich, somewhat yellowish red in spots on forewings and hindwings, which were therefore more densely scaled, although not much larger than *hispanica*. The dark margination of the hindwings is almost always quite absent in the ♀, in the ♂ it is narrower than in *hispanica*. Well pronounced distinct abdominal belt is always present. Specimens with *punctum*-like spot arrangement on forewings do not appear to be rare. My specimens from Totana and Sierra de Espunna (Murcia) according to KORB correspond in general with these specimens of the typical *balearica*. The ♂-type of *confluenta* from the Sierra de Espunna is illustrated. — var. **bethunei** Romei (1 m) which I received from QUERCI caught at Sierra Nevada (1200 m) also seem identical with *balearica*, especially as regards the size and denser scaling, as well as the heavy red abdominal belt, but there does not appear to be such a great variability as with *balearica*. Spots 2 and 4 are faintly conjoined, spot 5 is round. The only ♀ at my disposal has heavier black margination of hindwings than *balearica*. — A very pronounced subspecies is **algecirensis** Reiss (1 m, n) from Algeciras (according to PREDOTA). It is larger and has wider wings than *hispanica* and *balearica*, scaling sparser. Antennae with heavy club-heads. Spot 1 of forewings generally suffusing towards costa, spots 2 and 4 always conjoined (mostly widely), spot 3 faintly indicated, spot 5 mostly axe-shaped and very suffused. Hindwings hyaline at base, otherwise red, the black margin in the ♂ only present at apex, in the ♀ generally quite absent. Hindwings very wide at inner margin. The whole body heavier, thorax and abdomen strikingly heavily haired in both sexes, partly with white hairs on the thorax. A heavy red abdominal belt over 2 segments. The types illustrated are from the Hungarian National Museum.

*azona.* The following aberrations are mentioned: ab. **azona** Reiss without abdominal belt under *trimaculata*, *puncta.* *carmencita* and *variabilis*; ab. **puncta** Reiss (4 n) with a small round red dot on the discocellular of the otherwise quite bluish black hindwings under *variabilis*; ab. **pseudotrimaculata** Bgff. (= *nigrata* Reiss) under *variabilis* with completely adumbrated hindwings, without red body belt or only with traces of same; further ab. **quinque-** *trimaculata.* **puncta** Reiss with a distinctly perceptible spot 3 on forewings in the races *hispanica* and *variabilis*; ab. **rubrior** *quinque-* *puncta.* **Reiss** thickly scaled as *balearica*, the enlarged spot 5 axe-like often suffusing towards the outer margin. The other spots are also mostly enlarged; under *hispanica* and *variabilis*. Finally there is still ab. **totirubra** (F. Wagner i. l.) Bgff. (near Albarracin) with completely red forewings; the black margin of hindwings is narrow. The red abdominal belt extended over 2 segments and is open underneath.

The larvae feed on *Eryngium campestre* L. like those of *favonia*.

*punctum.* **Z. punctum** O. (Vol. 2, p. 20/21) from Hungary (as type race), lower Austria, the Balkan peninsular, *itala.* Italy, South Russia, Asia Minor. BURGEFF substitutes var. **itala** for the already utilised name of *italica* Stgr.-Rbl. (Vol. 2, p. 21). Specimens, mostly from Italy that are similar to the var. *contamineoides* Stgr. (Vol. 2, p. 21) (1 n) which only occurs on Sicily, are best denominated as ab. **pseudocontamineoides** (Stgr.) Bgff. (Vol. 2, plate 4 h) and those that are like the var. *dystrepta* Fisch.-Wald. as ab. **pseudodystrepta** Bgff. — STAUDER describes from Mount Faito the var. **faitensis** — I have similar specimens in my collection from Mount Sirente —, that varies considerably from the var. *itala* Bgff. by the confluent spots of forewings and approaching thereby *dystrepta* in appearance. Spot 5 of the forewings is very rarely separated from the other spots and at the same



time the specimens are very highly coloured. Specimens of this race that resemble *rubicundus* are ab. **pseudo-** *pseudorub-*  
**rubicundus** *Std.* — BURGEFF has named the red-belted form of var. *dystrepta* *Fisch.-Wald.* (Vol. 2, p. 21) (1 n) *cundus.*  
 from South Russia as ab. **cingulata**. The var. *dystrepta* has not actually completely red forewings in the spot *cingulata.*  
 area, as indicated in Vol. 2; a typical specimen from the lower Volga is illustrated.

The subsp. **anatoliensis** *Reiss* (1 n) from the neighbourhood of Ak-Shehir in Asia Minor and probably *anatolien-*  
 distributed elsewhere—Amasia from the Vienna Museum — is much smaller and daintier in comparison to the *sis.*  
 other races. The red fills out uniformly deeply the whole spot area of the forewings, nearly as in *Z. rubicundus*  
 without reaching to the inner margin along its entire extent. Ground colour is shining bluish, not faintly  
 greenish glossy as in typical *dystrepta*. Hindwings have a faint dark margin at the apex. The red of the wings  
 appears somewhat paler. The ab. **dystreptoides** *Reiss* with arrangement of spots on the forewings similar to *dystrep-*  
*dystrepta* and ab. **cingulata** (*Bgff.*) *Reiss* occur. — *malatina* *Seitz* (Vol. 2, p. 21), n. praecoc. probably from *toides.*  
 Malatia is scarcely identical with *anatoliensis*. A specimen before me from Malatia from BURGEFF's collection *cingulata.*  
 is more brick-red. The ab. ? **malatina** *Dziurz.* (mentioned by the author himself in writing as ab.) has completely *malatina.*  
 red forewings, only the apex and a bit of the border are dark, hindwings without margin. The red is also more  
 brick-red according to the written description of the author, and as in the specimen from the collection of  
 BURGEFF, that has not completely red forewings. Malatia may be presumed to be the original locality.

**Z. contaminei** *Bsd.* (Vol. 2, p. 20) (1 n) from the high Pyrenees is placed by BURGEFF next to *punctum contaminei.*  
 as subspecies, whilst I should prefer to continue same as a species. A ♀ is illustrated. — The larvae feed accord-  
 ing to OBERTHÜR on *Eryngium bourgati*. — The var. **ledereri** *Rmb.* from the mountains of Andalusia may *ledereri.*  
 correspond in general with those of *contaminei* from the Pyrenees.

#### V. Subgen. **Santolinophaga** *Bgff.*

**Z. corsica** *Bsd.* (Vol. 2, p. 24). The illustration (1 n) represents the ♀, for the ♂ see Vol. 2, plate 6 d. *corsica.*  
 Specimens with confluent spots on forewings are ab. **confluens** *Reiss.* *confluens.*

#### VI. Subgen. **Peucedanophila** *Bgff.*

**Z. cynarae** *Esp.* (= *millefolii* *Esp.*) (Vol. 2, p. 22 and p. 442) is a not widely distributed species. The *cynarae.*  
 local isolation of the various strains seems to favour the formation of races. *Cynarae* was named by ESPER from  
 specimens from Galicia (surroundings of Lemberg). According to ESPER's illustration these are large insects with  
 wide wings, with fairly wide margins and normal red belts. Near to the type race, which I do not know, we have  
 var. **pinskensis** *Bgff.* which is found in the immense west Russian marsh land around Pinsk. These are very robust *pinskensis.*  
 and unusually wide-winged insects with rather rounded truncate wing apices. They exceed *turatii* in size of thorax  
 and abdomen. A specially constant characteristic of the marking is, as opposed to the type race, a wider black  
 margination to the hindwings. It however is never continued to the area of the fold (inner angle), as for instance  
 in *turatii*, but seems to cut off the apex of hindwings obliquely. The ♀♀ show more reduced hindwings than usual  
 and exceptionally large bodies. The race flies mid-July. — The hungarian race var. **pusztiae** *Bgff.* is said to be *pusztiae.*  
 identical with the galician type race, but does not correspond with ESPER's illustrations. The insects are smaller  
 and daintier, fairly densely scaled, black with very faintly visible blue or green gloss, the ♀♀ dusted with grey  
 or greenish, more daintily scaled than the ♂♂. The red is a deep dull carmine. Spots are fairly frequently partially  
 or completely confluent: ab. **confluens** *Bgff.* The red abdominal belt is always present. From Peszer-Alsodahas, *confluens.*  
 Budapest and Goedoeloe. — The var. **veronicae** *Borkh.* (2 a) (= *cynarae* *O.*) is described from the neighbourhood *veronicae.*  
 of Marburg. The type distribution is unknown but the *cynarae* from Schweinfurt, Ludwigshafen, Schweizingen  
 and Darmstadt are probably identical with same. Both sexes are somewhat narrower in the wing and decidedly  
 more sparsely scaled than *pusztiae*. The thinner scaling makes the black areas of the wings strongly transparent,  
 the red is brighter, more iridescent. Some of the ♀♀ have a heavy golden green gloss on the black areas of the  
 wings, which can also be indicated in the ♂♂, which in extreme cases reminds one of *centaureae*: ab. **aureoviridis** *aureoviri-*  
*Bgff.* The inclination to every degree of confluence is large: ab. **confluens** *Bgff.* (Vol. 2, p. 442), the red abdominal *dis.*  
 belt of the ♂♂ generally does not meet on the back. Here we must place ab. *tricingulata* *Bgff.* mentioned in *confluens.*  
 Vol. 2, p. 22. The specimens of *veronicae* illustrated come from Ludwigshafen. Larvae of *veronicae* are found  
 on damp, chalky marshy meadows feeding on *Peucedanum cervaria* and *Libanotis montana*.

Note: The form of *genistae* *H.-Schäff.* mentioned in Vol. 2, p. 22 is a very uncertain *cynarae* form, which according  
 to various authors occurs in Siberia, the South Tyrol and the Riviera. The specimens illustrated in Vol. 2 on plate 5 d that  
 appear to correspond with the diagnosis have no defined locality; *genistae* *H.-Schäff.* was therefore deemed synonymous with  
*cynarae*.



Whilst the mid and east european *cynarae* like damp, even marshy localities, the southern main race  
*turatii*. subsp. **turatii** *Stdjss.* (Vol. 2, p. 22 described as ab., ♂ plate 5 c) (1 l) prefers hot sunny places. The ♀ illustrated originates from Genoa. The larvae of *turatii* are found only on *Peucedanum cervaria*, this applies to Genoa at the end of May where the perfect insect and also caterpillars were found on the food plant. *turatii* is densely scaled and fairly variable, apparently a purely coastal insect. Ligurian Apennines, Litoral of the Maritime Alps, Illyria. The following named forms must be mentioned: ab. **unita** *Rocci*: forewing spots 1, 3 and 5 as well as 2 and 4 confluent (*conjuncta* *Rocci* and *semiconfluens* *Rocci* are transitions hereto); ab. **depuncta** *Rocci*: spot 3 of forewings is absent; ab. **rubra** *Rocci*: spots of the forewing on underside are merged together to a blotch of spots (transition *semirubra* *Rocci*); ab. **cynaroides** *Rocci* with completely developed abdominal belt; ab. **deannulata** *Rocci* with quite black abdomen. — From the upper Val Bisagno at an altitude of 900 m *Rocci* describes a more thinly scaled dainty race with narrower wings and names it var. **humilis**. — Similarly to this main race belong large insects with truncate wing apices, small spots, densely scaled with wide margination of the hindwings and red abdominal belt, sometimes absent in the ♂: ab. **deannulata** *Rocci* (transition *semian-nulata* *Rocci*), in the ♀ it can be open on the upperside, from Bolzano (Etsch Valley), South Tyrol, named var. **waltharii** (= *genistae* *Calb.*) by *BURGEFF*. — A further race var. **ceriana** *Bgff.* (2 a) from San Remo (Valley of Ceriana) and Mentone, somewhat more sparsely scaled than *turatii*, larger in size and with wider wings and relatively small body. Margination of hindwings wider. Only a part of the ♀♀ show traces of a red belt on the underside of the abdomen. The specimens illustrated are from *BURGEFF*'s collection. — The var. **adriatica** *Bgff.* from Dalmatia and Istria (Zara, Salcano, Cologne) is very characteristic, it is similar to the former with sparse scaling and very acute wings. The black margination of the hindwings is fainter, some ♂♂ and the majority of ♀♀ have indications of a red belt on the abdomen.

*centaureae*. Further subsp. **centaureae** *Fisch.-Wald.* (Vol. 2, p. 22) (2 a) from the Ural region and the surroundings of the Volga. In specimens from Uralsk (caught at the end of June) the chief characteristic, which is usually said to be a green superficial gloss, does not occur in all specimens and varies considerably in its intensity. In most specimens a 6th conjoined spot is present, all specimens have a brilliant red belt encircling the entire abdomen, which in typical *cynarae* in the ♂♂ almost always and in the ♀♀ frequently is more or less covered on the back and under the abdomen by interspersed black scales. The scaling is finer and denser, the red more brilliant inclining towards vermilion. The specimens illustrated are from Uralsk and from the collection of *BURGEFF*. — ab. ? **mannerheimi** *Chard.*: the *mannerheimi* described and illustrated by *CHARDINY* probably belongs to *cynarae* and not to *laeta*. According to the illustration these are specimens with widely confluent spots on the forewings, but not with inverse markings as in the subsequent aberration. As the locality is given as "Siberia orientalis" this form is meanwhile placed with *centaureae*. — There is further to be mentioned: ab. **inversa** *Bgff.* (= *mannerheimi* *H.-Schäff.*, praecoc.), from the Urals, it has the red pigment so enlarged that actually the forewings seem to show red ground with black spots. — *SHELJUZHKO* considers *centaureae* as a separate species as, for instance near Kieff, where *cynarae* is widely distributed in woody localities, it only occurs about the middle of July at 2 specific spots near the town, where *cynarae* is not found. This race named by *SHELJUZHKO* as var. **ukrainica** from Kieff is differentiable chiefly by the sparser scaling as compared with *centaureae* from Uralsk. The red is brighter and more intensive, the gloss of the forewings more considerable, either green or blue. Spot 4 of the forewings is generally smaller in comparison to spot 3 than in *centaureae* from Uralsk. Here follow: ab. **cynaraeformis** *Shelj.*, insects similar to *cynarae* with a round spot 5 of the forewings; ab. **parvimaculata** *Shelj.*: spot 4 smaller than spot 3 and the remaining spots also reduced; ab. **privata** *Shelj.*: spot 4 quite absent, the other spots considerably reduced. The ab. *cynaraeformis* *Shelj.* occurs more frequently in connection with ab. *parvimaculata* and ab. *privata* than individually. — The larva of *centaureae* feeds according to *ZHURAVLEV* exclusively on *Peucedanum ruthenicum* M. B.

## VII. Subgen. *Lictoria* *Bgff.*

*achilleae*. **Z. achilleae** *Esp.* (Vol. 2, p. 27 and p. 443). The specimen described by *ESPER* originates from Uffenheim in Franconia. As long as the insects from Uffenheim are not known, the form from the Maine Valley (Gambach) must be considered the type race. Specimens from the Maine Valley are generally fairly densely scaled, the ♀ very heavily, ♂ rather less, but generally distinctly dusted with yellow. The axe-like mark (5—6) is somewhat reduced at the costa of the forewings. The red colour on the forewings is carmine inclining to vermilion. The distribution of the species is: mid and south Europe, western and Central Asia (northwards to Belgium, east Prussia, westwards as far as Aragon, eastwards as far as the Altai, to the south as far as mid Italy, Greece, Mesopotamia). *viciae* and *bellis* are both described by *HÜBNER* as occurring at Augsburg; the name *viciae* *Hbn.* was previously utilised for the uncertain type *viciae* *Schrank-Fuessly*. *BURGEFF* therefore replaces *viciae* by ab. (var. ?) **augsburga**. Among the race occurring around Augsburg there are larger individual specimens with brilliant superficial bluish gloss which are denominated ab. *bellis* *Hbn.* The name *bellis* *Hbn.* (Vol. 2, p. 27) hitherto used for south tyrolian races loses its justification. Besides the aberrations mentioned in Vol. 2, p. 27, we have to mention: ab. **rubescens** *Reiss* with almost quite red forewings in the



area of the spots, only between spots 3—4 and the axe-shaped mark there is a narrow patch of black that is also interspersed with red scales; ab. **flavogrisea** Bgff. (= *grisea* Reiss, praeocc.) ♂♂ heavily dusted *flavogrisea*. with grey-yellow. The yellow form ab. **flava** (Vol. 2, p. 27) was described by DZIURZYNSKI and not by *flava*. ROMANOFF. The ab. **blachieri** (Vol. 2, p. 443) is described by DZIURZYNSKI. The name *fulva* Spul. is withdrawn. *blachieri*. — var. **rhingauiana** Bgff. is a narrow winged very densely scaled race shining with blue gloss on the *rhingauiana*. upperside of forewings of ♂♂. Spot 5—6 on costa is not reduced but regularly developed. Spots incline to be confluent. Red of spots, a brilliant carmine, of hindwings pure carmine rose. The ♂♂ rarely, ♀♀ regularly dusted with yellowish-grey. BURGEFF mentions a gynandrous hermaphrodite, ♀ on left, ♂ on right; Geisenheim (Rheingau). — BURGEFF separates var. **jurassina** for the large, wide winged, thinly scaled race from *jurassina*. the Swabian Alb, which is rarely dusted with yellowish white in the ♂ sex, but heavily in the ♀; spots of normal size, sometimes axe-shaped mark is somewhat reduced on costa, diffused in its outline on account of the sparse scaling. Red of hindwings a delicate carmine rose, that of the spots somewhat bolder and partly mixed with vermilion. From Spaichingen, Tuttlingen, Sigmaringen, Herrlingen, Klingenstein in June. Specimens of this race that have an appressed yellowish dusting in the neighbourhood of the spots which appears to surround same with yellow, are named by BURGEFF as ab. **flavopraetexta**. — A very clearly differentiable race is var. **rlenana** Reiss (2 b) from the Kaiserstuhl; larger and more thinly scaled than the preceding with *flavopraetexta*. considerably increased red spots on forewings, above all with large wide shell-like spot inclining to confluence. Specimens from the Swiss Jura (Bözingen) are identical. The ♀ type is illustrated. — As compared with the type race, the var. **beraunensis** Reiss, has smaller spots and is generally smaller and daintier. The red is darker. *beraunensis*. Faint superficial blue sheen, besides sparse, interspersed of yellowish scales on forewings of both sexes, the spots sometimes appear distinctly with yellowish surrounds. Mid-Bohemia (Karlstein, Radotin). — The var. **peszerensis** Reiss from the sandhills in the surroundings of Budapest is small with generally very acutely formed *peszerensis*. wings. — The east Prussian main race subsp. **zobeli** Reiss (2 b), type race from Osterode, is much more heavily *zobeli*. built, rather larger, more densely scaled with a light superficial gloss on forewings. All spots are reduced, especially spot 3, that often can quite disappear. The small spot 6 is frequently attached to spot 5, that is also small. The ♀♀ have yellowish scale interspersions on the forewings, often however they are quite without yellow scales. The margination of the hindwings is heavier. As according to BURGEFF races occur in East Prussia that differ in some respects from *zobeli*, we mention *zobeli* as a subspecies. The ♀ type is illustrated. — The high alpine form (Valais, Upper Engadin, Bavarian Alps) has been named subsp. **alpestris** Bgff. (= *achilleae* *alpestris*. *Mengelbir*) occurring at 1200 to 2000 m. The chief characteristics are: Thin regular scaling and dusky appearance together with an inclination to a reduction of spots 5—6 and the complete absence of the yellowish dusting in the ♀♀; Bergün (Engadin) Saas-Fee (Valais). — The South tyrolian race of this high mountain insect is of medium size, enlarged forewing spots and called var. **castellana** Stl., being somewhat related to *praeclara* *castellana*. (see later) flying in the valleys; Castelrotto 700—750 m, Costazza 1500—1700 m. — The subsp. **miniacea** Oberth. *miniacea*. (2 b) (= *achilleae* Dup.) from Charente, lower Charente, Vendée shows a more apparent gloss. Ground colour steel blue sometimes slightly greenish. The red is a brilliant vermilion more or less mixed with carmine; ♀ dusted with pale grey. The illustrated specimens are from Dompierre sur mer. The yellow form is ab. **flava** *flava*. Oberth. — OBERTHÜR mentions ab. **brunnea** of subsp. *tristis* (Vol. 2, p. 27) from the high Pyrenees (Cauterets) *brunnea*. that is brown instead of red. — The subsp. *aragonensis* Stgr. (Vol. 2, p. 27) (2 b) is limited to Aragon. The ♂ illustrated is from Sierra Alta, Aragon, 1800 m. — The Basses-Alpes (Digne) and Isère are the habitat of subsp. **achillalpina** Bgff. (= *alpina* Oberth., n. praeocc.; *achilleae* Bsd.) (2 b) with large wide wings and enlarged spots. *achillalpina*. It is probably the largest race of european *achilleae* with carmine red spots and hindwings, ♀♀ dusted greenish-grey. The ♂ illustrated is from Digne. Under this heading ab. **janthina** Bsd. is mentioned, it has small red spots *janthina*. on forewings and the small spot 6 is frequently attached to spot 5.

**wagneri** Mill. (Vol. 2, p. 21 and p. 441) from the Maritime Alps, eastwards to Alassio, type race La *wagneri*. Turbie, which has hitherto been deemed a separate species, can be added to *achilleae* as a subspecies. Besides the aberrations mentioned in Vol. 2, p. 21 there are: ab. **subcaerulea** Mill. (= *nigra* Dziurz. Vol. 2, p. 21) and *subcaerulea*. ab. **sexmacula** Dziurz. (Vol. 2, p. 441) (= *quadrinaculata* Oberth.) — The race from Alassio: var. **osthelderi** *sexmacula*. Bgff. (2 c) is the darkest type of *wagneri*. In the ♂ spots are very small, often scarcely visible with considerably *osthelderi*. increased black hindwing margin, so that in a large number of insects the hindwings are almost black. There is an increase in the superficial blue sheen (more rarely green sheen) especially in dusky specimens. In the ♀ these characteristics are less pronounced. Spots of forewings mostly with yellow border. — In the ligurian Apennines westwards to Ceriale we find subsp. **ligustica** Rocci (= *ligustina* Bgff.) (2 c) that belongs immediately *ligustica*. next to *wagneri*, but in some respects is closer to *achilleae*. The differences from *wagneri* are: larger, narrower black margin to hindwings, generally on forewings spot 6 is attached or converged with spot 5, red more brilliant. The ♀♀ show the yellowish dusting of *achilleae* ♀ in the shape of fine yellowish edges to spots, the black margination of hindwings is generally only perceptible at apex. The superficial colouring is less distinct.



Brilliant blue specimens are rarer, green glossy specimens frequent. The specimens illustrated are from Genoa. The great variability of this subspecies is shown by the following aberrations: ab. **pseudoachilleae** Rocci with axe-like mark 5—6 like *achilleae*; ab. **divisa** Rocci with spots 5 and 6 of forewings separated (six-spotted); ab. **pseudocynarae** Rocci, purely five-spotted, spot 5 round, narrower margin on hindwings; ab. **pseudowagneri** Rocci is similar to *wagneri* with fairly wide black margin on hindwings, five-spotted; ab. **latemarginata** Bgff. (= *latemarginata* Rocci, n. praeocc.) with considerably wider black margin on hindwings; ab. **parvipuncta** Rocci with very small spots on forewings; ab. **paupera** Rocci without spot 4; ab. **decollata** Rocci without white necklet; ab. **translucens** Bgff. (= *diaphana* Rocci n. praeocc.) with semi-transparent wings in consequence of sparse scaling. Further ab. **flavocincta** Rocci with yellowish circumscription of spots of forewings; ab. **flavoinspersa** Rocci like former but with yellow dusting between spots; ab. **conjuncta** Rocci (= *confluens* Rocci, trans.): spot 1 confluent with 3 and rarely spot 2 with 4 and ab. **parva** Rocci relating to small specimens about half the size. The ab. **flava** Hebsacker is the yellow form, *flavescens* Rocci is a transition thereto. — The var. **propinqua** from greater altitudes of the ligurian Apennines (Mount Alpesisa) is named by Rocci. It has generally less brilliant colouration and the characteristics of ab. *pseudoachilleae* of *ligustica*. Specimens of this race that are similar to *ligustica* are called ab. **pseudoligustica** Rocci.

The remarkably large and beautiful main race from the southern valleys of the Alps (Etsch and Eisack Valleys near Bolzano) are named by BURGEFF subsp. **praeclara** (2 c) (hitherto erroneously classified as *bellis* Hbn., Vol. 2, p. 27, plate 7 c). The size and above all the stout abdomens of ♀♀ are characteristic, rich colours with considerable blue sheen of ♂♂, fainter blue or green gloss in ♀♀. Red is more vermilion than carmine. The majority of ♀♀ without yellow dusting.

The tuscan races as type race and besides the upper and mid-italian races with the exception of the group from the Riviera, are assembled under subsp. **triptolemus** Hbn. (2 d) as dark forms from the Litoral in Italy do not occur with the exception of Liguria and the variations of the races grouped together hereafter are small. HÜBNER mentions Tyrol as the locality. OBERTHÜR assumes the race from Tuscany to be the type race which agrees with HÜBNER's illustrations. The ground colour is steel-blue sometimes faintly greenish, spots of forewings and hindwings inclined to be vermilion red. Spots enlarged. The ♀♀ are large with wide wings, sparsely dusted with yellow or scarcely at all. Margin of hindwings narrow. The ♂ illustrated comes from the hills round Florence (BURGEFF's collection). Aberrations to be enumerated are: ab. **confluens** (Dziurcz.) Bgff. (= *emirubra* Vrtz. and *elongata* Vrtz.); ab. **flavopraetexta** Bgff., see previously and ab. **cingulata** Vrtz. (= *cingulata* Trti.) with red abdominal belt. — Varying races are: var. **maximerubra** Bgff. (= *ruberrima* Vrtz., n. praeocc.) with increased red from the Province Caserta (Mount Mainarde). Spot 1 strongly diffused on costa, spot 2 often conjoined with spot 4. Spot 5—6 fan-shaped; in the 2nd half of June. — var. **restricta** Std. from the peninsular of Sorrent, Mount Faito, above 1000 m is smaller (length of forewings 9—12 mm). Abdomen and feelers very stumpy, the latter shorter, thinner, clubs much less heavy, ground colour glossy bluish black, fringes yellow. Spots reduced, spot 3 frequently minute, spot 5—6 generally small, narrow, falcate. The ♀♀ shining grey-silvery, spots with whitish edges and these borders contrasting clearly from the general colouration. Red suffused. Hindwings almost hyaline transparent. — var. **verityana** Bgff. (= *bellis* Vrtz., n. praeocc.) from the Sibillini Mountains (Ascoli Piceno) with wide large spotted wings, approximating to *praeclara*, the ♀♀ however very densely dusted with yellow and differing thereby from *praeclara*. The red is less brilliant than in *maximerubra*. — Close to *maximerubra* is a race from Mount Sirente and Mount Velino (Abruzzi): var. **aspera** Bgff. It approaches *praeclara* in regard to size and has large brilliant red spots. The ♀♀ are heavily scaled with golden yellow. This yellow scaling is very coarse like the rest of the scaling. The yellow scales are visibly interspersed among the black. The fringes especially at the inner angle of hindwings are long and ciliate. Forma **aestivalis** Oberth. is the smaller summer form (August) with less deep colours.

In Transylvania (Gyergyoszent-Miklos) we have subsp. **transsylvaniae** Bgff. which varies considerably. They are very dark specimens. The small spot 6 of forewings is conjoined with the enlarged spot 5. In the ♀♀ disperse yellow scaling occurs, that is increased in the areas around the spots and indicates a yellow border to spots. The hindwings have definite black margins. — The subsp. **balcanica** Reiss (2 c) from Istria, Bosnia and Herzegovina (Type race from Korična, Bosnia, 1000—1200 m) is of a dusky appearance and has fairly wide wing contour with rounded apex. The ♀ is dusted with impure yellow on forewings. Hindwings of the ♂♂ more or less margined with black. Thorax and abdomen distinctly hairy. The ♀ type is illustrated. — Whilst *balcanica* still retains the normal red with inclination towards vermilion, on the other side of the albanian frontier we find the pronounced rose colour of asiatic races, as in subsp. **macedonica** Bgff. (2 d) from Macedonia (lake of Dojran). Less large than the type race of *achilleae*, distinctly narrow-winged at least in the ♂. The white scaling of the legs is very pronounced, distinctly white double collar is present, thorax has whitish hairs also in the ♂♂. The ♀♀ densely scaled with bright yellow. Indications of black scaling only on the margin of forewings, also many ♂♂ more or less dusted with yellow, so that the dark margin of forewings contrasts also



with them. Pure rose-red on the very narrowly margined hindwings and pale vermillion mixed with carmine red on the large spots. Apical spot well developed into an axe-like mark.

The asiatic races of *achilleae* can scarcely be envisaged: subsp. *bitorquata* Mén. (Vol. 2, p. 27) (2 d) is *bitorquata*. limited to Pontus and Armenia. A ♂ from Erivan from BURGEFF's collection is illustrated. — Subsp. *anatolica* *anatolica*. Bgff. (Vol. 2, plate 7 d) from southern Anatolia (Ak-Shehir and Marash in the Taurus) is smaller than former with large rose-red spots and hindwings and strong inclination to confluence of the spots. The forewings of ♀♀ and some of ♂♂ are densely scaled with yellow. The races of STAUDINGER var. *antiochena* and var. *phoenicea* illustrated in Vol. 2, p. 27, plate 7 d belong here. — The var. *senilis* Bgff. from the alpine regions around Malatia *senilis*. is still a little smaller than *anatolica*, yellow scaling considerably increased, the legs and underside of abdomen completely whitish yellow. On the upperside of forewings the yellow surrounds of the spots are increased in size. The shell-shaped spot is reduced to a round dot, its previous size is indicated by a more intensive yellowish scaling. The red is the usual rose of specimens from Asia Minor. The hairs especially of underside are fairly long. So far only the ♂♂ are known. — subsp. *georgiae* Reiss (2 d) from the neighbourhood of Abbas-Tuman and from *georgiae*. the mountains of Tiflis is larger and more densely scaled in comparison to previous asiatic races. The red is dark rose. Spot 5—6 seem falcate. Forewings of ♂ generally without yellow scale interspersion among the red spots, in the ♀ relatively few. Fairly heavy blue or green gloss is visible. Margination of hindwings rather more heavy especially at apex. The types are illustrated.

Food plants of *achilleae* are *Hippocrepis comosa* L. and *Coronilla varia* L.

**Z. ignifera** Korb (Vol. 2, p. 27 and p. 443) (2 e). A freshly emerged pair caught by Mr. O. QUERCI is *ignifera*. illustrated; in Vol. 2 there is an illustration of a ♂ (7 a).

**Z. ecki** Christ. (Vol. 2, p. 24, plate 6 c) and **Z. cambysea** Led. with subsp. *rosacea* Romff. (Vol. 2, p. 26 *ecki*. and p. 443, plate 6 i) are placed here. In the latter ab. *cingulata* Dziurz. (Vol. 2, p. 443) with red abdominal belt. *cambysea*. *cingulata*.

**Z. armena** Eversm. (= *kadenii* Led.) (Vol. 2, p. 27 and p. 443, plate 7 c). Specimens with confluent *armena*. spots in the distal area of forewing from Georgia are named by BURGEFF ab. *confluens*. — As *anthyllidis* var. *confluens*. *caucasica* Stgr.-Rbl. has proved to be an alpine *armena*, var. *caucasica* Stgr.-Rbl. must be placed to *armena*, *caucasica*. *alpina* Dziurz. (Vol. 2, p. 443) is synonymous with *caucasica*, its chief characteristics are: smaller than *armena*, more thickly haired in ♂♂, sparse scaling of both sexes, weak margination of the spots which in the ♂♂ is often quite reduced, reduction and dissolution of the shell-like spot on margin, that separates into 2 diffuse but distinctly distinguishable spots and less heavy black margins of hindwings in the ♂♂.

**Z. haematina** Kollar (Vol. 2, p. 27/28) (2 e) is to be considered a separate species. The type from the *haematina*. Vienna Museum is illustrated. It is caught at Shiraz, Province Farsistan (S.W. Persia). There is a further specimen in the Vienna Museum. Faintly scaled forewings with quite faint green gloss; spots pale rose; spots 1 and 2 confluent, spots 3 and 4 small and separate, spot 5 and 6 elongated crescent shaped and confluent. Hindwings pale rose, semi-transparent, slightly more densely scaled with rose at inner angle, rather more heavily scaled with darker rose in the outer area, especially at the apex, collar, scapulae and abdominal belt on one segment coloured rose. Legs yellowish.

### VIII. Subgen. *Peristygia* Bgff.

**Z. anthyllidis** Bsd. (= *erebus* Meig.) (Vol. 2, p. 22 and p. 442) from the high Pyrenees. The ♂ and *anthyllidis*. the ♀ from Gèdre are freshly illustrated on plate 2 e. In regard to *caucasica* Stgr.-Rbl. see above under *armena*. The form with confluent spots 1 and 3 and also spots 5 and 6 and other combinations is ab. *conjuncta*. *conjuncta* Car. (= *conjuncta* Dziurz., Vol. 2, p. 442, *confluens* Le Charles). The ab. *flava* Oberth. (Vol. 2, p. 22) is described under *exulans* and therefore need not be mentioned here.

**Z. oxytropis** Bsd. (Vol. 2, p. 25 and p. 443) (2 e): OBERTHÜR and VERITY see in *oxytropis* and *rhadamantus* subspecies of the same species. In my opinion both groups are certainly related but different species, that inhabit different localities and meet in the Litoral of the Maritime Alps. *rhadamantus* is larger, more robust and dusted with grey in both sexes, with narrower more acute wings; *oxytropis* on the other hand is daintier with rounded apices of wings almost always haired with black in both sexes and with much less deeply black surrounds to the spots. The distribution of *oxytropis* is Italy (westwards Porto Maurizio, northwards to Piedmont), Sicily, the type race being from Tuscany. The newly illustrated ♂ is from Florence. Besides the aberrations mentioned in Vol. 2, p. 25 there are to be named of the type race: ab. *conjuncta* Spul. (Vol. 2, p. 443); ab. *conjuncta*. *corsicoides* Std. (Mount St. Angelo, 1250 m), similar to *corsica*, 5 very narrow, sharply separated red spots *corsicoides*. without black surrounds on forewings, spot 6 is absent on upperside; ab. *ruberrima* Std., all 6 spots widely *ruberrima*.



*lampadouce.* conjoined together being confluent. In ab. **lampadouce** Bgff. (= *guenéeiformis* Vrtv.) the lateral black margin-ation of spots has suffused and unites spot 3 with 5 and 2 with 4, otherwise the red spots are more or less confluent (Sabini Mountains). I myself possess a specimen from Genoa with the whole area of spots consisting of red, only between spot 3 and 5 there is a small black streak. The ab. **tricingulata** Vrtv. has a red abdominal belt over 3 segments. There are also quite small specimens with less intensive colouring which, as the denomination given them of *minima* Rocci is previously utilised, had better remain unnamed. — VERITY has established various races, for instance, var. **pumila** Vrtv. very small with narrow wings and dainty build, otherwise similar to the type race, not leaning towards *sibyllina*, from the Mountains of Tuscany (Traversa). — var. **laterubra** Vrtv. from Caserta (Mount Mainarde), Abruzzi (Mount Sirente); large, red of spots more extended than in the other races, so that frequently all spots are confluent. Here we have to mention: ab. **corsioides** Bgff. as *corsioides* Std.; ab. **octonotata** Bgff. with spot 4 widely intersected by black; ab. **phlebomelas** Std. with veins with black scales creating a ray-like marking; ab. *confluens* Zickert; ab. **irregularis** Std.: spots 5 and 6 are absent, spots 1 and 2, as well as 3 and 4 confluent; ab. **ruberrima** Std. (see above); ab. **reissi** Std. without black circumscription to the spots; ab. **rubescens** Bgff.: spot 1 elongated on costa and united with spot 3 ending just before spot 5 of the forewings; ab. **garibaldina** Std. with quite red forewings on upper and undersides. — The var. *sibyllina*. **sibyllina** Vrtv. (2 f) Mount Sibillini (Bolognola) is a small mountain race, larger however than *pumila* and delicately and sparsely scaled, forewings semitransparent, only the margin still intensive but narrowly black. *quercii*. The ♂ illustrated is from VERITY's collection. — The var. **quercii** Vrtv. from Sicily (Mount Cuccitiello), differentiates chiefly by its wide wings and exceptional size. It shows alpine character combined with sparser scaling. — In northwest Sicily STAUDER discovered a small (smaller than *sibyllina*) race that occurs rarely: var. *insulicola*. **insulicola** Std. with normal colouration. The forewing spots are conjoined in pairs and with distinct black circumscription, spots 5 and 6 form a perfect right angle with almost equally long sides.

*acticola.* The subsp. **acticola** Bgff. (2 f) from Alassio, Laigueglia and Porto Maurizio varies considerably from the type race. It differs by its somewhat longer and narrower wings, much darker with less green gloss, dusky red, very coarse scaling and longer fringes. Hindwings with wider black margin. Spots of forewings surrounded completely with black, the vertical part of the circumscription considerably heavier. Red spot 4 in some ♂♂ and in most ♀♀ interspersed with yellow-white scales, in some ♀♀ the upper and lower parts are almost yellow, only the middle being red: ab. **inopinata** Bgff. The ♂ illustrated is from Alassio.

The larva has been bred on *Lotus corniculatus* L. in captivity. VERITY mentions *Onobrychis sativa* as the food plant. The ground colour of the larva after the last moult is deep velvety black. Head bluish black. There is a pale rose-red dorsal stripe with a grey-reddish tone beginning on the 3rd segment and disappearing in a similar way on the anal segment. The rose-red tone of the narrow lateral stripe merges underneath quickly in the grey-black of the flanks. In the upper part of the lateral stripe there are at regular intervals from the 5th segment 7 brilliant sulphur yellow warts. On the lateral excursions of the rose coloured dorsal stripe there are tufts of stiff white bristle-like hairs on each segment. The stigmata and surrounds are grey-black. Thoracic legs black, prolegs fleshy red. Pupa longish in an eggshaped round cocoon.

*graslini.* **Z. graslini** Led. (Vol. 2, p. 25) (2 f) is distributed in Syria, Mesopotamia, Taurus and Kurdistan. In regard to ab. **confluens** the author's name is DZIURZYNSKI and not OBERTHÜR. A ♂ from Syria is illustrated.

*rhadamanthus.* **Z. rhadamanthus** Esp. (Vol. 2, p. 26 and p. 443) is distributed in South France and the Pyrene Peninsular. The type race is from Nîmes (Languedoc). In regard to its relationship with *oxytropis* I refer to my remarks in that species. The ab. **guenéei** Oberth. (Vol. 2, p. 443) (= *confluens* Heinrich) corresponds with ab. *lampadouce* Bgff. in *oxytropis*; ab. *cingulata* Led. (Vol. 2, p. 26) is to be limited to all races that are pronouncedly without belts. The yellow form ab. **flava** Oberth. (Vol. 2, p. 443) also occurs. — The subsp. **alfacarensis** Reiss (= *rhadamanthus* H.-Schäff.) (2 f) from Andalusia, type race from Sierra de Alfacar, is larger and more robust than *rhadamanthus*. The specimens illustrated are typical. Spots 3 and 4 as well as spots 5 and 6 are often confluent together. On the underside of forewings the area of spots shows a complete red surface in which the separate spots can be discriminated. Hindwings red with narrow black margin. The hairs of thorax and abdomen are denser, abdomen always has a distinctly visible red belt. Specimens from Albarracin vary little. — As *kiesenwetteri* H.-Schäff. has been utilised as the name of an aberration, VERITY has denominated the catalonian race (Barcelona) as var. **barcina** (2 f). The race is small with bright colours and the ♀♀ are dusted with grey. The thorax has profuse white hairs, abdominal belt absent, ground colour brightly glossy green or blue, six-spotted and hindwings often strongly suffused with black. Specimens of this race with normal red hindwings are named ab. **pseudorhadamanthus** Bgff. The following aberrations occur: ab. **quinquemaculata** (Oberth.) Bgff. (see later on); ab. *kiesenwetteri* H.-Schäff. (Vol. 2, p. 26, plate 6 h) and ab. **obscura** (Oberth.) Reiss (2 g) (see later on). — VERITY has named the race from the Pyrenees (La Traucada d'Ambouilla in the east Pyrenees in April, May) var. **pyrenaea** (= *rhadamanthus* Oberth.). It is without gloss, ground colour of the



forewings bluish-grey, red dull and without gloss, abdomen without belt. — The subsp. *grisea* Oberth. (Vol. 2, *grisea*, p. 443, plate 6 h ab. *cingulata*) (2 g) from the Basses-Alpes (Type from Digne) is dusted whitish-grey on the forewings. The following aberrations have been named: ab. *kiesenwetteri* (H.-Schäff.) Oberth. and ab. *guenéei* <sup>kiesenwetteri.</sup> <sup>guenéei.</sup> <sup>azurea.</sup> Oberth. (see above). The ♂ illustrated is from Digne. — Next to it var. *azurea* Bgff. (= *oxytropiferens* Vrtty.) from the Maritime Alps (Vence, La Turbie etc.) with chief characteristic a brilliant blue superficial gloss on the black areas of wings. The ♀♀ sometimes faintly dusted with grey. Specimens with hindwings more or less blackish are ab. *pseudostygia* Bgff.; ab. *albovittata* Vrtty. denominates specimens with a white longitudinal stripe on forewings. — A constant race var. *stygia* Bgff. (= *kiesenwetteri* Oberth.) (2 g) with rather heavy blackish margins to hindwings occurs at Bordighera, San Remo and other localities on the Litoral of the Maritime Alps. Forewings are blue black or greenish with 6 black bordered spots. The ♂ illustrated is from San Remo. ab. *obscura* Oberth. <sup>obscura.</sup> denominates specimens with dusky forewing spots and black hindwings and ab. *quinquemaculata* Oberth. <sup>quinque-</sup> <sup>maculata.</sup> which are five-spotted are not exactly rare here. To be mentioned still are: ab. *albovittata* Vrtty. (see above) and ab. *pseudoazurae* Bgff. with predominantly red hindwings. — Finally there is subsp. *algarbiensis* Christ. (= *roederi* <sup>pseudoazurae.</sup> <sup>reca.</sup> Stgr.) (Vol. 2, p. 26, plate 6 h) from South Portugal (Faro).

**Z. lavandulae** Esp. (= *spicae* Hbn.) (Vol. 2, p. 25/26, plate 6 g). Distribution throughout Liguria, S. France and Spain. In the type race from S. France specimens with considerably increased red on hindwings are named ab. *pseudoconsobrina* (Germ.) Bgff. (Vol. 2, plate 6 g). OBERTHÜR designates with ab. *siepii* the <sup>pseudo-</sup> <sup>consobrina.</sup> yellow form; ab. *powelli* Oberth. are specimens in which the lateral black border of forewing spots is suffused <sup>siepii.</sup> <sup>powelli.</sup> (similar to ab. *lampadouche* Bgff. in *oxytropis*) and spot 2 and 4 as well as 3 and 5 are conjoined and besides spot 1 and 3 are merged longitudinally with red. — The var. *consobrina* Germ. (Vol. 2, p. 26) (2 g) is limited to Marseilles, the estuary of the Rhone, Digne, Hyères and the Pyrenees. The ♂ illustrated is from Digne. Specimens in which spot 4 is absent on forewings are named ab. *quadripuncta* by BURGEFF. — In the Sierra Espunna (Murcia) a pronounced race subsp. *espunnensis* Reiss (2 g, h) occurs with considerably enlarged forewing spots. The insects are larger and more robust. The underside of forewings shows a completely red surface over the spot area. The hindwings are red with a more or less heavy black margin. The ♂ and ♀ illustrated are the types. ab. *pseudolavandulae* Reiss refers to specimens like *lavandulae*, that occur rarely. A specimen with completely red hindwing in which black pigments cover the anal fold of the wings, stretching also to the apex midway to the discocellular are named ab. *eradiata* by BURGEFF. The insect gives the impression of a <sup>quadri-</sup> <sup>puncta.</sup> <sup>espunnen-</sup> <sup>sis.</sup> <sup>pseudo-</sup> <sup>lavandulae.</sup> <sup>eradiata.</sup> Zygaena with normally black bordered hindwings. — In Albarracin (Aragon) a race occurs halfway between *lavandulae* and *espunnensis* with a heavier superficial gloss, which reminds one of *theryi*.

**Z. theryi** Joannis (Vol. 2, p. 443) (= *nisseni* Rothsch.) (2 h) is a genuine species distributed in Algiers <sup>theryi.</sup> (Hamman R'irha, Philippeville, Djebel-Zaccas), flying in May. Besides the thinner and longer antennae that are only slightly thickened towards the clubs and the hindwings that are quite black on the upperside, *theryi* differs from *lavandulae* by the deeper blue gloss of the ground colour and also of body and the black instead of white fringes to forewings, which appear more rounded. The specimens illustrated are from Hamman R'irha and from BURGEFF's collection.

The larva was illustrated by Lord ROTHCHILD on a pocket carbon block but was not described. The food plant is stated to be *Coronilla* spec., according to BURGEFF it is a *Lotus* with rough edged stem with woolly fluff and characteristic trefoil leaves.

#### IX. Subgen. *Coelestis* Bgff.

**Z. cuvieri** Bsd. (Vol. 2, p. 26 and p. 443, plate 6 h). Distribution over Mesopotamia, Armenia, Syria, *cuvieri.* Transcaspia, Persia. Here we have ab. *confluens* Oberth. (Vol. 2, p. 26) and ab. *totarubra* Dziurz. (Vol. 2, p. 443). *totarubra.* — BURGEFF establishes the var. *libani* (2 h) from Lebanon. This syrian race is distinguished from the persian *libani.* and armenian races by the considerably reduced spots, of which the two outer ones seem to be each resolved into two, so that here a normal six-spotted type is indicated. The specimen illustrated was caught at Beirout and is from the collection of BURGEFF.

Here we should place **Z. rubricollis** Hmps. (2 h) — Chitral — which according to the painted illustration *rubricollis.* from the British Museum appears more heavily scaled and of darker carmine colouring than *cuvieri*. The middle and outer forewing spots of *cuvieri* have dissolved in two, the basal spot is reduced, spots 3 and 4 are intersected by a vein, spots 5 and 6 are fairly widely separated. I should consider *rubricollis* to be a subspecies of *cuvieri*. *Z. rubricollis* is mentioned already in Vol. 10, p. 52 of the indian Fauna as being a boundary-line insect, but it is as well to mention it among the palaearctic Fauna.

**Z. tamara** Christ. (Vol. 2, p. 26 and p. 443, plate 7 b). In ab. *rubra* (Vol. 2, p. 26, plate 7 b) the author's *tamara.* name should be corrected to *Stgr.-Rbl.*; besides we have to name ab. *daemon* Christ. (Vol. 2, p. 26, plate 7 b).

**Z. placida** O. B.-H. (2 h) from the Wan region (Armenia). It appears to be very closely related to *placida.* *tamara*. The black ground colour has a bluish gloss (about like *cuvieri* from the same locality), the spot marking



corresponds approximately with that of *tamara*, also the size. The antennae seem to me weaker and shorter than in *tamara*. The red especially on the forewings is intermixed with yellow (vermilion colour), hindwings with exception of the inner angle somewhat transparent, similar to *cuvieri*. Collar and scapulae red, *tamara* only has a yellow collar, abdominal belt about the same as *tamara*, only red. Black margins of hindwings fainter than in *tamara*. The ♀ illustrated was placed at my disposal from the collection of BANG-HAAS.

- escalerai*. **Z. escalerai** Pouj. (Vol. 2, p. 28) is illustrated on plate 2 i according to OBERTHÜR.
- manlia*. **Z. manlia** Led. in Vol. 2, p. 26 and illustrated on plate 6 h is now considered a genuine species, whilst *Z. cacuminum* Christ. (Vol. 2, p. 26, plate 6 k) is classified as a subspecies of *manlia*. We have to name here ab. *nigra*. **nigra** Dziurz. (Vol. 2, p. 443).
- fraxini*. **Z. fraxini** Ménétr. (= *carneolica* Freyer, *oribasus* H.-Schäff.) in Vol. 2, p. 27/28 and p. 443, plate 7 e, from Armenia and Central Asia. SHELJUZHKO has named the form with red belt ab. **cingulata** and that with *confluens*. confluent spots ab. **confluens**. — The var. *perdita* Stgr. (Vol. 2, p. 28) from the Southern Caucasus is added here. — The subsp. *scowitzii* Ménétr. (= *sogdiana* Ersch.) in Vol. 2, p. 28, plate 7 e is from the Province of *nigra*. Ferghana and the Thian-Shan. The ab. **nigra** Dziurz. has no red abdominal belt and has very small spots with *alba*. little white edging, further ab. **alba** Dziurz. and ab. **confluens** Dziurz., both mentioned in Vol. 2, p. 443 are placed *confluens*. here. In ab. **rubescens** Bgff. (= *confluens* Shelj, trans.) the red spots of forewings are quite suffused and have *rubescens*. suppressed the white borders, which are presumably more easily influenced, almost completely so that there are scarcely any traces of same visible. — Transcasian *scowitzii* and specimens from the Alai region often show a tendency to form a traverse band on the hindwings. The black margin bulging almost in the middle of the lower hindwing margin in a wide streak up to the costa, dividing thereby the hindwing into two halves: *ornata*. ab. **ornata** Bgff. — Here we place var. **separata** Stgr. from the southern Fergana (Namangan, Osh) (Vol. 2, *separata*. p. 28, plate 7 e) a uniform race of good size, brilliant colours, with reduced spots. A division of spots 3 and 4 *allissima*. does not occur in all specimens. — The var. **altissima** Bgff. (2 i) from the Trans-Alai Mountains (Ak-Bassegha) above 2000 m has considerably narrower wings and strongly reduced spots on forewings. The body hairs are longer than in all other races and the red abdominal belt is almost extinct in most ♂♂. The red collar of the ♂♂ consists of black intermixed with a few red hairs.
- erschoffi*. **Z. erschoffi** Stgr. in Vol. 2, p. 28, plate 7 f, illustrations 3 and 4 (= *olivieri* var. *Ersch.*) is considered a species, as also is
- truchmena*. **Z. truchmena** Eversm. (Vol. 2, p. 28) (2 i) from the southern Steppes of Kirgisen (Samarkand) whence *carbuncula*. the specimens illustrated originate. — Of these BURGEFF has separated as var. **carbuncula** a dusky race with very reduced spots from the Syr-Darja region, Baigacum, in July, which is shown by the specimen illustrated in Vol. 2, plate 7 g. Spots 4 and 3 are mostly separate, small and roundish, more or less with reddish centres. Scaling, especially of hindwings heavier, areas without scales therefore contrasting more strongly, veins with red scales as in the type form.

Besides above we have to mention here the following species:

- formosa*. **Z. formosa** H.-Schäff. (Vol. 2, p. 28, plate 7 i) from Pontus, Taurus and Armenia with var. *malatiana* Stgr.-Rbl. (Vol. 2, p. 28, plate 7 h) from Kurdistan and subsp. *rosinae* Korb from Kulp (Armenia) (Vol. 2, p. 28, plate 7 f).
- mangeri*. **Z. mangeri** Bgff. (2 i) from Afghanistan, Pachmann Mountains, west of Kabul. Spots of forewings, hindwings and abdomen, excepting a basal segment, rose-red. Borders of forewing spots pure white. All wing areas except red and white parts a deep lustreless black. Margins of hindwings of medium depth in the ♀, not bulging unusually in the middle, very narrow in the ♂. A double rose-red necklet is present. Legs and scapulae *laticincta*. are scaled with white. A specimen with 4 black and 3 red terminal segments of abdomen is called ab. **laticincta** by BURGEFF. The ♀ illustrated is the type from the collection of BANG-HAAS.
- kavrigini*. **Z. kavrigini** Gr.-Grsh. in Vol. 2, p. 28, plate 7 g, (= *rhodogastra* Stgr.) from the eastern Bokhara, Pamir with var. *karategini* Gr.-Grsh. (Vol. 2, p. 31, plate 7 f, illustration 5) from the Karategin Mountains with less red on abdomen and heavier borders to spots. — The var. *kohistana* Gr.-Grsh. (Vol. 2, p. 28) from the northern reaches of the Hissar mountains, Jagnob river, Shaksara also has reduced forewing spots. — *glasunovi* Gr.-Grsh. (Vol. 2, p. 28) can be deemed a nomen nudum.
- roltschildi*. **Z. rothschildi** n. sp. (2 i). From the museum at Tring I received as *haematina* a *Zygaena* ♂ that can be briefly described as follows: Black-greenish ground colour of forewings, scarcely glossy, red dark rose, six-

Note: *mitisi* Dziurz. mentioned in Vol. 2, p. 26, plate 56 h is to be cancelled, as it is identical with *Zululba* (*Epizygauca*) *ochroptera* Feld. or *myodes* (Vol. 14, p. 29, plate 2 c) from South Africa.



spotted with confluent spots 1 and 2, as well as the round spots 3, 4 and 5 with fairly heavy yellowish-white surrounds, spot 6 divided as in *carniolica* but situate much lower than in same and almost without white border. Hindwings with narrow black margins. Underside as above. On the sides of the pronotum a little red, traces of a red belt on the abdomen. Clubs of antennae rounded anteriorly, legs yellowish. From the Hissar Mountains, Ulaix Capa in July from the collection of GRUM-GRSCHIMAILO. I am naming the insect in honour of Lord ROTHSCHILD who has graciously placed all his types at my disposal. A second identical ♂ is in the Museum at Tring.

**Z. cocandica** Ersch. (Vol. 2, p. 31, plate 7 g) (2 k). Type race: Western Alai along the river Kisil-su in *cocandica*. Chan Kokan. Specimens without abdominal belt are ab. **nigra** Dziurz. A fresh ♂ is now illustrated. — var. **nigra**. **minor** Ersch. from Chan Kokan, near Djiptik, at end of June is in the same relationship to *cocandica* as *iberica minor* is to *occitanica*. According to the description of one single ♀ the wing expanse is 26 mm; collar red, scapulae and tip of abdomen blackish-blue (*cocandica* has collar, scapulae and tip of abdomen yellow) forewing spots small, situate separately, darker red. As nothing is said in regard to the absence of the red abdominal belt, it must be presumed that same occurs, otherwise presumably also like *cocandica*. — The subsp. **banghaasi** Bgff. *banghaasi*. (2 k) from the village of Dombraichi, in the south east of the Karategin mountains (Bokhara) has much enlarged brilliant golden yellow forewing spots with rather paler yellow surrounds, so that the forewing is predominantly yellow. The hindwings are more yellowish-red than in the type form. The black margin is narrower and separated from the red wing area by a distinct yellow line. The specimens illustrated are cotypes from the collection of BANG-HAAS. Specimens of this subspecies similar to the main form are designated with ab. **pseudococandia** (Ersch.) Bgff. — subsp. **pamira** Shelj. (= *avinoffi* Hmps. and Durr.) (2 k): Forewing spots usually pure yellow are somewhat reduced as against *cocandica*, spots 1 and 2 are intersected by black veins, also spots 3 and 4. — Margin of hindwings somewhat wider, abdomen without red belt; general colouration duskier. Pamir in July. The specimen illustrated is a ♂-cotype from the collection of SHELJUZHKO. — The subsp. **conserta** Gr.-Grsh. (Vol. 2, p. 31 as ab.) from Darwas has red collar and spots instead of yellow.

**Z. lydia** Stgr. (Vol. 2, p. 27 and p. 443, plate 7 a). *cremonae* Seitz mentioned here in Vol. 2 is placed with *lydia*. *olivieri* Bsd.

**Z. olivieri** Bsd. (= *dsidsilia Freyer*) in Vol. 2, p. 28 and p. 443, plate 7 h from Syria, Lydia, Taurus, *olivieri*. Armenia with ab. *laetifica* H.-Schäff. (Vol. 2, p. 28, plate 7 g) and ab. **confluens** Dziurz. (Vol. 2, p. 443). The name of *hebe* Seitz (Vol. 2, p. 28) is withdrawn. — Here we must add as subspecies *haberhaueri* Led. mentioned as a species in Vol. 2, p. 26, plate 6 i, from Hankynda (Armenia) and Bernd-Dagh (Taurus). — The subsp. **libanicola** Bgff. (2 k) from the eastern Lebanon, surroundings of the town of Zahlé has thinly scaled and consequently transparent wings. Base of hindwings is scarcely scaled and hyaline. Instead of the brilliant red of *cremonae*, it has delicate rose-red spots and hindwings. The specimens illustrated are cotypes. — The subsp. *cremonae* Seitz (instead of *Stgr.*) (in Vol. 2, p. 27, plate 7 a) probably emanates from the immediate neighbourhood of Beirout and is not from the Lebanon.

**Z. ganymedes** H.-Schäff. from Pontus (Vol. 2, p. 28 and p. 443, plate 7 h) is probably a genuine species. — I mention as aberrations: ab. **algarvensis** Dziurz. and ab. **confluens** Dziurz., both in Vol. 2, p. 443.

**Z. sedi** F. (Vol. 2, p. 26, plate 6 k) from Bulgaria, South Russia. Specimens with separate spots on forewings have been denominated ab. **dissoluta** Bgff. The typical *sedi* from Sarepta have fairly thoroughly confluent spots and at all events in the ♂ sex only traces of yellowish-white surrounds.

**Z. laeta** Hbn. (Vol. 2, p. 26/27, plate 7 a) (2 b) from lower Austria, Moravia, Hungary, the Balkans, South Russia, Pontus. A ♂ from lower Austria (Marchfeld) is now illustrated. Specimens of the normal inversely marked *laeta* designated ab. **reversa** by BURGEFF, revert to the older five-spot type. Specimens of the type form with extreme inverse marking of forewings, but with 2 to 3 black basal segments of the abdomen are ab. **pseudomannerheimi** Bgff. The ab. **eos** Sterzl has almost completely red forewings, the black ground colour only appears at costa as a narrow margin, wider towards the apex. Abdomen with wide red belt. — The subsp. **orientis** Bgff. (*laeta* *Stgr.*, *akschehirensis* Reiss, *mannerheimi* Seitz in Vol. 2, p. 26/27 plate 7 a) is said to cover the eastern races of *laeta*. These differ from the typical *laeta* of Austria and Hungary above all by the abdomen being reddened to the base and the frequent occurrence of the extreme inverse marking. Hindwings with traces of black margin at apex. Type race from Bogdanzi and Nicolie (on the lake of Dojran) in Macedonia. The larvae are found on *Eryngium campestre* L.; the insects rarely at rest on *Scabiosa*, *Centaurea* and *Cirsium*. Differing only slightly are south russian specimens from Bogdo (in the Province of Astrachan). Near Ak-Shehir in Asia Minor a small number of *laeta* were caught in June 1928 at an altitude of 900—1100 m, that correspond also with *orientis*.

The *mannerheimi* Chard does not belong to *laeta*, it is classified with *cynarae*.



X. Subgen. *Argrumenia* Hbn.

- hilaris*. **Z. hilaris** O. (Vol. 2, p. 28/29 and p. 443) from Portugal, Spain, S. France, the Riviera eastwards to Savona. Type race from Portugal. According to the original description of OCHSENHEIMER it is very clear that the portuguese form *hilaris* is an inversely marked form, that is more densely scaled than *escorialensis* (which is also inversely marked and that is rose-red instead of vermilion-red which is the colouration of *hilaris*).
- galliae*. — The subsp. **galliae** Oberth. (21) distributed over South France (as type race) the Pyrenees and Maritime Alps is especially variable in South France, and is fairly large and robust. The red spots of forewings vary very much in size, they are more or less carmine or vermilion red, the border of spots is narrow or wide, straw yellow, orange yellow or even red, so that in the latter case it mingles with the spots. Although scarcely one specimen is the same as another, the general appearance of the southern french race is homogeneous. Collar, scapulae and hairs of thorax are more or less yellowish white. Abdomen always without a belt. The illustration in Vol. 2, plate 7 i denominated *hilaris* belongs here. Still to be mentioned are ab. *confluens* Oberth. (Vol. 2, p. 28, plate 7 i) (= *conjuncta* Spul., *crubescens* Sag.); ab. *bicolor* Oberth. and ab. *unicolor* Oberth. (also Vol. 2, plate 7 k). The yellow form is ab. **foulquieri** Oberth. (Vol. 2, p. 443); the name *pallida* Oberth. (Vol. 2, p. 443) is withdrawn.
- foulquieri*. Further ab. **tricolor** Oberth. when the yellow does not entirely suppress the black ground colour as in *bicolor*, *ononidis*. as black spots or streaks are left between the red spots, notably between spots 2 and 4. — The var. **ononidis** Mill. (Vol. 2, p. 28) (21) of *galliae* is found on the coast around Cannes, in the Estérel and the Maritime Alps. It has small spots, almost always separate from one another and faintly bordered with white-yellow, the red is dark carmine. The ab. **exarcuata** Bgff. occurs frequently. — From the heights around Barcelona and the southern slopes of the Montseny (Catalonia) SAGARRA names the var. **catalonica** (= *cataloniana* Bgff.). This is smaller than the other races, the yellow borders of the medium large, scarcely confluent spots are very narrow. It differs from *ononidis* Mill. by its smaller size and wider spots. The red colour is less pronouncedly vermilion. At Ribas in the Pyrenees of Catalonia it occurs according to BURGEFF in more brilliantly vermilion red specimens, not differing otherwise. — New denominations of subsp. *escorialensis* Oberth. (Vol. 2, p. 28, plate 7 k) are: ab. **falleri** Reiss without a trace of yellow borders to red spots of forewing. Ground colour pure rose, every trace of yellow admixture has disappeared entirely from red of fore and hindwings, from Castile.
- aphrodisia*. — In Andalusia we have var. **aphrodisia** Bgff. (= *hilaris* Rmb.) (21) which is a little smaller than *escorialensis*, but not inversely marked as same, nevertheless however with the same delicate rose reflected through. The spots of forewings are medium large, the edges of which are partly immediately and partly not quite adjacent through the delicate creamy yellow borders. The specimens illustrated are from Sierra Nevada (Andalusia) 1200 m, caught by QUERCY; the ♀ is a transition to *inversa*. Of this race BURGEFF names ab. **inversa** (= *hilaris* var. Rmb.) with inverse spots and ab. **exarcuata** in which the upper arcuate part of spot 6 is absent from forewing, so that the lower wider remaining part appears like an isolated triangular spot.
- fausta*. **Z. fausta** L. (Vol. 2, p. 29 and p. 444, plate 8 e): The ab. **brunnea** Oberth. has red-brown spots on forewing and brown hindwings; ab. *lugdunensis* Mill. (Vol. 2, p. 29) (= *flava* Reiss) (21) is the yellow form. — At the northern edge of the Swabian Alb (Hohenneuffen, Wielandsteine etc.) a special race occurs: var. **suevica** Reiss (2 m) which is larger than typical *fausta* (for instance from Thuringia). The yellow border of forewing spots is fainter, especially in ♂♂, dusky and darker, it does not stand out clearly as in typical *fausta*. The yellow of streaks on thorax is reduced, often the streaks appear to be coloured red halfway to the heavy red collar. The ♂ type is illustrated. Small specimens of this race are ab. **pygmaeoides** (Blach.) Bgff. (see below). The ab. **inversa** Reiss is a *fausta* with inverse markings in which the red of forewings has become so predominant that only 4 roundish black spots with yellow borders are left. — Specimens of var. *jucunda* Meissner (Vol. 2, p. 29), usually without abdominal belt, having a red belt are denominated ab. **cingulata** Reiss. *jucunda* is limited to the alpine region of West Switzerland, whilst var. **genevensis** Mill. (Vol. 2, plate 8 e, *jucunda*) originates from Mount Salève near Geneva and scarcely differs from *jucunda* excepting the paler yellow borders to spots of forewings and a slightly smaller size. Of *genevensis*: ab. *segregata* Blach. (Vol. 2, p. 29) and ab. **pygmaeoides** Blach. representing very small specimens. — The race from the Grisons Alps (Filisur): var. **lacrymans** Bgff. (= *fausta* Zeller) (21) is scarcely smaller than typical *fausta* but it has relatively longer and narrower wings. The general impression is a much more dusky one. The spots of forewings are reduced in size, their yellow borders are only faintly developed. The red abdominal segments are more or less covered by interspersed black scales. Hairs and fringes of wings long. — The subsp. **fortunata** Rmb. (2 m) from the Charente, mid-France, is generally larger and with wider wings than the type race. The forewing spots are slightly larger, spots 3 and 4 are generally confluent and sometimes narrowly bordered with yellowish-white. The specimens illustrated are from Dompierre sur mer. In ab. **tricolor** Oberth. the yellow of the borders of red spots on forewings has suppressed the black in the area of spots, so that there is only a round black spot left between red spots 5 and 6; ab. **lugdunensis** (Mill.) Oberth. is the yellow form. To this main race belong also ab. **melusina** Oberth. and ab. **dupuyi** Oberth. (Vol. 2, p. 444). In the former the black of the spot area is suppressed and replaced by yellow and the red spots are widely confluent together, so that an inverse form is created with



yellow spots or with black spots with yellow borders. The autumn form of *fortunata*: f. **autumnalis** Bgff. (2 m) *autumnalis*. that flies in September and October only differs from the summer form by its much smaller size. A cotype from the collection of BURGEFF is illustrated. — The var. **alpiummicans** Vrtz. from the Cottic Alps, Oulx, Val *alpium-*  
Susa, in August is more similar to *nicaea*, the enlarged spots of the forewings are sometimes widely con- *micans*.  
fluent. — In the Litoral of the Maritime Alps and the estuary of the Rhone the more brightly vermilion  
red subsp. *nicaea* Stgr. (Vol. 2, p. 29, plate 8 d and 8 e) (*faustina*) is found. — The var. *juncea* Oberth. (Vol. 2,  
p. 29) from the Pyrenees (Vernet les Bains) is brightly vermilion red mixed with carmine and smaller  
than the former. — We find var. **oranoides** (Bgff. i. l.) Sag. (= *oranoides* Bgff.) (2 m) in Catalonia (Manso *oranoides*.  
Vincens, Villa Major). The forewing spots in this race are more isolated, the bow-shaped spot 6 is rarely  
conjoined on top and below with No. 5, mostly free on the upperside and quite separate in a number of specimens,  
so that the spots are situate as in *orana*. The colour is carmine-rose (not vermilion). The insects described were  
caught in September. The ♂ illustrated is from Llinas (September). From Llinas (Catalonia) I received from  
QUERCI specimens of this *fausta* race taken from 3rd June to 19th July and then again in September. According  
to the particulars supplied by QUERCI *fausta* occurred in the catalonian plains thrice in the year 1925  
(May/June, mid July and September) whilst in all other localities it only occurred in Aug./Sept. SAGARRA  
denominates the May/June form with forma **maeraria**, the smaller July form with forma **microsaria**, both *maeraria*.  
these forms scarcely differ one from another with the exception of minute differences in size. Dwarf specimens *microsaria*.  
are called ab. **lilliputana** Sag. Further we have: ab. **fractimacula** Sag. in which the upper part of spot 6 of *lilliputana*.  
forewings is absent and ab. **sagarrai** n. nov. (= *disjuncta* Sag., praecoc.) with completely separate spots 3 and 4 *fractima-*  
of forewings. *cul-*  
*sagarrai*.

The subsp. **preciosa** Reiss (2 m) from the Sierras around Albarracin (as type race) have more acute *preciosa*.  
forewings. The red is brilliant. The enlarged and generally strongly confluent forewing spots are generally  
faintly surrounded as a whole with pale yellow. Sometimes this border is partly or entirely absent. Spots 3  
and 4 are always confluent along their whole width. The red abdominal tip is clearly present in the ♂. I have  
similar although slightly varying specimens from Villacabras and Cuenca which I do not consider it necessary  
to name. The ♂ type is illustrated. — *faustina* O. from Portugal and Andalusia (Vol. 2, p. 29) is also considered  
a subspecies. I do not know the insect but according to the description it has nothing to do with *preciosa*.

The cocoons of *fausta* are affixed on the food plant (*Coronilla minima* Jacq. and *montana* Scop.) just  
over the ground so that they are rather difficult to find.

**Z. baetica** Rmb. (= *faustina* Dup.) (Vol. 2, p. 29, plate 8 b) from southern and western Andalusia, *baetica*.  
Grenada. It has a simple abdominal belt, a red collar is indicated. RAMBUR captured it in April and again in  
September. — The subsp. **murciensis** Reiss (2 m, n), the type race from Totana and Sierra Espuña (Murcia) *murciensis*.  
differs from *baetica* by its slightly less brilliant yellow-red, the pronounced red collar, the very wide red abdominal  
belt and indicated yellow streaks on the thorax, as well as the partial occurrence of a red tip to the  
abdomen in the ♂. The hindwings besides are more narrowly margined with black. The illustrated specimens  
are the types.

**Z. algira** Dup. (= *algira* H.-Schäff.) in Vol. 2, p. 29, plate 8 a. Contrary to the opinion of OBERTHÜR, *algira*.  
who rejects *algira* Dup. because DUPONCHEL's illustration does not correspond with his description, I should  
like to subscribe to Lord ROTHSCILD's opinion and retain *algira* Dup.; *bachaga* Oberth. is considered as  
synonymous. — We have var. *exigua* Seitz. (Vol. 2, p. 29, plate 8 a) from the lower reaches of the Aurès  
Mountains. — *Z. algira* occurs on the coast in February and March and then again in June in a considerably  
smaller form. It is improbable however that this summer form represents a 2nd generation, in appearance it  
corresponds with *exigua* Seitz from the Atlas, which also flies in June.

The larvae feed on *Coronilla juncea* L. and *minima* Jacq. The usual black dorsal spots are considerably  
increased so that they cover the whole back in a regular black pattern. The lateral stripes over the stigmata  
consist of a row of separate black markings. Above them the rosy-red ground colour forms longitudinal  
stripes, the upper part of which is intersected on each segment by the vertical sulphur-yellow spots. The belly  
is blackish; the hairs are short and fine. The caterpillar therefore is plainly provided with "poison" colouration.  
It rests openly on the food plant in the sun. The cocoons are longish barrel-shaped, white porcelain colour and  
glassy and resemble exactly those of *Z. fausta*. Contrary however to *fausta* the pupation occurs fairly high up  
on the twigs of the food plant.

**Z. marcouna** Oberth. (Vol. 2, p. 29, plate 8 b) from Algeria (Marcouna, Constantine, Laghouat) is a very *marcouna*.  
rare insect. They are more thinly scaled than shown in the illustration, more rose coloured and partially have  
a border of white spots.

**Z. excelsa** Rothsch. (2 n) from West Algeria (Djebel-Mekter near Ain-Sefra, 1600—1900 m) is larger *excelsa*.  
than *marcouna*, with wider wings and more densely scaled with brilliant red; on the underside the spots are



- somewhat confluent in the spot area; in May. The illustrated specimens are from the localities named and are in the Museum at Tring. — subsp. **alluaudi** Oberth. (2 n) from Morocco (near Bou-Angher in the middle Atlas at an altitude of 2000 m early June). The ground colour of the wings and the whole body are deep black. The red is a very lively vermilion. The forewing spots, which are red and often confluent, have no border at all. The black margin of the hindwings is wider than in *algira*, it is separated in the middle into 2 parts by a black cone-shaped mark that arises from the middle of the outer margin and penetrates towards the middle of the wing. The fringes are brown or black. The specimens illustrated are from Aghbalu Larbi in the middle Atlas 2100 m and are in the Museum at Tring.
- felix.* **Z. felix** Oberth. (Vol. 2, p. 28, plate 7 k) is a genuine species. It occurs with and without a red abdominal belt. Classified here are ab. *faustula* Stgr., Vol. 2, p. 28 (= *faustina* Allard) with heavy white surrounds to the forewing spots and f. *mauretunica* Stgr. (Vol. 2, p. 28, plate 8 a). Algeria, Tunis, Morocco. — BURGEFF describes from Andalusia the var. **andalusiae** (= *felix* Spul.) without a trace of an abdominal belt and with fairly large forewing spots with narrow white surrounds. It differs from the african *felix* by the larger reniform spot and the wider and more rounded wings.
- quercina.* The subsp. **quercina** Bgff. (2 n) is very close to being what one would designate a subspecies, one might even be justified in classifying it as a separate species. It occurs at Tajura near Sidi Mesri in Tripoli. The insects remind one strongly of *carniolica* and they are smaller than *felix*. The apices of the wings are more rounded and the antennae considerably heavier. The red instead of being vermilion rose, as in *felix*, is almost carmine. The spots of the forewings have wide white borders, spots 1 and 2 are partly separated by the white border. Hindwings with black margin of the usual width, but in the middle of the hindwing margin a cone-shaped mark arises that penetrates towards the middle of the wing. Specimens in which this cone-shaped mark is prolonged with a sharp point to the median nervure of the wing are named by BURGEFF ab. **ornata**. Abdomen black, sometimes with faint red belt; ab. **cingulata** Bgff. The underside of forewings is deep bluish black, spots red. — From another locality near Sidi Mesri *quercina* occur in a larger, bolder form with enlarged spots on forewings, this increase in size being at the expense of the white borders: var. **silvestri** Romei (2 o). Specimens with confluent spots of the forewings are ab. **confluens** Reiss. The specimens illustrated of *quercina* and *silvestri* are original captures by QUERCI and are now my collection.
- ornata.* **Z. felix** is found in June for instance in the immediate surroundings of Batna on hilly country at about 1000 m above sea level. In the great heat of the middle of the day the insect rests. It is found resting on *Asperula hirsuta* Desf. and various grasses. The eggs are deposited on the leaves of the food plant *Astragalus nummularioides* Desf. in regular order and single layers. The larva is sea-green, almost exactly the same colour as the food plant and the only markings are 2 rows of black dots on the back. The white hairs are short and fine. The sea-green cocoon is almost always found on the food plant or in its immediate neighbourhood. It is shortly boat-shaped, smoothly glossy with scarcely indicated longitudinal ridges on the back. The shell of the pupa is dark brown at the thorax, rarely pale brown, in the abdomen it is transparent. BURGEFF also found the larvae in the south-east of Batna and at Lambessa at 1200—1400 m above sea level on *Hedysarum Perrauderianum* Cos. The cocoon was never found on the food plant but always hidden elsewhere close by. It is of the same form but instead of being sea-green it is brilliant golden-yellow.
- orana.* **Z. orana** Dup. (Vol. 2, p. 30 and p. 444, plate 8 h) is also a genuine species. Algeria (Oran), Tunis and Morocco. — The var. **limitans** Rothsch. (2 o) from the tunisian-algerian coast from Tunis to Philippeville, in May, is small, without abdominal belt, very dark ground colour, forewings shorter and rounder. Type from Bône. A ♂ is illustrated from the Museum at Tring. Of this race which occurs for instance at Tunis in March and April, parallel generations fly in July and October which BURGEFF has named forma **autumnalis**. The insects are rather more boldly margined with yellow than *limitans*. — Here is classified the var. *sardoa* Mab. (Vol. 2, p. 30) (2 o) occurring in Sardinia. The specimens illustrated are from the collection of BURGEFF. Of these have been named: ab. **pulchra** Krausse (= *suffusa* Trti.), in which the blue-black ground colour is partly suppressed by the suffused yellowish surrounds of the spots; ab. **cingulata** Trti. with a narrow red abdominal belt and ab. **colligata** Trti. with confluent spots (1—3 and 2—4).
- pulchra.* In Géryville (sonthern Algeria) and Djelfa subsp. **lahayei** Oberth. (Vol. 2, p. 444) (2 o) is found, in which the spots of the forewings are more boldly surrounded by white than in *orana* from Oran. Illustration according to OBERTHÜR. In ab. **powelli** Oberth. (Vol. 2, p. 444) the black ground colour of the forewings suppresses the white around the spots. — In subsp. **contristans** Oberth. (3 a), illustration according to OBERTHÜR, from Zehroun “Marocain” the red is an impure rose. A very fine white border, which is often scarcely perceptible, surrounds the spots of forewings. Larvae on *Erophaca bactica* according to OBERTHÜR. — The var. **rothschildiana** nov. (= *media* Rothsch., praecoc) from the lake of Sidi-Ali (middle Atlas), 2250 m, has more glossy colours than *contristans* and the size is about the same as *limitans*.
- rothschildiana.* **Z. allardi** Oberth. (Vol. 2, p. 30, plate 8 i) from the Province of Constantine in Algeria with ab. *barbara* H.-Schäff. (Vol. 2, plate 8 i) follows here. It occurs chiefly from the middle of June onwards, for instance in the mountains around Batna at 1000—1300 m above sea level. The name *minor* Seitz (Vol. 2, p. 30, plate 8 i) (*minima*) is withdrawn.



The larva of *allardi* is blue-green and is found in quantities on the food plant *Hedysarum pallidum* Desf. Its markings are limited to 2 dorsal rows of black spots. The hairs are white. The cocoon is boat-shaped, pale yellow and faintly glossy, 11—13 mm long and is found hidden near the food plant. On its back there are slightly buckled longitudinal ridges and it reminds one, apart from the size and colour, of the cocoon of *transalpina*. The insect is very swift on the wing and shy and it rests by preference on the food plant. It feeds by choice besides on the flowers of the food plant, on the flowers of *Onobrychis alba* Desf., which is often quite covered by the insects. The eggs are placed on the leaves of the food plant in single layers.

**Z. maroccana** *Rothsch.* (2 o) from Mogador in Morocco is described from a ♀ specimen from the collection of the firm Dr. STAUDINGER & BANG-HAAS. The type illustrated is from the Museum at Tring. It differs from *orana* by its size and the vertical position of spot 6 on the forewings. Spots 3, 4 and 5 have distinct white borders, spot 6 without white border. Apex of hindwings rounded. Underside as upperside only paler, head and body completely black. *maroccana*.

**Z. youngi** *Rothsch.* (3 a), a ♂ was caught above Azrou (in the middle Atlas) at 1800 m altitude in June. *youngi*. It has a faint bluish gloss on the forewings and brilliant red. Spot 2 is enlarged, 3, 4 and 5 almost equally large, roundish and faintly surrounded with yellow-white like spot No. 2. Spots 3, 4 and 5 are situate so close together that their light borders touch. Spot No. 6 is more vertical than in *orana* and is narrow without pale surround and relatively widely separated from spot 5. On the underside the spots of forewing are often confluent. Antennae with club shape, rounded at tip. Head and body deep black and fairly thickly haired. Outer side of legs black-brown. We illustrate the type from the Museum at Tring.

**Z. harterti** *Rothsch.* (3 a) from Azrou in the middle Atlas, at 1300 m altitude, end of May, beginning of June. The marking of spots is approximately the same as of *maroccana*, but smaller and coloured a dark rose. Spots 2, 3, 4 and 5 with narrow white borders, 6 is inclined to be absent in the ♂. Hindwings more pointed. Underside as upperside only paler. Antennae with heavy clubs. Head and body black and hairy. Side of legs outwardly pale brown. Illustration according to the types at the Museum at Tring; in this insect perhaps we have a subspecies of *maroccana*. *harterti*.

**Z. carniolica** *Scop.* (= *scopolii* *Rocci*) (Vol. 2, p. 29 and p. 444). The question of dividing up the *carniolica* races has been stimulated by a number of critical treatises. Two large race complexes, a western and an eastern are easily separable from one another. The chief differences lie in the colouration and marking of the insects; *carniolica* with dark carmine, *onobrychis* with a more brilliant red going over into vermilion are the typical representatives, to which we will revert later on. *carniolica*.

I. European race complex, the races of which are mainly without red belt, only subsp. *diniensis* (to which we will refer again later on) forms an exception: The type race of *carniolica* *Scop.* from Carinthia, Carniola and Slavonia is large, with bright colours, without red abdominal belt and with no very wide yellowish-white borders to the medium large spots of forewings and with the black marginal border of hindwings slightly bulging in the middle. It shows little inclination to aberrations. We have: ab. **pseudoberolinensis** *Bgff.* without yellow-white borders to the spots of forewings; ab. **dupuyi** (*Oberth.*) *Bgff.* (see later on); ab. **cingulata** (*Dziurz.*) *Bgff.* with red abdominal belt and ab. **confluens** (*Dziurz.*) *Bgff.* — BURGEFF separates as a special race the large istrian coastal race from Trieste: var. **histrina**, which inclines to have spot 6 of forewings reduced in size, then further ab. **octonotata** (*Trti.*) *Bgff.* (see later on). — Further divisions are var. **gottscheeina** *Bgff.* with intensive yellow borders, from the neighbourhood of Gottschee in Carniola and var. **herzegowinea** *Bgff.* with vermilion rather than red spots of increased size on forewings. Frequently there is a red abdominal belt or indications of same; from the Vuciabara near Gacko in Herzegowina. — The subsp. *hedysari* *Hbn.* (Vol. 2, p. 30, plate 8 e) (= *carniolica* *Oberth.*) is limited to the southern alps of Piedmont to the South Tyrol. Spot 6 of forewings is rudimentary and the bulge in the margin of hindwings is rather wider. The ab. **cingulata** (*Dziurz.*) *Bgff.* is not rare in the ♀; ab. **pseudoberolinensis** *Bgff.* is rare and ab. **apennina** (*Trti.*) *Bgff.* (= *quinquemaculata* *Vorbr.*, *pseudoapennina* *Rocci*) is very rare and ab. **octonotata** (*Trti.*) *Bgff.* — In the mountain race that is connected here var. **rhaeticola** *Bgff.* from Filisur in the Grisons (1000 m) has no superficial gloss and all spots are reduced. The white borders to the spots of forewings are narrow, but of uniform width. — The var. **mendolensis** *Dann.* from the heights of Mendel with similar racial characteristics is classified here. It has a strong inclination to a reduction of spot 6 on forewings and generally the white borders of the spots are wide. — Subsp. **valesiae** *Bgff.* (= *carniolica* *Oberth.*) is somewhat smaller than *hedysari* with brilliant red inclined to yellowish and with widely bordered large forewing spots, of which the middle ones are mostly united by their borders and often confluent with shining green-blue ground colour. From the Alps at Valais, the Swiss Jura, type race from Martigny-Ville (Valais). Amongst these we find rarely ab. **pseudoberolinensis** *Bgff.*; ab. **laticincta** *Bgff.* with wider white borders to the spots of forewings, so that they coalesce without however producing a diffusion of the white scales as in ab. **amoena** (*Stgr.*) *Bgff.*, which also occurs. Then we have ab. **confluens** *pseudobero-*  
*linensis.*  
*dupuyi.*  
*cingulata.*  
*confluens.*  
*histrina.*  
*octonotata.*  
*gottscheeina.*  
*herzego-*  
*winea.*  
*cingulata.*  
*pseudobero-*  
*linensis.*  
*apennina.*  
*octonotata.*  
*rhaeticola.*  
*mendolen-*  
*sis.*  
*valesiac.*  
*pseudobcro-*  
*linensis.*  
*laticincta.*  
*amocna.*  
*confluens.*



(*Dziurz.*) *Bgff.*: "VORBRÖDT has given a most detailed definition and innumerable name diagnoses to the various possibilities of confluence of spots in *carniolica*. These go into such detail that we have grouped together all the confluent forms (including *bohatschi* *Wgn.*, Vol. 2, p. 30) under ab. *confluens*." Further we have here ab. *weileri* (*Stgr.*) *Vorbr.* (= *jurassica* *Blach.*, Vol. 2, p. 30) and ab. *securigera* *Bgff.*, in which spot No. 5 of forewings coalesces with spot No. 6 as in *achilleae*.

*diniensis*. The subsp. *diniensis* *H.-Schäff.* (Vol. 2, p. 30, plate 8 e) from the Basses Alpes, Maritime Alps is a very curious race. Together with yellow borders of the spots of forewings we generally have a red belt which in the ♂ sometimes extends over 4 segments and in the ♀ sometimes over 3 segments of the abdomen and reminds one strongly of *occitanica* *Vill.* One cannot reject the possibility that *diniensis* has adopted the characteristics of *occitanica*. Aberrations occurring here: ab. *hedysaroides* *Trti.* without red abdominal belt; ab. *bicolor* *Oberth.* (Digne) without yellow borders to the spots; ab. *melusina* *Oberth.* (Digne) which is inversely marked like *fausta* ab. *melusina* and ab. *dupuyi* *Oberth.* (Vol. 2, p. 444) only with white instead of red collar. — Belonging hereto var. *dinioides* *Bgff.* from the Maritime Alps (St. Martin-Vésubie, Guillaumes in the upper Valley of the Var) is somewhat larger than *diniensis*, the wings are narrower at the apex with smaller narrower spots bordered with yellowish white. The red abdominal belt does not occur so often. This race graduates over to *hedysari* in Piedmont.

*albarracina*. Without any known connection with the mid european races we have subsp. *albarracina* *Stgr.* (Vol. 2, p. 30) (3 a) from South-West Aragon and Grenada with pale red spots on forewings with delicate white borders, which had best be placed here. The abdomen shows traces of a red belt. It is not impossible that this is a relic from the tertiary period and possibly a genuine species. The ♀ illustrated was caught in Grenada, middle of June.

*modesta*. From the mid Rhine Valley as a type race BURGEFF describes subsp. *modesta* (= *onobrychis* *Borkh.*, *carniolica* *Berge-Rbl.*, *media* *Reiss*) that also occurs in the Swabian Alb, Franconian Jura, Lower Franconia, Upper Palatinate, Hanover, Thuringia and Saxony. The spots of forewings have very narrow white borders. The red abdominal ring is absent in the majority of specimens of the mid german races. Forms that occur are ab. *pseudoberolinensis* *Bgff.* (see above); ab. *cingulata* *Dziurz.*; ab. *amoena* *Stgr.* (= *philamoena* *Reiss*, trans.); ab. *meteora* *Reiss* like the former, but at the same time with spots 1 and 2 confluent, suffusing posteriorly and conjoined with spots 3, 5 and 6 by a red streak along the costa, spots 2 and 4 faintly conjoined; in ab. *vellayi* *Aigner* the forewings are covered only by an admixture of white and red scales; then ab. *confluens* (*Dziurz.*) *Bgff.*; ab. *weileri* *Stgr.* and ab. *flaveola* (*Esp.*) *Bgff.* The ab. *paradoxa* *Bgff.* has only the 1st, the reniform mark and a trace of the 2nd on the forewings. BURGEFF separates from *modesta* the var. *diluviicola* (= *media* *Reiss*) from Kaiserstuhl which is larger than *modesta*, about the size of *hedysari*, but with thinner scaling and generally green or bronze coloured gloss and paler red with inclination to yellow admixture. The white borders to the spots are bolder than in *modesta*. — The var. *duponti* *Rocci* (= minor *Rocci*, *carniolica* *Oberth.*) from Normandy, North and West France is of medium size with paler red bordering on rosy-red, with very large spots on forewings which are always narrowly bordered with yellowish. Especially spot 6 is very large, hindwings narrowly margined with black, abdomen rarely with red belt: ab. *cingulata* (*Dziurz.*) *Rocci*.

*berolinensis*. The main race of North Germany is assembled under subsp. *berolinensis* *Stgr.* (3 a). The type race occurs around Berlin. It is fairly large, rarely with white borders to the spots of forewings, without abdominal belt. The name *berolinensis* can only refer to the north german *carniolica*. The specimen illustrated is from Rüdersdorf near Berlin. The following varieties are named: ab. *pseudomodesta* *Bgff.* with white borders to the spots of forewings; ab. *cingulata* (*Dziurz.*) *Bgff.*; ab. *pseudocarniolica* *Bgff.* with white borders to the spots of forewing and abdominal belt. — A race from Eberswalde with considerably increased forewing spots 3, 4 and 5 and often with spots 3 and 4 confluent is named by BURGEFF var. *verrina*. — The subsp. *leonhardi* *Reiss* (= *berolinensis* *Car.*) (3 a) connects with *modesta* and *berolinensis*. From Transylvania, type race from Kronstadt. It generally has no white borders to the forewing spots, only rarely traces of same are shown. Forewing spot 6 is reduced to small red traces around the black veins. It has a strong green metallic gloss on the forewings, the white collar is almost absent. Traces of red belt generally perceptible on abdomen. The specimen illustrated is the ♂ type.

*incerta*. In the ligurian and tuscan Apennines, Mount di Mainarde, we find subsp. *incerta* *Rocci* (3 b) (= *carniolica* *Querci*) in July as a mountain race, which according to *Rocci* occurs in gradations to the races of the plains at the sea-board. It is six-spotted, spot 6 rarely reduced, spots with uniform yellowish white borders, hindwings with fairly wide margin; general impression somewhat dusky and only slightly variable. The following aberrations occur: ab. *dealbata* *Rocci*, six-spotted without white borders to forewing spots; ab. *bohatschi* *Rocci*: spots 3 and 4 confluent; ab. *laticlavata* (*Bgff.*) *Rocci* (see below); ab. *canuta* *Rocci*: thorax and scapulae liberally haired with white and scaled and ab. *apennina* *Trti.* (= *wiskotti* *Calb.*, *pseudoapennina* *Rocci*) without spot 6 on forewings. The illustrated specimens of *incerta* are from the heights around Florence (from the collection of VERITY).

*roccii*. The subsp. *roccii* *Vrty.* (= *apennina* *Seitz* in Vol. 2, p. 30, *intermedia* *Trti.*) (3 b) from the sea-board of the ligurian Apennines (for instance near Genoa) is a main race of extraordinarily great variability. The main characteristics are the very heavy scaling and occasionally the considerable superficial gloss on the black



parts of the wings the considerable increase in the black pigments being at the expense of the red, which is evidenced in a proportion of specimens (abt. 2/3rds of the ♂♂ and 1/3rd of the ♀♀) by the absence of spot 6 of forewings. The following aberrations are named: ab. **dichroma** (*Hirschke*) *Rocci*; ab. **[pseudo]berolinensis** *Seitz* (Vol. 2, p. 30, plate 8 g) (= *berolinoides* *Trti.*; *dealbata* *Rocci*); ab. **pseudocarniolica** *Rocci* (= *pseudo-berolinensis* *Seitz* (Vol. 2, p. 30, plate 8 g) (= *berolinoides* *Trti.*; *dealbata* *Rocci*); ab. **pseudocarniolica** *Rocci* (= *pseudo-berolinensis* *Seitz* (Vol. 2, p. 30, plate 8 g) (= *berolinoides* *Trti.*; *dealbata* *Rocci*); ab. **dupuyi** (*Oberth.*) *Bgff.* (3 b); ab. **nigrocincta** *Rocci* (= *nigrosupposita* *Bgff.*, *genovensis* *Reiss*) (3 b), 5- or 6-spotted with black borders to forewing spots; ab. **bohatschi** *Rocci* (see above); ab. **nigricans** *Bgff.* (= *parvipuncta* *Rocci* trans.) with considerably reduced or blackened forewing spots, 5- or 6-spotted with or without white circumscriptions; ab. **depauperata** *Trti.* (= *paupera* *Bgff.*, *deleta* *Rocci*) (3 c) without spot 4 on forewings, besides which also spot 3 and 5 can be missing; ab. **stoechadoides** *Trti.* (= *nigrescens* *Rocci*, *ornata* *Bgff.*) with small spots and black traverse band on hindwings; ab. **octonotata** *Trti.* (= *prolifera* *Bgff.*, *octornata* *Reiss*), spot 4 of forewings intersected by the vein, so that a figure of "8" is created. The ab. **laticlavata** *Bgff.* with black margin of hindwings double as wide as usual, ab. **cuprea** *Trti.* with coppery shining ground colour; ab. **cingulata** *Dziurz.* (= *cingulata* *Bgff.*) and ab. **canuta** *Rocci* (see above) also must be mentioned. The specimens illustrated of *roccii*, *dupuyi*, *nigrocincta*, *depauperata* are all from Genoa. — The var. **florentina** *Vrty.* (3 c) from Tuscany (Pian di Mugnone), the Campagna (Aurunci, Mountains Mount Petrella) is a dainty race, close to *roccii* with less considerable reduction of spot 6 of forewings. A ♂ from VERITY's collection is illustrated. Here ab. **apennina** (*Trti.*) *Vrty.* occurs. — var. **livornica** *Bgff.* from the sea-board at Leghorn is larger than *roccii* with slight inclination to reduction in spot 6, small spots but regular white borders. The ab. **apennina** (*Trti.*) *Bgff.* and ab. **pseudoberolinensis** (*Seitz*) *Bgff.* (see above) are rare and also ab. **cingulata** (*Dziurz.*) *Bgff.*

From Mounts Sirente and Velino BURGEFF describes subsp. **dulcis** that occurs there and which is larger on an average than *incerta* with brighter red and large forewing spots that are narrowly surrounded with white in the ♂ and very widely in the ♀. There is a great inclination towards the form ab. **amoena** (*Stgr.*) *Bgff.* (= *suffusa* *Trti.* trans.) and also ab. **confluens** (*Dziurz.*) *Bgff.* occurs. — The var. **amanda** *Reiss* (3 c) joins up in easy transitions as a high alpine race from the alpine zone of the Abruzzi Mountains (Gran-Sasso, Majella). It is very small with forewing spots less pronouncedly surrounded by white, with less brilliant colour reminding one of the mid-European races. The ♂ illustrated is the type. — In Calabria (Reggio) we find the var. **calabria** *Trti.* (3 c) which, together with *livornica*, is the largest of all *carniolica* races. It has unusually wide wings of shining deep black colour with narrower but very regular white surrounds to spots of forewings and fairly narrow black margins to hindwings. The reniform spot (6) is present and more or less circumscribed with white. The ♂ illustrated is from BURGEFF's collection. Here occur ab. **intermedia** *Trti.*: spot 6 absent except for a narrow white streak; ab. **octonotata** *Trti.* (see above) and ab. **cingulata** (*Dziurz.*) *Trti.* — The var. **siciliana** *Reiss* (= *sicilica* *Ragusa*) (3 c) from Sicily (Type race from Taormina) has brighter red, the ground colour of forewings is shining steel blue, spots of forewings are only faintly, almost rudimentarily, surrounded by white. The specimens illustrated are the types.

*Rocci* names *carniolica* from the southern plains of the Po (Parma, Reggio in July): subsp. **padana**. It has enlarged spots on forewings, which are fairly widely surrounded by yellowish, the red is of a bright, lively scarlet red. The black margin of hindwing is narrow. Thorax with whitish hairs, abdomen more or less with red belt. — A smaller, daintier parallel generation occurring in September in Turin (Colline del Po), which often is paler in colouration than the summer generation, is designated as forma **autumnalis** *Rocci*. — var. **gradiscana** *Std.* from the sea-board of Gradisca at end of June has on forewings large darker red spots that are irregularly surrounded with impure yellow. Thorax rarely with whitish hairs. Red abdominal belt is present but only faintly indicated by a violet stripe. Of this race ab. **rubrothoracalis** *Std.* is described with thorax heavily dusted with red. — var. **onobrychoidea** *Bgff.* from Zepče (Bosnia) is the transition to *onobrychis* (*Schiff.*) *Esp.* (see later). This race is a brilliant vermilion red with heavy white surrounds to the spots of forewings — also in the ♂. Frequently a double or treble red abdominal belt occurs.

II. European race complex, of which the races chiefly show a heavy red abdominal belt: In lower Austria, Hungary; Type race from Vienna (Mödling) we find subsp. **onobrychis** (*Schiff.*) *Esp.* (= *carniolica* *Fuessly*, *scopolii* *Rocci*) (3 d) which is uncommonly variable and has a heavy red belt especially in the ♀ sex. Particularly large forewing spots with white or yellowish-white surrounds. The specimens illustrated are from Mödling. The following aberrations have been named: ab. **pseudoberolinensis** (*Stgr.*) *Bgff.* (= *vangelii* *Schultz* Vol. 2, p. 444); ab. **laticincta** *Bgff.* (see above under *valesiae*) with characteristics of *onobrychis*; ab. **alba** *Dziurz.* is a transition to the form that has not yet been found with pure white forewing spots, the spots still have red centres. Then ab. **confluens** *Dziurz.* (= *bohatschi* *Wgn.*) ab. **amoena** *Stgr.* in Vol. 2, p. 30 (= *albomarginata* *Spul.*, *tricolor* *Oberth.* in Vol. 2, p. 444, *assymetrica* *Oberth.*), the specimen illustrated on plate 56 h is a transition to *klapálecki*; ab. **klapálecki** *Joukl.* (= *amoena* *Dziurz.*, *klapálecki* *influens* *Sterzl*) as *amoena*, but spots 1 and 2 confluent and conjoined by a narrow red streak running along costa to spots 3 and 4 that are confluent. Spot 6 coalesces with spot 5 by an enlargement of the surrounds on the top and bottom. The red can be even further increased. Further we have ab. **vellayi** *Aigner* (see under *modesta*); ab. **weileri** (*Stgr.*) *Dziurz.* (= *ragonoti* *Gian.* in Vol. 2, p. 30, plate 8 f); ab. **melusina** (*Oberth.*) *Bgff.* (see under *diniensis*) ab. **totirubra** *Seitz* (Vol. 2, p. 30, plate 8 f); ab. **dupuyi** (*Oberth.*) *Bgff.* (= *transiens* *Dziurz.*, *dupuyi*).



*azona*. *nigratransiens* Dziurz.); ab. **azona** Wgn. without red abdominal belt; ab. **drastichi** Hirschke (Vol. 2, p. 444);  
*drastichi*. ab. *flaveola* Esp., Vol. 2, p. 30, plate 8 d (= *detschi* Oberth.); ab. *dichroma* Hirschke; ab. **venusta** Schultz (Vol. 2,  
*venusta*. p. 444); ab. *grossi* Hirschke; ab. **totanigra** n. nov. for *nigra* Reiss (equivocal for *nigra* Dziurz.) (3 d) without any  
*totanigra*. red, the entire insect black as the ground colour. The type from Dammberg is illustrated. — The following  
*interposita*. races belong to subsp. *onobrychis*: var. **interposita** Bgff., which comes between *modesta* and *onobrychis*, from  
upper Austria (Linz). Build very much more dainty than the former and especially the ♂♂ with smaller bodies,  
expanse as in *modesta* differing hereby also from the considerably smaller *onobrychis*. Ground colour more  
brilliant, superficial gloss stronger than in *modesta*. White borders to the spots, forewing uniformly narrow  
and only a little wider in the ♀♀, middle spots approximated and therefore confluent in almost all ♀♀. The  
black margin of hindwings wider than in *modesta*; red pigment similar to that of *onobrychis*, more brilliant and  
less pure carmine. A simple red belt, generally dusky and indistinct in about 50 per cent of the insects. —  
*scopjina*. From Central Macedonia (Uskub) and South Bulgaria (Rilo-Dagh) BURGEFF describes var. **scopjina**, very  
characteristic small insects with the spots of forewings coloured almost red-lead and with wide yellowish-  
*paeonia*. white borders. Abdomen with wide red ring of similar shade on 3—4 segments. — The var. **paeonia**, Bgff. (3 d)  
from South Macedonia (district of the Dojran lake, Nicolie and Volovec) is equally large as *onobrychis*, forewing  
spots with regular and partly wide white borders; a bold red abdominal belt extending sometimes over two  
or three segments is present. The red is close to the rose shade of Asiatic races. BURGEFF has found the larva  
fairly rare around rivulets through chalky country on slate on *Doryenium suffruticosum*, in very limited  
localities. Typical specimens from the collection of BURGEFF are illustrated. — var. *graeca* Stgr. (Vol. 2, p. 30)  
*crymaea*. (= *carniolica* Wgn.) from Greece. — the var. **crymaea** Std. from Feodosia in Crimea caught in June should be  
placed here. It is described as medium large, between *taurica* (Vol. 2, plate 8 g) and *amasina* (Vol. 2, plate 8 h),  
in regard to wing contour and appearance normal. Upperside of forewings glossy greenish, red paler than  
*onobrychis* both of spots and hindwings. Spots of forewings well developed and bordered with white-yellow.  
Spot 3 inclined to be reduced, 4 generally quadrangular, 6 large. The black margin of hindwings is as wide  
as in *taurica*, *crymaea* differs from same by narrower wings and larger borders to spots. Abdomen almost without  
gloss, short in relation to size of insect, with 3-fold pale red belt.

III. The asiatic races: Here we have first subsp. *taurica* Stgr. (Vol. 2, p. 30, plate 8 g) from  
the Taurus with faint white borders to the brilliant vermilion red forewing spots and hindwings and an almost  
entirely red abdomen; then **erythrosoma** Röber with completely red abdomen. — BURGEFF names var. **europaea**  
the specimens like *taurica* with generally only single red abdominal belt from Therapia near Constantinople.  
*crythroso-*  
*ma.*  
*europaea.*  
*suavis.* The subsp. **suavis** Bgff. (3 d) is the most widely distributed main race in Asia Minor with delicate pale  
rose forewing spots, which are widely bordered with yellowish-white, and hindwings, occurring next to *taurica*  
in Taurus (Marash and Hadjin), apparently without there being an intermixing of the 2 races. Abdominal  
belt in both sexes extended over 3 segments. The ♂ illustrated is from Marash from the collection of BURGEFF.  
*amabilis.* — To be classified here var. **amabilis** Reiss (3 e) from the Wan region in Armenia. Differing from *suavis* from  
the Taurus by the pure rosy-red colour of forewing spots and hindwings, the white borders of spots are slightly  
less bold, sometimes being completely absent around spot 6. It is also somewhat smaller and dainter than  
*suavis*. The ♂ illustrated is the type. — var. **alta** Reiss (3 e) from Georgia (the forest belts of the Grusien Mountains,  
600—800 m) has a more carmine red colouration and is larger than *suavis*. The red abdominal belt inclines to  
be absent, sometimes only traces of same are left. The specimens illustrated are the types. — ab. **dupuyi** (Oberth.)  
*dupuyi.* Bgff. designates specimens of var. *amasina* Stgr. from Pontus (Amasia) (Vol. 2, p. 30, plate 8 h) with spot  
6 of forewings without red: ab. **pseudowiedemanni** Bgff. refers to specimens with completely red abdomen from  
*pseudo-*  
*wiedemanni.* Amasia. — Besides var. *wiedemanni* Ménér. (Vol. 2, p. 30, plate 8 h) from Pontus, Lydia and Transcaspiæ. —  
Then follows subsp. *transiens* Stgr. (Vol. 2, p. 30) (3 e) from Persia. The specimen illustrated is from Shaku  
from the collection of BURGEFF.

*praestans.* The subsp. **praestans** Oberth. (3 h) from Syria (Lebanon), type race from Akbès, is one of the finest  
races of *carniolica*. Ground colour of forewings deep black-blue, red is carmine rose, the white borders of spots  
are narrow, partly rudimentary. The white collar is absent as also is the whitish sealing on thorax and scapulae.  
Abdominal belt carmine rose over 3 segments. The specimen illustrated is from Beirout (Syria) from the  
collection of BURGEFF.

*uralia.* The subsp. **uralia** Bgff. (= *uralensis* Krul., praecoc.) from the middle Urals is very close to *berolinensis*.  
Ground colour of forewings is more greenish, spots always have very narrow yellowish borders, collar and  
scapulae more whitish. Abdomen with traces of a red belt.

*nuratanya.* Further subsp. **nuratanya** Bgff. (3 e) from Turkestan (Jani Kurgan, 2500 m), which is somewhat smaller  
than the type race of *carniolica* has in both sexes regular yellow surrounds to spots of forewings and the red is  
a mixture of red-lead colour going over into yellowish. Abdomen with red belt over 3 segments. The specimen  
illustrated is from the collection of BURGEFF.



Finally we have to mention: subsp. **rueckbeili** *Shelj.* (3 f) from the district of Djarkent (mid July) with *rueckbeili*. large forewing spots, finely bordered with yellowish-white. This white borderation is generally entirely absent in spot 5 and always in spot 6; spot 6 sometimes isolated but not rarely joined to spot 5 by red streaks. Red abdominal belt more or less present, sometimes quite absent. Cotypes from the collection of SHELJUZHKO are illustrated.

The food plants of *carniolica* are *Lotus corniculatus* L. and *Onobrychis sativa* Lmk. in Mid-Europe and *Doryenium herbaceum* Vill. in S. E. Europe.

**Z. occitanica** Vill. in Vol. 2, p. 30, plate 8 i (= *phacae* Hbn.) is doubtless a genuine species. It is *occitanica*. distributed over South France (the type race), Pyrenee Peninsular, Italy (west of Savona). Among the typical *occitanica* without belts are named as aberrations: ab. **pseudoiberica** Bgff. specimens similar to *iberica* with red *pseudo-iberica*. abdominal belt. — var. *disjuncta* Spul. (Vol. 2, p. 30 as ab.) (3 f) with broad red abdominal belt and separate spots on forewings is classified here from the Riviera di ponente and the Pyrenees. The ♂ illustrated is from Vernet-les-Bains, caught at the beginning of August.

The subsp. *iberica* Stgr. (Vol. 2, p. 30, plate 8 i) from Catalonia forms several aberrations, for instance ab. **cataloniae** Reiss (3 f) in which spot 6 of forewings is absent, as also is the white border of the five other *cataloniae*. spots and the white collar; with and without red abdominal belt (Barcelona). The ♂ illustrated is a cotype. In ab. *azona* Spul. (Vol. 2, p. 30) ♀♀ specimens also occur without red belts. The ab. **nigra** Reiss (3 f) has black *nigra*. margins of hindwings doubly as wide. Besides the margin bulges to the middle of wing and beyond, forming a black traverse band towards which a black projection arises from the costa. The type from Barcelona is illustrated. With ab. **ornata** (Bgff. i. l.) Sag. (= *ornata* Bgff.) specimens are denominated with a complete black *ornata*. traverse band on hindwings like similar aberrations of *scowitzii*; from Barcelona. In ab. **octonotata** n. ab. spot *octonotata*. 4 is divided in two parts forming an "8" with a white border; type from Barcelona. — var. **eulalia** Bgff. (3 f) *eulalia*. from St. Eulalia, Province Murcia in June: the red colour is a brilliant vermilion, the red abdominal belt in ♂♂ and partially in ♀♀ is darkened by interspersation of black scales. The ♂ illustrated is from the collection of BURGEFF.

STAUDINGER's name *albicans* is given to an aberration and designates the widening of the white surrounds to spots of forewings beyond the usual width. BURGEFF has therefore denominated the large and very wide winged race from Andalusia as subsp. **vandalitia** (= *pseudooccitanica* Reiss). The margin of hindwings is *vandalitia*. narrow, in ♀♀ limited to the fringes. All specimens have a complete reddish abdominal belt. The various strains all have transition forms with normally bordered spots graduating to ab. *albicans* Stgr. (Vol. 2, p. 30, plate 8 k). Further aberrations have been named: ab. **pseudodisjuncta** Reiss; specimens of similar type to *pseudo-disjuncta*. *disjuncta* (see above); then ab. **extrema** Reiss (3 f) with quite white forewings in the spot area and 5 almost *extrema*. uniformly large separate red spots. At outer margin the white forewing has a regular narrow black margin which is somewhat wider at apex. Hindwings are pale rose. The specimen illustrated is the cotype still having a little black in the spot area. — The name *miniosa* Wgn. are withdrawn.

The larva feeds on *Doryenium suffruticosum* Vill. and is bright green with whitish dorsal stripes, largish yellow lateral spots and black dots. It pupates in a whitish elongated round cocoon.

**Z. magiana** Stgr. (Vol. 2, p. 24, plate 7 b) from Samarkand and Sarafshan and var. *hissariensis* Gr.-Grsh. *magiana*. (Vol. 2, p. 24, plate 7 b) from the Hissar mountains (Kizil Gazy) are placed here.

## XI. Subgen. **Thermophila** Hbn.

**Z. meliloti** Esp. (= *loti* Hbn.) in Vol. 2, p. 25 and p. 443 (3 g) from the Pyrenees, mid and east Europe *meliloti*. (excepting Holland), England, Scandinavia, Finland, Siberia and the central Asiatic Mountains. OBERTHÜR presumes that ESPER described his *meliloti* from specimens caught at his residence in Erlangen. The mid-European strains are generally very difficult to analyse; from all localities certain specimens vary in the density of scaling and the width of margins of hindwings. Very thinly scaled strains occur in south Germany in the Baar, the Jura, upper Bavaria, flying partly already at end of May. The newly illustrated specimens are from the Velburg (upper Palatinate) in Bavaria. Aberrations named are: ab. **sexpunctata** Tutt. with 6 forewing *sexpunctata*. spots; ab. **unimaculata** Vorbr. with quite black forewings excepting a small red basal spot; ab. **confluens** Tutt. *unimaculata*. (Vol. 2, p. 443) with confluent forewing spots; ab. **pseudoconfusa** Bgff. like *confusa* Stgr. (see later); ab. **totarubra** *confluens*. *Dziurcz.* with quite red forewings, the black ground colour being only retained at margins; ab. **pseudostentzii** *pseudocon-* *Bgff.* with red belt; ab. **flava** Bgff. finally ab. **fimbriata** Bgff. with very long fringes on fore and especially *fusa*. on hindwings from Regensburg. — The var. *ehnbergi* Reuter (Vol. 2, p. 25 as ab.) occurs in Finland, Esthland and Lapland; among it ab. **confluens** (Tutt.) Bgff. (see above). — In East Prussia (Osterode) we find var. *totarubra*. **nigrina** Bgff. (= *nigrescens* Reiss praeocc.) (3 g). It is fairly large with deep black ground colour and body. *pseudo-* *stentzii*. *flava*. *fimbriata*. *confluens*. *nigrina*. has denser hairs on thorax and abdomen, wing contour is more elongated and pointed; hindwings equally wide



with deep black margins. The ♂ illustrated is the type from my collection. Here again we have ab. *pseudostentzii* (Bgff.) Reiss (see above). — var. **rhaetica** Bgff. (= *alpina* Reiss praeocc.) from the Grisons (Filisur) a wide winged, densely scaled race with lustreless black ground colour and dull dusky red, always five-spotted, with wider margin to hindwings. Larva instead of being sea-green is grey-colour. A specimen with 5 sooty-red spots on forewings and hindwings coloured black-red from base to midway is named ab. **funerea stentzii** by CORNELSEN. — In the neighbourhood of Gorizia and Gradisca we find var. **stentzii** Freyer (= *cingulata farriolsi* Frey) which frequently occurs with red belt. — Here we best classify var. **farriolsi** described by SAGARRA from Puigsacalm (Catalonia), always five-spotted, a faint bluish gloss on forewings and regularly a fairly wide blue-black margin to hindwings.

The following aberrations have been described of subsp. *teriolensis* Speyer (Vol. 2, p. 25, plate 6 e) from the south eastern valleys of the Alps (Mesocco Valley, Etsch Valley), upper and mid-Italy, almost always six-spotted, red spots 5 and 6 often widely coalescing, margins of hindwings fairly wide: ab. **quinquemaculata** Vorbr. with only 5 spots on forewings and ab. *decora* Led. (Vol. 2, p. 25, plate 6 e) (= *stentzii* H.-Schäff.) with red belt. — As races we name: var. **silenus** Bgff. small and with narrow wings and small forewing spots and very adumbrated hindwings, differing from *italica* by the sparser scaling and smaller size, from Maresca and var. **giussana** Std. from Mount Faito, Sorrent (Sila Giusso, 1000 m) which according to the description is almost always six-spotted and generally has a wider black margin to hindwings than *teriolensis*. The red-belted form: ab. *decora* Std. is just as frequent as the unbelted form. — Now follows subsp. **charon** Hbn. (3 g) from the south west valleys of the Alps and the Maritime Alps. Here all six forewing spots are smaller, almost always separated from one another, the hindwings with an increase of black. The specimens illustrated are from Mount Cheiron in July. In ab. **scabiosaeformis** Le Charles from Belvédère (Maritime Alps) spots 3 and 5 are confluent. — The var. *italica* Car. (Vol. 2, p. 25, plate 6 d) from the sea-board of the ligurian Apennines is probably the darkest race of *meliloti*. The following aberrations occur: ab. **examaculata** Rocci (= *incompleta* Rocci, trans.) with 6 instead of 5 spots on forewings; ab. **paupercula** Rocci with spot 1 of forewings missing. The ab. **kerleri** Reiss (3 g) has black forewings with scarcely perceptible traces of red scales in place of spots 1, 2 and 5, the hindwings are also quite black except for a scarcely visible little red spot in the middle of same. In ab. **nigra** Dziurcz. the red is extended from base in ray-like formation over the otherwise black hindwing. Further ab. **biguttata nigerrima** Rocci with a distinct red spot in the middle of the otherwise black hindwing; ab. **nigerrima** Rocci with quite black hindwings and ab. **rubefacta** Rocci with narrow almost uniform black margination of hindwings. — The subsp. *sicula* Calb. (Vol. 2, p. 25) (3 h), type race from Mistretta has to be mentioned. The specimen illustrated is from Le Madonie (Sicily) at 1700 m altitude. — var. **silaecola** Vrtz. (3 h) (= *silana* Trti. praeocc.) from the Sila (Calabria) is six- or five-spotted, generally with heavy black on hindwings and reminds one of *italica*. Here we have ab. **cingulata** Trti. (= *decora* Bgff.) with red abdominal belt; ab. **confluens** Trti. with confluent spots and ab. **rubricosta** Trti. with spot 1 projecting beyond spot 3. The specimen *silaecola* ♂ illustrated is from the collection of BURGEFF.

In Styria, Carniola, parts of Hungary, Transylvania and Rumania we find subsp. **dacica** Car. (Vol. 2, p. 443 as ab.) with wide black margins to hindwings, which in some specimens are so wide that only the middle patch of the hindwings retains its red. Aberrations occurring are: ab. **pseudomeliloti** (Car.) Bgff. similar to *meliloti*; ab. **annulata** Car. with red abdominal belt (Vol. 2, p. 25); ab. **pseudoitalica** (Car.) Bgff. similar to *italica*. — Then follow subsp. **bosniensis** Reiss (Type race from Korična in S. W. Bosnia) from Bosnia and Herzegovina at an altitude of over 1000 m with somewhat wider wings and remarkably long abdomen that is rather more heavily haired. A pronouncedly mountain race, only slightly variable and with dusky red. Red abdominal belt not present. All insects are five-spotted with fairly heavy even black margins to hindwings. — Further var. **menoetius** Bgff. from the Vuciabara near Gacko (1300 m) in Herzegovina which is described as follows: size about as *italica*, but always five-spotted. Spots of forewings large, sometimes elongated, hindwings with regular very wide black margins. Scaling is finer and hairs less coarse than in *bosniensis*.

The races from Asia so far known are var. **dahurica** Bsd. (Vol. 2, p. 25, plate 6 d), only from S. E. Siberia; var. **mongolica** Stgr. and Rbl. (Vol. 2, p. 25) from Mongolia and subsp. **confusa** Stgr. (Vol. 2, p. 25, plate 6 d) from Ala-Tau. — In completion I should mention the larger, more brightly coloured and widely red belted race from Kuldjar, N. E. Persia, specimens of which are both in BURGEFF's as well as in my collection and which I name **burgeffiana** n. subsp. (3 h).

Food plants of *meliloti* larvae in mid-Europe are *Onobrychis sativa* Lmk, *Vicia tenuifolia* Roth. and *Lotus corniculatus* L.

**Z. niphona** Btlr. (Vol. 2, p. 25, plate 6 e) (= *christophi* Stgr.) from the Amur territory and Japan is classified here.

**Z. cilicica** Bgff. (3 h) (= *ledereri* Stgr., praeocc., *laphira* H.-Schäff., *laphria* H.-Schäff.) from Pontus, Taurus and Syria. The specimen illustrated was kindly sent to me by BURGEFF. The short truncate antennae are characteristic, as well as the relatively long and stout body and the heavy margins to hindwings



with fairly long dark fringes. Spot 6 is always widely attached to spot 5. Red a dark carmine-rose. Abdomen fairly heavily haired. The name *confluens* Dziurz. is withdrawn as a confluence of pairs of spots is typical of the species. *cilicica* is often mistaken for *filipendulae* races which occur in the same localities. The description of *ledereri* Stgr. in Vol. 2, p. 25 and the illustration on Plate 6 e was not based on a typical *cilicica*.

**Z. laphria** Freyer (Vol. 2, p. 25 and p. 443) (3 h) from Anatolia (Ak-Shehir) and Armenia has a brilliant red mixed with yellow and a slight blue-green gloss on forewings. Spot 6 is widely attached to spots 5. Spots 3 and 4 generally separated, but placed closely together. Hindwings pointed, paler with intermixed yellow scales, with irregular narrow dark margins rather wider at apex, fringes long and dark; antennae short especially in the ♀, pointed at tip. The bodies of the ♀♀ very long and heavy. The ab. **confluens** Bgff. has confluent spots (Ak-Shehir). The specimens illustrated were collected by KORB in Armenia (in the Collection of BURGEFF). BURGEFF has established his *laphria* as a separate species on the basis of his examination of the genitals. Whether BURGEFF's *laphria* is actually identical with that of FREYER is not ascertainable.

**Z. filipendulae** L. (Vol. 2, p. 22 and p. 442). The *filipendulae* described by LINNÉ originated from S. Sweden. Specimens of this type race from Wisby, Slite, Thorsburg on the Island of Gothland, from Kristineborg and Stockholm have a strikingly large 6th red spot on the forewings as compared with the size of the other spots; spots 3 and 4 as well as 5 and 6 are closely approximated, the latter spots are often confluent or widely conjoined together. The wing contour is pointed and narrow, margin on the hindwings is scarcely present. The spots on underside of forewings are generally situate in a red surface which covers the whole spot area, in which however they are still discernible. Beyond the spot area on underside the black ground colour reappears. — The var. **tutti** Rbl. in Vol. 2, p. 23 (= *hippocrepidis* Steph., *filipendulae* Briggs) occurs in England. ab. **flava** (Robson) Bgff. (3 i) occurs here. The specimen illustrated is from N. Kent. — In Lapland and Norway (Grötö) var. **arctica** Schneider (= *manni* Auriv.) occurs, it is a small form, thinly scaled, which closely resembles *manni* from the high Alps. — The var. **stettina** Bgff. (= *stettinensis* Reiss, praeocc.) (3 i) from the surroundings of Stettin is larger than the type race and has considerably wider wings. Besides these characteristics the 6 spots on the forewings are most pronouncedly large so that often, especially in ♀♀ specimens, wide red bands of spots 3—4 and 5—6 are created. The hindwings have scarcely wider margins than the type race. The ♀ type is illustrated.

VERITY assembles the entire races of mid and east Europe and the northern territory of the Alps under subsp. **pulchrior** Vrtz. (= *angelicae* Bsd., *austria-hungarica* Reiss) (type race from Vienna). It differs from the previous races by more sparsely haired bodies. Thorax and abdomen have the same silky gloss as the forewings. Further characteristics are the brighter and warmer red and the somewhat denser scaling. The name *grisescens* Oberth., mentioned in Vol. 2, p. 442, is withdrawn as it referred to an albinotic specimen. The following aberrations are to be mentioned: ab. **quinquemaculata** Vorbr. without the 6th forewing spot; ab. *cytisi* Hbn. (Vol. 2, p. 22/23), the illustration on plate 5 f is a transition to this aberration; in ab. **confluens** (Vol. 2, p. 23) the author's name is Oberth. instead of Dziurz. Transitions to *confluens* have been named *communimacula* Selys, *bipunctata* Selys, *trivittata* Tutt, *conjuncta* Tutt, all mentioned in Vol. 2, p. 23, and are now withdrawn. Then ab. **polygalae** Esp. with almost completely red forewings, only the black margin remains, and ab. *flava* Robson (not Hobson) in Vol. 2, p. 22 (= *lutescens* Cock., *citrinus* Webb). Besides ab. **chrysanthemi** Borkh., in which the spots of forewings and hindwings are deep brown. The illustration on plate 5 f in Vol. 2 does not represent *chrysanthemi*. The names *aurantia* Tutt, *miniata* Tutt and *intermedia* Tutt in Vol. 2, p. 442 are withdrawn. — The race of the highlands of Germany occurring in the Central German Mountains and the high plateaux to the south to the boundary of the Alps is var. **germanica** Reiss (3 i). The specimens illustrated are from the neighbourhood of Stuttgart. The chief characteristics are the relatively small size, the less brilliant red as compared to the *pulchrior* of Vienna, the smaller generally sharply separated spots of forewings, of which especially in the south of the area of distribution spot 6 is frequently very small. The hindwings especially in the ♂♂ have narrow black margins and the underside of forewings is generally yellowish-grey and silky glossy. The ab. **pseudoalpina** Reiss, which I caught near Weilderstadt (Württ.), has reduced spots on forewings, spot 6 inclines to disappear and is generally intersected by the black vein. The red is darker, the black margins to hindwings fairly wide and generally rather irregularly so. The yellow-grey silky gloss on underside of forewings has disappeared except for a few traces and has been replaced by black. A form of *germanica* in which the forewing spots and the hindwings are impure white instead of red is named ab. **pallida** Reiss (taken near Ulm on the Danube) (3 i), the type is illustrated. — The race from W. France (Dompiere sur mer) is named by VERITY var. **pulcherrima** (3 k) (= *manni* var. Oberth.). It is larger than *pulchrior* and *germanica* and has very brilliant red. The spots are always very large: ab. *confluens* Oberth. which otherwise is very rare occurs fairly frequently. The ♂ illustrated is from Auzay (Vendée).

Here follows subsp. *manni* H.-Schäff. (Vol. 2, p. 23) from the territory of the high Alps. To be mentioned are ab. **quinquemaculata** (Vorbr.) Bgff., see above, and ab. **stoechadina** Bgff. with 5 spots, similar to *stoechadis*,



- paulula*. very thinly scaled, hindwings with one spot (5) and slightly reddened base. — Further var. **paulula** *Vrty.* from the Stelvio-Pass with spot 6 of forewings regularly reduced. — var. **vitrea** *Bgff.* (3 k) from Stalden, Saas-Fee (in the Valais) which is extraordinarily finely scaled so that it resembles coloured glass. The specimen illustrated is from the collection of BURGEFF. — SCHAWERDA has described the var. **pseudomanni** from Bosnia and Herzegovina (Trebinje) which is very sparsely scaled like *manni*, but has not dense hairs like same on abdomen.
- The next main race is the strain from the southern Alps, S. France, upper and central Italy and the Balkans, which has been assembled under the name subsp. *ochsenheimeri* Zell. (Vol. 2, p. 23). ZELLER wishes to differentiate *transalpina* O. from *transalpina* Esp. OCHSENHEIMER indicates Italy and S. France as the habitat. As type race, the race also indicated by the description *filipendulae-major* Esp. as it occurs around Montpellier is adopted. Aberrations to be mentioned are: ab. *dubia* *Stgr.*; ab. **stoechadioides** *Std.* (Cologna near Trieste), 6 spotted, hindwings black instead of red, only in the distal area a fairly large red spot, the reddish colouration is reflected through at the base; ab. **biconjuncta** *Vrty.*: spots 3 and 4 as well as 5 and 6 confluent, and ab. **apiceconjuncta** *Vrty.*: spots 5 and 6 confluent. — The autumn generation is forma **autumnalis** (*Reiss*) *Bgff.* (= *exigua* *Std.*). MAUS bred specimens from the ova to the imago without hibernation between the end of June to October 1910. The specimens are about  $\frac{1}{3}$ rd smaller than the usual size. — BURGEFF described from Zara in Dalmatia the var. **zarana** (3 k) with purely *filipendulae* type and unusually pointed and narrow wings. Spot 6 of forewings is considerably reduced, very distinctly intersected by the vein, frequently only half the spot present, often even entirely absent. The black margin of the narrow hindwings is always wider than in *ochsenheimeri*. The specimen illustrated is a ♂ from the collection of BURGEFF. — The race from the high Apennines (Mt. di Mainarde) var. **microochsenheimeri** *Vrty.* (3 k) is small and dainty with narrow wings. The specimen illustrated is from the collection of VERITY from Valle Mollarino, 500 m. — Further to be named are: var. **anceps** *Oberth.* from the delta of the Rhone, Var, in June and smaller specimens in September, 5 or 6 spotted, thinly scaled and less glossy than *duponcheli* (see below), hindwings with narrower black margins, red a lively carmine-rose. On underside of forewings a diffuse stripe in very different degrees of development. — var. **oberthüriana** *Bgff.* (= *angelicae-alpina* *Oberth.*) from the Basses-Alpes (Digne) is 5 or 6 spotted with all sorts of transitions, ground colour more or less blue or green glossy, red a lively earmine. The earmine-rose diffuse streak on the underside of forewings is not always constant and sometimes absent. Specimens with 5 spots are named ab. **angelicaeformis** *Vrty.* — Then var. **pyrenes** *Vrty.* (= *dubia* *Oberth.*) from the Pyrenees (Vernet les Bains), in which frequently specimens occur with 5 spots and again specimens without the diffuse streak on the underside of forewings. Hindwings with fairly heavy dark margins. — Bred hybrids from a crossing between *filipendulae* ♂ and *ochsenheimeri* ♀ have been named by TUTT **angloitalica** and hybrids from a reverse crossing **italoanglica**. — To be classified here from Spain: subsp. **seeboldi** *Oberth.* (3 k) from Bilbao, densely scaled with bluish or greenish superficial gloss on the forewings, 6 or 5 spotted. Red a brilliant earmine, margin of hindwings very narrow. The ♀ specimen illustrated is from Bilbao. — subsp. **gemina** *Bgff.* (3 l) from the Province of Mureia (type race from Sierra Segura), Aragon, Portugal (Coimbra) is always 5 spotted. It is difficult to differentiate from *loniceræ* subsp. *intermixta* *Vrty.* occurring at the same locality by the somewhat varying and narrower black margin of the hindwings which bulges in a different shape. Further the spots on the forewings are generally slightly smaller. However, it is easily differentiated through the genitals. In *gemina* spot 4 of the forewings is generally cut off straightly towards the base, rarely it is pointed outwards, narrow and inclining perpendicularly to the media, whilst in *intermixta* from the same locality spot 4 is generally pointed towards the base of the wings and is roundish lachryform or cordiform (see also under *loniceræ*, p. 38). The specimens illustrated are from Aragon. Here we have ab. **privata** *Bgff.*, originally described as belonging to *loniceræ* (Vol. 2, p. 21/22), in which spot 3 of the forewing is absent. — subsp. **himmighofeni** *Bgff.* (3 l) (= *stoechadis* *Rmb.*, *kindermanni* *Oberth.*, *eatalonia* *Sag.*, *praeoec.*) from Catalonia is a race with heavy blue gloss and often with heavily blackened hindwings. On underside the spots are not confluent. The ♂ illustrated is from Llinas, 200 m (leg. QUERCI).

- The subsp. *stoechadis* *Borkh.* (= *lavandulae* *Esp.*) in Vol. 2, p. 22 and p. 442 mentioned as a separate species is not easily differentiable from *filipendulae*, as in the boundaries of its distribution it is closely related to same. A crossing between a ♂ of *filipendulae* from Herrsching in Bavaria and a ♀ of the *stoechadis* race from Genoa created no difficulties. The hybrids which BURGEFF named **bavarica** are all fairly exactly intermediary and approximately resemble *ochsenheimeri* with a reduced 6th spot on the forewings. They are completely fertile in interbreeding. *stoechadis* is distributed in the southern valleys of the Alps, "the Maritime Alps and the Julian Alps (as type race)" and in upper and central Italy. Aberrations of the type race to be mentioned are: f. **oberthüri** *Dziurz.* (Vol. 2, p. 442); ab. *judicariae* *Calb.* (Vol. 2, p. 22); ab. **dubia** (*Stgr.*) *Seitz* (Vol. 2, p. 22, plate 5 b); ab. **flava** (*Oberth.*) *Bgff.*, the yellow form. The ab. *siepii* *Oberth.*, mentioned in Vol. 2, p. 442, belongs to *lavandulae*. — The race from the sea-board of the Maritime Alps is var. **duponcheli** *Vrty.* (= *medieaginis* *Dup.*). Almost always 5 spotted, spots of forewings generally clearly separated on underside, hindwings with wider or narrower dark margins and partly adumbrated as in *stoechadis*. Aberrations to be mentioned here are: ab. **dubia** (*Stgr.*) *Oberth.*; ab. **pseudostoechadis** (*Borkh.*) *Bgff.* (= *medieaginis* *Oberth.*) like *stoechadis*; ab. **flava** *Oberth.*, yellow. — In the sea-board of the ligurian Apennines we find **gigantea** *Rocci* (3 l), a very large race with heavily scaled wide wings and very variable. A ♀ from the sea-board near



Genoa is illustrated. The aberrations to be named here are: ab. **bongerti** Reiss (3 l) (Genoa) with spots of forewing diffusing longitudinally; ab. **undecimaculata** Rocci with 5 spots on upperside and 6 spots on underside; ab. **tripunctata** Rocci: spots 3 and 5 missing, the remaining spots reduced in size; ab. **impar** Rocci with 6 spots on upperside and 5 spots on underside; ab. **plusnotata** Rocci: spot 4 distinctly separated in 2 parts; ab. **parviguttata** Rocci with quite small red spots; ab. **reducta** Rocci: spots 3 and 4 missing (= *quadripuncta* Rocci, trans.); ab. **nigrata** Dziurz. in Vol. 2, p. 442 (= *nigerrima* Reiss) (3 m), the specimen illustrated is the *nigerrima* type; ab. **mediounita** Rocci: spots 3 and 4 confluent; ab. **triconjuncta** Rocci: spots 1 and 2, 3 and 4, 5 and 6 of forewings confluent on underside, lying in a faintly red spot area; ab. **lavanduloides** Rocci, spots of forewings with black borders; ab. **biguttata** Rocci: hindwings blue-black with a red spot in the middle; ab. **zonata** Rocci, the red hindwing is separated into 2 parts by a black cuneiform mark proceeding from the outer margin; ab. **zlatoroga** Reiss (= *citrina* Rocci) (3 m), yellow instead of red (Genoa); ab. **judicariaeformis** Rocci similar to *judicariae* Calb. (Vol. 2, p. 22), especially observable in adumbrated quite fresh specimens; ab. **violacea** Rocci with a violet sheen on all wings; ab. **cuprea** Rocci with green-bronze gloss; ab. **dubia** (Stgr.) Rocci; ab. **sexmaculata** Rocci with 6 spots on upper and undersides; ab. **septemaculata** Rocci: spot 6 divided into 2 parts; ab. **amplomaculata** Rocci with considerably increased spots, especially spot No. 5. — The presumable 2nd generation is forma **autumnalis** Reiss (= *genuensis* Rocci) (3 m), it is much smaller than the first generation and flies in reduced number in September (Genoa). The ♂ illustrated is the type. — Rocci describes the var. **microstoechadis** (Mt. Maggio, Val Scrivia) from the heights of the ligurian Apennines (700—1500 m). In size it is approximately like *autumnalis*, is more weakly scaled and less glossy. It occurs in July and August. — An intermediate race from the reaches of the ligurian Apennines (300—600 m according to Rocci) which comes between *gigantea* and *microstoechadis*, has been named by Rocci as var. **liguris** (Mt. Alpesisa, Val Bisagno). It does not incline to such an extent of adumbration and is smaller than *gigantea*. — Here follow: var. **aterrima** Vrtz. (5 and 6 spotted) from N. Tuscany (the mountains above Lucca and Pistoia). This is a small race with wing expanse 27—31 mm in the ♂, in which a very heavy adumbration of the wings is predominant. — var. **etrusca** Vrtz. from Florence (Pian di Mugnone) has a very heavy green gloss, the red is brilliant carmine. Size as *ochsenheimeri* and mostly 6 spotted. Margin of hindwings approximately like *pyrenes*. Here we have ab. **loniceraeformis** Vrtz. without the 6th forewing spot. — var. **oraria** Vrtz. (5 or 6 spotted) from the coast of Tuscany (near Viareggio) is larger than *etrusca*, however not so large as *gigantea* although closely resembling this race. — var. **campaniae** Stgr.-Rbl. (Vol. 2, p. 22) from the Campagna (Mt. Aurunci). — var. **montivaga** Vrtz. (6 or 5 spotted) (3 m) from Mt. Sibillini (Bolognola), Abruzzi, is like *aterrima* in regard to size but less lively coloured, generally 6 spotted. Margin of hindwings generally wider than *microochsenheimeri*. A ♂ from the collection of VERITY is illustrated. — subsp. **siciliensis** Vrtz. (3 m) from Sicily (neighbourhood of Palermo in May). It varies little, with very narrow margin to hindwings, size as *ochsenheimeri*. The spots on underside of forewings are situate in a red area. The ♂ illustrated is from the collection of VERITY and from the neighbourhood of Palermo. — Here we have var. **calabra** Vrtz. from Calabria (Piano di Carmelia, 1200 m, Aspromonte), in which the ♂♂ in comparison with *siciliensis* incline more to resemblance with *ochsenheimeri*, whilst the ♀♀ often approach the *pulcherrimaeformis* type. Therefore there is a considerable sexual dimorphism. As an aberration to be mentioned here ab. **pulcherrimaeformis** Vrtz., specimens that resemble *pulcherrima* (5 k).

“The name diagnoses given by VERITY as capable of combination, to cover comparisons of the Italian races (which he however designates as denominations without systematic intentions) have not been included.”

The separate main races of Asia can be briefly sketched as follows: subsp. **ramburi** Led. from Syria (3 n) with rose colour, ground colour mostly steel blue. Spots 5 and 6 form a wide stripe, (almost crescent form) rounded towards the apex, spots 3 and 4 faintly confluent. With a hyaline patch at the base of hindwings. The newly illustrated specimen presumably originates from the collection of LEDERER, its origin is given as Antiochia. — var. **rosa** Oberth. (ab. ?) (3 n) from Akbès (Syria). The rose-red of the spots covers the upperside irregularly almost over the whole forewing, underside of forewings completely rose coloured as the hindwings, which also show a hyaline patch stretching out from the base. Illustration according to OBERTHÜR. — var. **gurda** Led. (= *mersina* H.-Schäff.) from Mersina (Asia Minor) with more extended and pointed wings than *ramburi*. The red is somewhat darker. Ground colour of the ♂ steel blue, of the ♀ glossy green. A hyaline patch stretches out from the base of the hindwings. According to the illustration of LEDERER spots 3 and 4 in the type are considerably increased and confluent, spot 6 is widely attached to spot 5. — subsp. **anodolitia** Reiss (3 n) from Ak-Shehir (Asia Minor). A pure *filipendulae* type, larger, wings wider and red darker than in *ramburi*. In typical specimens spots 3 and 4 are confluent or attached to one another. Spots 5 and 6 in about half the specimens are round and isolated, in the other half they are confluent. On the underside of forewings the spots are still recognisable although situate in a diffusion of rosy colour which covers the entire spot area. Margin of hindwings narrow. The types are illustrated. — subsp. **syriaca** Oberth. from Akbès (Syria) (3 n) is large and robust, ground colour blue-greenish glossy (6 or 5 spotted), red of spots and hindwings a bright carmine. The diffusion around the spots on underside of forewings is generally absent. Spots 5 and 6 are always separate. The specimens illustrated are from the Museum at Tring and probably OBERTHÜR's cotypes. — A large race from the Taurus which is very similar to the preceding race is named: subsp. **tauriana** Bgff. (= *taurica* Dziurz., praeocc., Vol. 2, p. 442) (3 o). Underside of forewings also without a diffusion of red around spots. Differs from *syriaca* by the very truncate forewings, spot 6 is widely separated from spot 5. The illustration shows a ♂ from the Taurus from the collection of BURGEFF. — subsp. **hadjina** Stgr. (Vol. 2, p. 22, plate 5 c) from the Taurus.

*bongerti*.  
*undeci-*  
*maculata*.  
*tripunctata*.  
*impar*.  
*plusnotata*.  
*parrigut-*  
*tata*.  
*reducta*.  
*nigrata*.  
*mediounita*.  
*triconjunc-*  
*ta*.  
*lavandul-*  
*toides*.  
*biguttata*.  
*zonata*.  
*zlatoroga*.  
*judicariae-*  
*formis*.  
*violacea*.  
*cuprea*.  
*dubia*.  
*sexmacu-*  
*tata*.  
*septemacu-*  
*tata*.  
*amplomaculata*.  
*autumnalis*.  
*micro-*  
*stoechadis*.  
*liguris*.  
*aterrima*.  
*etrusca*.  
*lonicerae-*  
*formis*.  
*oraria*.  
*montivaga*.  
  
*siciliensis*.  
  
*calabra*.  
  
*pulcher-*  
*rimae-*  
*formis*.  
  
*ramburi*.  
  
*rosa*.  
  
*gurda*.  
  
*anodolitia*.  
  
*syriaca*.  
  
*tauriana*.



*intermedia*. The hybrid from the crossing between *filipendulae* ♂ and *lonicerae* ♀ has been named **intermedia** by TUTT.

The larva of *filipendulae* feeds in mid Europe on *Lotus corniculatus* L., as also does the *stoechadis* larva in S. France, the *stoechadis* larva in S. Europe feeds besides on *Dorycnium suffruticosum* Vill. and also on *Dorycnium herbaceum* Vill.

*huguenini*. **Z. huguenini** Stgr. (Vol. 2, p. 26, plate 6 i) from Ferghana.

*trifolii*. **Z. trifolii** Esp. (Vol. 2, p. 21 and p. 442). Distributed through Central Europe, the islands of the north german coast, England and the northern Balkans. The type described by ESPER originated from Frankfurt on the Main. Besides the forms described as aberrations in Vol. 2 the following also occur: ab. **sexmaculata** (Oberth.) Bgff. (Berlin), see below; ab. *minoides* Selys (= *confluens* Stgr.); ab. **rubescens** Bgff.: spot 1 on the costa diffusing upwards as far as spot 5, all the other spots irregularly enlarged and conjoined together, the veins remain black; ab. *trivittata* Speyer; ab. **extrema** Tutt (Vol. 2, p. 442). In ab. **obsoleta** Tutt one or more of the forewing spots are absent; ab. **pauperrima** Vorbr. is uni-coloured black on all wings (Stäfa in Switzerland); ab. **candida** Bgff. (= *albomaculata* Locher) shows an absence of red pigment, purely white instead of red (Regensburg). The names *glycirrhizae* Hbn., *basalis* Selys, *intermedia* Tutt and *semilutescens* Higgs (Vol. 2, p. 21 and p. 442) are withdrawn as representing transitions. — The var. *gracilis* Fuchs (Vol. 2, p. 21) is the summer form occurring in the middle Rhine Valley from the end of July to the beginning of September. It has finer scaling, frequently spots 3 and 4 on forewings are separated, further it has more slender and pointed antennae than the spring form; specimens with confluent forewing spots are more rare. The form named *gracilis* by FUCHS from a few specimens collected on the Loreley is smaller but with the exception of this smaller size corresponds with the summer form (see above). — In N. W. France (near Rennes as type race) and in England *trifolii* is represented by subsp. *palustris* Oberth., Vol. 2, p. 21, (= *trifolii* Briggs, *trifolii-major* Tutt), large with brilliant red and considerable variability. The name *palustrella* Vrtv. is deemed synonymous with *palustris*. Here occurs ab. **confluens** Oberth. with completely red spot area; ab. **sexmaculata** Oberth. and ab. **nigricans** Oberth. (Vol. 2, p. 442), in the latter the red of the spots and the hindwings is adumbrated to grey-brown; f. **subsyracusiae** Vrtv. is a form found chiefly on the N. W. coast of France and in the Channel Islands in which the spots of the ♂ are considerably reduced and the dark margin of the hindwings increased; f. **transferens** Vrtv. (= *britanniae* Vrtv., Warthill, Yorkshire, *misera* Vrtv.) from Tring Park in Hertfordshire has spots 3 and 4 separated and hindwings with a narrow margin. — var. **decreta** Vrtv. from Sussex (England) is a dwarf race in which in the majority of specimens spots 3 and 4 are separated. Here we have ab. **longicornibus** Vrtv. with extremely long antennae, especially in the ♂♂. — The subsp. **duponcheliana** Oberth. (= *trifolii* Dup.) from the East Pyrenees (Casteil and Vernet-les-Bains, in May and September) is relatively smaller than *olbiana* (see below) with dull gloss, spots and hindwings carmine-rose. Here we have ab. **glycirrhizae** (Hbn.) Oberth. Specimens occurring at the end of September which are somewhat daintier, are named by VERITY as f. **duponcheliella**. — subsp. **hibera** Vrtv. (4 a) from Oviedo (Asturia, Spain) is equal to typical *palustris* in size, but partly has somewhat longer antennae, more truncate forewings and heavy bodies in the ♀♀. The specimens illustrated are from the collection of VERITY. Specimens resembling *syracusiae* are named by VERITY ab. **hiberuncula**. — subsp. **olbiana** Oberth. (3 o) from the Department Var (Hyères) in May. The ground colour is indigo-blue with faint gloss, spots small and lively carmine-red, hindwings carmine-red with wide margins. Antennae relatively long, thorax and abdomen black-blue. The ♀ has narrower wings and similarity with *lonicerae*. Colouration is less bright than in the ♂ and spots are larger. The 2nd and 3rd figure from the left on plate 3 o represent a ♂♀ from Hyères (Var) from the collection of BURGEFF; the 4th figure from the left is a reproduction of OBERTHÜR's illustration. — subsp. *syracusiae* Zell. (Vol. 2, p. 21) (= *siciliae* Vrtv.) from Sicily. The type race is distinguishable by relatively long abdomen and longer antennae, of which the tips appear more pointed, small spots, hindwings with almost uniform heavy black margin. Specimens similar to *australis* are ab. **paraaustralis** Vrtv.; ab. **tinacria** Vrtv. is a fairly large form with large spots and somewhat narrower margins to hindwings. In ab. **krügeri** Ragusa (= *punctonotata* Vrtv., trans.) spots 3 and 5 are conjoined. — The smaller form flying in September and presumably a 2nd generation in Sicily and Algeria is named by VERITY f. **secundogenita**. — The var. **barcelonensis** Reiss from Catalonia (Barcelona), in May, is generally somewhat larger than *syracusiae* and has more pointed forewings. Spot 3 is very small and always separated from the large spot 4. Margination of hindwings also in the ♀♀ is as wide as in *syracusiae*. The f. **depravata** Sag. (3 o) from Llobregat in Catalonia, occurring in October, is described by BETHUNE-BAKER as a special species *clorinda*. It refers to very small specimens probably of a 2nd generation, spot 4 is always separate from spot 3, but smaller in proportion than in *barcelonensis*. Normal large specimens, which however scarcely differ except through their somewhat smaller size from specimens flying in May are named by SAGARRA f. **intricata** (3 o). The specimens illustrated of *depravata* and *intricata* were captured by QUERCI. — The var. **australis** Oberth. (= *australis* Led., nomen nudum; *trifolii* Rmb.) from N. Africa, S. Spain, is smaller than *syracusiae*, densely scaled with greenish-bronze gloss on forewings. The bright carmine of the spots has a touch of claret colour; hindwings are carmine-rose and fairly widely surrounded by steel blue. Here we have: ab. **pseudocaerulescens** Bgff. with hindwings more or less blackened (Lambessa); ab. **ruficostata** Holl: spot 1 on the costa diffusing upwards to the level of spot 5.



— var. **magnaustalis** *Vrty.* from Algeria (Khenchela) is larger than *australis* and has larger forewing spots. — From the mountains of Andalusia (Sierra de Alfacar) OBERTHÜR mentions the var. **caerulescens** (4 a) (= *stoechadis Rmb.*) which besides having in the ♂♂ a considerable extension and diffusion of the margins of hindwings, has same often heavily adumbrated. A ♀ from Sierra Nevada (1200 m) is illustrated. Aberrations to be mentioned are: ab. **pseudoaustralis** (*Bgff.*) *Reiss* (see below); f. **tenuelimbata** *Romei* with narrower margin to hindwings approximately as the german *trifolii*. — Then follows subsp. *seriziati Oberth.* (Vol. 2, p. 21, plate 4 k) from the sea-board of Algeria with brilliant steel-blue ground colour and lively carmine red spots on forewings, hindwings more or less heavily clouded with indigo blue. In ab. **rusicadica** *Std.* the forewing spots 1 and 2 as well as 3 and 4 are roundly confluent (Philippeville). Further must be mentioned: ab. *nigra Dziurz.* (Vol. 2, p. 21, plate 4 k); ab. **pseudoaustralis** *Bgff.*: specimens with hindwings not more widely margined than in *australis*. — The subsp. *orientalis Hormuz.* (Vol. 2, p. 21) described from the Bukovina (alpine Plateau of the Lutshina) follows here. Hindwings have a very wide black margin extending sometimes to the middle of the wing.

**escheri** *Stdflss.* is the bred hybrid from a cross between *trifolii* ♂ and *filipendulae* ♀ and **fletscheri** *Tutt.* from a cross between *trifolii* ♂ and *lonicerae* ♀.

The food plant of *trifolii* larvae is *Lotus corniculatus* L. and also for *australis* in the Atlas (BURGEFF). The larva of the african *australis* differs from that of the european *trifolii* by its somewhat paler colouration, the lateral stigmata are only faintly indicated.

**Z. lonicerae** *Schev.* in Vol. 2, p. 21/22 and p. 442, (= *loti Stephens*). The type race from Regensburg is identical with the mid german strains. Large forewing spots, spots 3 and 4 sometimes confluent, thinly scaled, the red sometimes mixed with yellow and fairly narrow margins to hindwings. The species is distributed in Lapland, Finland, Scandinavia, Denmark, England, central and southern Europe from Spain to the Urals, Pontus, Armenia, Altai and Ussuri. Besides the aberrations mentioned in Vol. 2, p. 21, the following are named: ab. **citrina** *Speyer* in Vol. 2, p. 21 and p. 442, (= *lutescens Oberth.*, *flava Oberth.*). Further ab. **cuneata** *Tutt*; ab. **centripuncta** *Tutt* (both Vol. 2, p. 442) and similarly ab. **incendium** *Oberth.* (= *rubrosuffusa Vrty.*, trans.). In ab. **trivittata** *Tutt* the forewing spots are conjoined longitudinally in the wing. The ab. **bercei** *Sand* has spot 2 widely confluent with spot 4 and diffusing, similarly 3 with 5, forming an irregular red area. Costa is free of red. The ab. **hades** *Metschl* (Regensburg) has spots and hindwings smoky-brownish and sooted with black. The spots are only clearly differentiable from the steel blue ground colour in oblique light. The ab. **translucens** *Bgff.* (= *diaphana Bgff.*, *praeocc. semidiaphana Std.*) is very thinly scaled and has transparent wings. In ab. *rubescens Bgff.* (Vol. 2, p. 21) we have to add that spot 1 extends upwards as far as spot 5, the other spots expand irregularly and conjoin, the veins of the wing remaining black. The ab. *privata Bgff.* (Vol. 2, p. 21/22) belongs to *filipendulae* subsp. *gemina Bgff.* (see notes there). The names *eboraceae Prest.* and *carnea Spul.* are withdrawn, as also are *semilutescens Hew.* and *lutescens Hew.* (Vol. 2, p. 442). — From the Province Brandenburg (Berlin, Brandenburg on the Havel and Tangermünde) BURGEFF separates var. **praeacuta**. These are large insects with pointed and narrow wings with long and heavy antennae and medium wide margins to hindwings. Colour is a bold carmine-rose frequently mixed with yellow in the fold area and at the base of hindwings. The black areas of the wings with faint superficial blue or green gloss. — The subsp. **linnei** *Reiss* (4 a), type race from Slite on the Isle of Gothland and surroundings of Stockholm has easily recognisable characteristics. Heavily haired thorax and abdomen and somewhat wider margin to hindwings. Specimens with fairly similar race characteristics also occur in Lapland, Finland and Estland and the type covers these districts. The ♀ type is illustrated. — The var. **kareliae** *Bgff.* from Carelia is pale carmine-rose coloured. — A larger and more robust race with heavy hairs like *linnei* is var. **stettinensis** *Reiss* (4 a, b) from the neighbourhood of Stettin (Hoekendorff), similar specimens also occur in the neighbourhood of Sleswick. The ♂ type and a ♀ cotype are illustrated. — subsp. **latomarginata** *Tutt* (Vol. 2, p. 442 as ab.) with wide wings, densely scaled and with wider to very wide margination of hindwings. Forewing spots and hindwings carmine-rose with slight yellow admixture. A heavy green gloss on the black parts of the wings and sometimes also on the abdomen of both sexes. Mid and south England, Smethwick, Bournemouth, New Forest. — The subsp. **major** *Frey* (= *alpiungigas Vrty.*) from the southern valleys of the Alps (St. Nicolas in the Visp Valley), Vol. 2, p. 21, is very large with pointed wings, densely scaled and fairly wide margin of hindwings; ab. **alpiumnana** *Vrty.* are specimens similar to *trifolii*. In higher altitudes (Formazza Valley in the Tessin) it graduates into var. **glaciei** *Vrty.* which is smaller than *major* and more thinly scaled. — var. **martinensis** *Reiss* from St. Martin-Vesubie, in July, is more robust than *major* with wider wings and generally somewhat wider, almost uniform blue-black margins to hindwings. — subsp. **apenninica** *Rocci* from the ligurian and etruscan Apennines, Mt. Sibillini. The type race from Parma and Reggio from considerable altitudes is small and dainty, sparsely dusted, the wings extended and pointed. The spots of forewings are small and the hindwings have fairly wide black margins. — var. **etruriae** *Vrty.* (Mt. Sennario, 800 m) from Tuscany is more densely scaled with brighter red and of larger and more robust form. — The var. **pauper** *Vrty.* (4 b) from Mt. Sibillini (Marche), 1400—1700 m, differs very little from *apenninica* except through partial sparser scaling. A ♂ from VERITY's collection is illustrated. VERITY classifies specimens as ab. **centralitaliae**



which resemble *trifolii*. — In July VERITY captured at Bolognola a race coming between *etruriae* and *pauper* which he names **pauperetincta**. The forma **autumnalis** Vrt'y. is a parallel generation of this race that flies in September, which is smaller and more sparsely scaled. A single specimen of this race having hindwings adumbrated similar to ab. *nigra* Dziurz. of *seriziati*, VERITY names ab. **nigra**. — In subsp. **silana** Bgff. (= *herthae* Std., *minima* Trti., *dimorphica* Vrt'y.) (4 b) from Calabria. Sila, the very dark brilliant red and wide margins to hindwings are quite unusual for *loniceræ*. The forewings have a heavy superficial gloss. The specimens illustrated are from Mt. Martinello in Calabria. — Here we classify var. **vivax** Vrt'y. from Caserta (Mt. Mainarde), end of June, which differs from *silana* only through the less heavy margins of the hindwings and less heavy gloss. Here ab. **posticeobscurata** Vrt'y. in which the hindwings are covered with black except for a red middle streak, also this middle streak is traversed by black lines along the veins. — ab. **brevicornibus** is the name given by VERITY to specimens of all Italian races with shorter antennae and wings. — In Andalusia, Aragon there is a special main race, the subsp. **intermixta** Vrt'y. (4 b, c) with wider more truncate wings at the apex, especially in the ♀♀. The shape and distribution of the spots is typical, spots 3 and 4 are rarely confluent, spot 4 generally pointed towards the base of the wings, roundish, lachryform or cordiform. The margin of hindwings is narrower than in typical *loniceræ*. In spite of the thin scaling all specimens, even the ♀♀, have a quite unusually deep blue gloss on their short scaled bodies and on the black parts of the wings, which is quite unusual for *loniceræ*. In a few specimens this gloss has a greenish sheen. The specimens illustrated are from Aragon (Sierra Alta). — From Anatolia (Sultan-Dagh) at the end of June, at about 1700 m, we find subsp. **natolica** Reiss (4 c) about the same size as *trifolii* with more acutely pointed wings. The spots 3 and 4 of the forewings are close together. Blue gloss on forewings and body. Red carmine-rose. The ♀ type is illustrated. — The subsp. **achalcea** Bgff. (4 c) from Armenia (Achalzich) is very large, only slightly smaller than *major*, with wide wings and very heavy feelers in the ♂♂ and heavily haired body. Ground colour with a pronounced steel-blue gloss, more rarely greenish. Spots always separated on forewings and very wide margins to hindwings, dark carmine red, sometimes with somewhat yellow admixture. The ♂ illustrated is from the collection of BURGEFF. — Specimens from Abbas-Tuman are of dainty build, narrower extended wings and very darkly margined hindwings: var. **abbastumana** Reiss (4 c). The ♂ type is illustrated. — var. **kindermanni** Oberth. (= *stoechadis* Freyer) was placed by OBERTHÜR to *stoechadis*. It actually corresponds with *stoechadis* in the markings, in general appearance however with *achalcea*, but it is smaller. The spots of forewings are small, the hindwings have a red streak from the base of wings outwards in conjunction with a large spot on the median nervule (5). From the Caucasus, Cuban territory. An examination of the genitals has proved them to be typical *loniceræ* genitals. Here we have ab. **ledereriana** Bgff. (= *stoechadis* var. *Led.*) with bright orange-yellow spots of forewings, hindwings almost black, only a little orange yellow at the base, at the end of the cell a round orange-yellow spot. — The subsp. **ussuriensis** Reiss (4 c) from Ewgieniewka, Ussuri, is somewhat smaller than typical *loniceræ*, more sparsely scaled and rather brighter carmine red. Wings more extended, spots 3, 4 and 5 almost round, spot 3 almost as large as spots 4 and 5, spots 3 and 4 nearly contiguous. Hindwings with normal black margins, rather heavier black fringes of the inner margin. Underside as the upperside only slightly paler. Antennae slightly daintier than in *loniceræ*, hairs on the body heavier. The specimen illustrated is from the Hungarian National Museum.

**inversa** Tutt is a bred hybrid from a crossing between *loniceræ* ♂ and *filipendulae* ♀, **worthingi** Tutt from a crossing between *loniceræ* ♂ and *trifolii* ♀, and **burgeffi** Przegendza from a crossing between *loniceræ* ♂ and *ephialtes v. borealis* ♀.

The larva of *loniceræ* feeds in mid Europe on *Lotus corniculatus* L., *Trifolium montanum* L. and *Onobrychis sativa* Lmk.

## XII. Subgen. **Polymorpha** Bgff.

**Z. transalpina** Esp., Vol. 2, p. 23 and p. 442 (= *medicaginis* Hbn., *charon* Bsd., *loti* Vrt'y.). This, possibly the most interesting species, separates into the central and Mediterranean groups. The central group inhabits central Germany, France southwards to the Provence and over the Pyrenees to Spain and is presumably a survival of the tertiary period. In Germany it reaches in one place to the Algau Alps. The Mediterranean group, which has developed south of the Alps, presumably only reached the Alps after the ice period and proceeded to invade the Rhine and Inn Valleys. It covers besides the entire region of the Alps, Italy as far as Calabria, ending in the west in the Basses-Alpes, in the east in the Adriatic sea-board and the Carst; further it occurs in Bosnia and the transylvanian Alps. The central group has the apex of the wings pointed, spots 5 and 6 closely approximated; the Mediterranean group has a truncate apex to the wings and widely separated spots. These are the chief characteristics which suffice to discriminate individual specimens of each group.

I. Mediterranean Group: the type race of *transalpina* VERITY has discovered on the Italian forerunners to the Alps around Lago Maggiore. — subsp. **emendata** Vrt'y. (4 d) (Mazerata) is distributed in the plains of the Po, north and central Italy, east of the Apennines. It is larger than the typical *transalpina*, with dark red, faint blue gloss on forewings, narrow black margins to hindwings and a cuneiform mark on vein C 2;



antennae long and heavy. A ♂ from the collection of BURGEFF is illustrated. The following aberrations are named: ab. **anticeconjuncta** Vrtv.: spot 1 and 3 confluent; ab. **flava** Sicher (4 d) (instead of *Dziurz.* in Vol. 2, p. 23), yellow. — Here we have var. **interjacens** Bgff. (= *intermedia* Rocci), a race combining the race characteristics of *altitudinaria* and *pinguis* from medium altitudes of the Apennines (Val Scrivia, Val Bisagno), end of June to end of September, in 2 parallel generations. The ab. **quinqueguttata** Rocci is 5 spotted on upperside and 6 spotted on underside. — var. **pseudointermedia** Rocci (= *intermedia* Costantini) from the ligurian Apennines, Emilia, at an altitude of 700 m, approaches more closely to *altitudinaria* from the Abruzzi Mountains. Here ab. **privata** Costantini, 5 spotted and ab. **depauperata** Costantini: spot 3 completely absent. — Then follows subsp. *maritima* Oberth. (Vol. 2, p. 23), type race from the sea-board of the Maritime Alps (La Turbie), further from the sea-board of Liguria and on the western coast of central Italy. The typical *maritima* is daintily built, has a narrow body and relatively large wings with quite small forewing spots. Spot 6 is rarely absent: ab. **trimacula** n. nov. (= *trimaculata* Oberth., praecoc.). The blue gloss of the ground of forewings is predominant over the green gloss. Underside of forewings generally with considerable diffuse streak which only dissipates gradually in dark specimens. We also find in a number of the ♂♂ the peculiar purple sheen on the blue wings. — To the typical *maritima* has to be added var. **promunturii** Bgff. from Laigueglia. It occurs on the promontory of Capo Mele jutting out into the sea and covered with *Pinus halepensis* and *Macchien* on chalky ridges. The larvae are found on *Hippocrepis comosa*. Rather smaller in size than *maritima*; forewing spots much smaller, generally in the form of *pseudosorrentina* (see below), larger in specimens with more or less red hindwings. About half the number of specimens is still further adumbrated. Traces of spot 6 are traceable on the upperside even if only in the shape of a few scales. A quite black specimen in which scarcely visible traces of scales indicate the 6 forewing spots and the area of spots 4 and 6 of hindwings has been named by BURGEFF ab. **anthrax**. — The characteristics for the 6 and 5 spotted var. **pinguis** Bgff. (= *maritima* Rocci) from the ligurian Apennines around Genoa, not immediately on the sea coast, are plain when compared with a typical *maritima*. *pinguis* has a plumper build, thicker body and relatively smaller wings, chiefly with green gloss and frequently without a 6th forewing spot. Aberrations are: ab. **parvimaculata** Rocci., spot 5 or 6 exceedingly minute; ab. **depauperata** (Trti.) Rocci, see below; ab. **pseudosorrentina** (Trti.) Bgff., see below; ab. **amplomaculata** Rocci with considerably enlarged forewing spots; ab. **circumscripta** Trti.: spots 3, 4 and 5, especially spot 4, distinctly narrowly surrounded with yellowish; ab. **diffusa** Rocci: spots on the underside of forewings conjoined together by a red cloud; ab. **brunnea** (Dziurz.) Rocci, red-brown instead of red. — The 6 and 5 spotted var. **litorea** Bgff. (= *transiens* Rocci, praecoc.) (4 d) from the coastlands around Genoa (in May) is generally somewhat larger than *pinguis*. Ground colour blue-black, rarely with green gloss, the smaller spots and hindwings are darker red than in *pinguis*. Hindwings with very wide violet-black margin. The specimens illustrated are from the sea coast of Genoa. Aberrations to be mentioned are: ab. **pseudomaritima** Rocci, similar to *maritima*; ab. **pseudosorrentina** (Trti.) Rocci, see below; ab. **pseudocalabrica** Rocci, similar to *calabrica* with quite black hindwings; ab. **depauperata** (Trti.) Rocci, see below. — The race from Formia (Prov. Caserta) presumably from the sea-board of Mt. Aurunci in March and April is var. **collina** Bgff. (= *italica* ab. *Dziurz.*, Vol. 2, p. 23, plate 5 h, *maritima* Querci, *transiens* Vrtv.) 6 and 5 spotted. These are large, robust, brightly coloured insects inclining to the following aberrations: ab. **depauperata** Trti. with spot 3 or 4 absent on forewings; ab. **annulata** Trti. with red abdominal belt; ab. **pseudosorrentina** Trti., similar to *sorrentina*. — In subsp. *sorrentina* Stgr. in Vol. 2, p. 23, (= *stoechadis* H.-Schäff.) from the peninsular of Sorrent and the surroundings of Naples the following aberrations are named: ab. **sexmacula** Dziurz. (Vol. 2, p. 442); ab. **gramanni** Std.: spot 1 of forewings absent, hindwings black or with small red dot in the middle; ab. **roseopicta** Trti. (= *rubromixta* Std.) with rosy-red colouration; ab. **nigroinspersa** Bgff.: spots adumbrated by a few distributed black scales; ab. **albicincta** Bgff. with pronounced white surrounds to spots of forewings; ab. **depauperata** (Trti.) Bgff. (= *tertiadeleta* Std., *mediodeflecta* Std.), see above; ab. **pseudomaritima** (Rocci) Bgff. with red hindwings similar to those of *maritima*; ab. **pseudolitorea** Bgff. with widely margined hindwings similar to *litorea*; ab. **pseudocalabrica** (Calb.) Bgff. like *calabrica*; ab. **posticebipuncta** Std.: hindwings black with 2 neatly outlined separated spots; ab. **postictripuncta** Std. like the former only with 3 spots on hindwings; ab. **zickerti** (Hoffm.) Bgff.; ab. **annulata** Trti., see above; ab. **tripicta** Std. with minute spots 2, 3 and 4, otherwise quite blue-black; ab. **bipuncta** Std. as the former, but only spots 3 and 4 still present; ab. **flavescens** Trti., yellowish instead of red. — var. (and ab.) **xanthographa** Germ. (= *boisduvalii* Heydenreich), Vol. 2, Plate 5 i, is yellow, 5 and 6 spotted. COSTA has described a *stoechadis* var. Here we have ab. **verityi** Std. with narrow hindwing margins; ab. **centripunctata** Std. like the former, but in the middle of hindwings besides a blue-black spot; ab. **radiatula** Std. like *verityi*, but the yellow area from the base of the hindwings intersected by blue-black streaks; ab. **zickerti** Hoffm. (Vol. 2, p. 23). — The var. **tenuissima** Bgff. (= *boisduvalii* Perlini) is a small yellow summer race from Sarracinesco and from Mt. Gennaro, at the end of July; transitions to the red form occur. — At Albano in the Alban Mountains the largest yellow race of *transalpina* occurs: var. **albana** Bgff., ♂ 17, ♀ 19 mm length of forewings. Red forms and transitions do not occur. — From Mt. di Mainarde (Villalattina), Mt. Sirente, in the first half July we have the very variable var. **latina** Vrtv. (4 d, e) generally with considerable adumbration of hindwings like *zickerti*. Yellow specimens are not rare, but are never predominant. The illustrated specimens are from Mt. di Mainarde, leg. QUERCI. — Of the var. *calabrica* Calb., Vol. 2, p. 23, (= *spicae* Stgr.) from Calabria very little has become known. Whether

*anticeconjuncta*.  
*flava*.  
*interjacens*.  
*quinqueguttata*.  
*pseudointermedia*.  
*privata*.  
*depauperata*.  
*trimacula*.  
*promunturii*.  
*anthrax*.  
*pinguis*.  
*parvimaculata*.  
*depauperata*.  
*pseudosorrentina*.  
*amplomaculata*.  
*circumscripta*.  
*diffusa*.  
*brunnea*.  
*litorea*.  
*pseudomaritima*.  
*pseudosorrentina*.  
*pseudocalabrica*.  
*depauperata*.  
*collina*.  
*depauperata*.  
*annulata*.  
*pseudosorrentina*.  
*sexmacula*.  
*gramanni*.  
*roseopicta*.  
*nigroinspersa*.  
*albicincta*.  
*depauperata*.  
*pseudomaritima*.  
*pseudolitorea*.  
*pseudocalabrica*.  
*posticebipuncta*.  
*postictripuncta*.  
*zickerti*.  
*annulata*.  
*tripicta*.  
*bipuncta*.  
*flavescens*.  
*xanthographa*.  
*verityi*.  
*centripunctata*.  
*radiatula*.  
*tenuissima*.  
*albana*.  
*latina*.



a separation from *sorrentina* is justified, must still be proved. — From the ligurian and etruscan Apennines and the Abruzzi Mountains (Mt. Gennaro and Mt. all' Autore, in July) subsp. **altitudinaria** Trti. (= *aestivalis* Oberth.) (4 e) is described. In comparison to *maritima* it is relatively small, with sparse scaling, forewings narrow and pointed, colour a duller red, spots without black circumscription. Ground colour green or blue-green, not heavily glossy; hindwing margins narrow. The ♂ illustrated originates from Mt. Majella (Abruzzi), 1600 m, leg. ROMEI. The following aberrations occur: ab. **privata** Costantini, see above; ab. **depauperata** Costantini, see above; ab. **amplomarginata** Rocci with wider margins to hindwings like *pinguis*; ab. **sorrentinaeformis** Rocci, specimens similar to *sorrentina*; ab. **cingulata** Trti. with a red belt. — A smaller and semitransparent parallel generation occurring in September is forma **autumnalis** Vrtj. — The subsp. **hilfi** Reiss (4 e) from the sea-board of Istria (Fuzine, Cologna) is a dainty race with pointed wings, a little smaller than *maritima*, 6 spotted, rarely 5 spotted. Margins of hindwings vary in the widths of *alpina*-, *maritima*-, and *litorea*. The underside of forewings has a fainter diffusion than is shown in *maritima*. The superficial blue gloss is considerably fainter, red brighter, more brilliant and inclining to greater yellow admixture. The ♂ type from Fuzine is illustrated. I should like to still mention a specimen from Bosnia (Korična), leg. LEONHARD, and a small series from the transylvanian Alps (Butschetsch), taken in August, leg. DANNEHL, in my collection which can only be mentioned here on account of the small number of insects. According to this the distribution of *transalpina* proceeds much further to the East than has been presumed hitherto. — subsp. **alpina** Bsd. (= *angelicae* Bsd., *angelicae* Dup., *transalpina* Vorbr., *helvetica* Rothsch. and *Beth.-Baker*), Vol. 2, p. 442 as ab., (4 e): the description of BOISDUVAL has had a curious fate. OBERTHÜR first included *alpina* under *transalpina*; later he considered it a *dubia* form from Digne. Type race from Grenoble on the Isère, in a wider sense Savoy and the western reaches of the Alps and as a subsp. of the entire territory of the Alps with the exception of the southern valleys of the northern Tyrol and Styria. The specimen illustrated according to OBERTHÜR is from Digne. The name *ferulae* Led. (Vol. 2, p. 23) is withdrawn. The following aberrations are known: ab. **reducta** Trti. (= *quinquemaculata* Vorbr.) without spot 6 on forewings; ab. **parvimaculata** Vorbr. with considerably reduced spot 3 or 4; ab. **confluens** Vorbr. with the spots confluent in all kinds of forms; ab. **omniconfluens** Vorbr. with completely confluent spots, so that only a little black is left; ab. **flava** Oberth., yellow instead of red. — The very large race of the Etsch Valley coming between *emendata* and *alpina*, occurring near Bolzano and neighbourhood is named by BURGEFF var. **athicaria** (= *costazina* Std.). Superficial gloss more pronounced than in *alpina*, in the ♂ generally blue, often with a purple sheen as in *maritima*, in the ♀ generally greeny-bronze. Hindwings with wider margins and generally with a pronounced cuneiform mark jutting out into the middle of the wing. A brilliant bright red. Here occurs ab. **cingulata** Bgff. with red abdominal belt. — var. **jugi** Bgff. (= *altissima* Bgff., *praeocc.*) (4 e) is a very pronounced high alpine race of *transalpina* from the Ortler territory. On the Stilfser Joch it occurs from 1800 m to 2400 m. The most important characteristics, which are not absent in a single specimen, are the narrow extended wings, the somewhat curved outer margin of the forewings, the short somewhat truncate antennae, the relatively short abdomen and the coarse and heavy hairing together with similar fringes, unusual in *transalpina*. The illustrated specimen is from the collection of BURGEFF. — The subsp. *astragali* Borkh. (Vol. 2, p. 23) (= *hippocrepidis* O.) (4 e) attaches itself closely to the alpine *transalpina*. The most important characteristics are the size, the truncate wing apex and the fact that spots 5 and 6 of forewings are almost always separate. The round spots of forewings and the hindwings are all a brilliant red inclining somewhat towards vermilion. The black part of the wings has a very pronounced gloss, generally blue in the ♂♂, more rarely green, in the ♀♀ almost always green. The type race occurs in the middle Rhine Valley from Thurgovia to Coblenz. Besides this *astragali* occurs in the border hills of the upper Rhine lowlands. The yellow form is ab. **flava** Spul. — Here we place var. **boica** Bgff. (= *bavarica* Bgff., *praeocc.*) from the surroundings of the Starnberger Lake. In regard to wing contour, it is habitually similar to *astragali*, it is less densely scaled than same and with fainter superficial blue or green gloss of the black parts of the wings. Therefore the black circumscription of the spots of forewings is less pronounced. The red often changing to brownish rosy red being inclined to show the rose colour of alpine specimens as well as the brilliant vermilion-like red of *astragali*. Spots as in *astragali*, 5 and 6 always separate, especially spot 4 with indicated white circumscription in the ♀♀, which in the ♂♂ can only be ascertained by means of a magnifying glass in the shape of a few white scales. Spot 4 sometimes pointed towards the base or conjoined with single minute red dots. Remarkable white tips to the antennae which in *astragali* are much less distinct. Margins of hindwings as in *astragali*. *astragali* and *boica* are the only 2 immigrant races to Germany of the Mediterranean *transalpina*.

BURGEFF has discovered 2 races in the Alps which in certain respects come half way between the central and Mediterranean *transalpina*. On the other hand they form an extraordinary characteristic group with their own individuality. It is subsp. **splugena** Bgff. (4 f) from the St. Bernard Pass and the lower Rhine Valley (Splügen), the larva of which feeds exclusively on *Hippocrepis comosa* and has never been found on *Lotus corniculatus*, therefore behaving like the central *transalpina* (the Mediterranean *transalpina* larva feeds frequently in the open on *Lotus* as well as on *Hippocrepis*). The insects differ from the *alpina* type, firstly through the shape of the wings, which whilst being wide have however a curved and not a simple rounded outer margin and therefore appear to be pointed. The spots of forewings are about double as large as in *alpina*, 5 and 6 are contiguous and incline to be confluent. Black margin of hindwings narrower than in *alpina* with a



slight bulge towards the middle of the wings. Red a brilliant bright carmine with a slight yellow admixture (some specimens show a yellowish fold area of hindwings). No trace of minium. Black parts of wings with dull blue gloss, much more finely and densely scaled than *alpina*. Only a few of the ♂♂ show a greenish gloss in the basal area of forewings, whilst the majority of ♀♀ show same. The specimens illustrated are from the collection of BURGEFF. ab. **flavinrubra** Bgff. has yellowish red colouration, having a regular mosaic of yellow and red scales and cannot be mistaken for the usual yellowish red form of *aurantiaca*. — Besides we have var. **jurassoboica** Bgff. from the districts around Reichenhall and Berchtesgaden, which approximates closely to *splugena*, but which has considerably narrower and even more strikingly pointed wings. Spots are large, in the ♂♂ apical spots close together, in the ♀♀ approximately in the degree of 1 to 3 confluent. Localities of *splugena* and *jurassoboica* are so widely separated, that a geographical relationship cannot easily be established, especially as the Inn Valley, that separates the two localities, is the habitat of *alpina*.

II. Central Group: In subsp. **hippocrepididis** Hbn. (= *astragali* Spul.) from Thuringia (Jena), southern Hanover, Lower Franconia, Neckar Valley, the wings, in comparison to *astragali* are more pointed, the spots more or less angular, 5 and 6 often confluent. The colouration and the superficial gloss are much duller and with a somewhat slighter admixture of vermilion; scaling considerably less dense. The following aberrations are named: ab. **rubescens** Bgff. (Weilderstadt in Wuerttemberg, Jena): spot 1 on costa of forewings is elongated, the other spots incline towards diffusion; ab. **huebneri** Bgff. the inversely marked form (illustrated by HUEBNER); ab. **cingulata** Bgff. with red abdominal belt; ab. **flava** (Kaufmann) Bgff., yellow instead of red. — The var. **jurassicola** Bgff. (= *jurassica* Bgff., praeocc.) (4 f) differs from *hippocrepididis* by its relatively shorter and wider wings, with which in most specimens we find a simultaneous reduction of spot 6. Further *jurassicola* varies by the shade of red being rather more brownish or yellowish. Swabian Alb (Geislingen on the Steige), franconian Jura (Eichstätt, Bavaria). The ♂ illustrated was taken at the Teck (Swabian Alb). Here we have ab. **flava** Kaufmann (4 f) from Hohenneuffen (Swabian Alb), yellow instead of red; ab. **brunneata** Przegendza from the Altmühl Valley, pale to dark brown instead of red; ab. **alpinoides** Reiss, rosy with small spots, spot 6 reduced in size, hindwings with heavy black margins; ab. **cingulata** Bgff. (see above) and ab. **totirubra** Reiss (4 f) from the surroundings of Ulm with quite red forewings, only the apex and a narrow border at outer margin being black. — The hybrid **flammula** Bgff. was bred by BURGEFF, being a cross between *astragali* ♂ and *jurassicola* ♀. — Further the var. **allgaviana** Bgff. (= *jurassica* Bgff.) from the Algau Alps (Oberstdorf) which differs from *jurassicola* by the generally somewhat wider black margins to hindwings, but chiefly by the absence of the heavy green or blue gloss of the black parts of forewings, the dull black instead of glossy body and the longer scaling and hairs. Among these we find ab. **cingulata** Bgff.

Joining up here we have the subsp. **centralis** Oberth. in Vol. 2, p. 442 as ab. (4 g) from Central and S.W. France (as-type race), neighbourhood of Paris, Pont de l'Arche, Chartres, in July; the Pyrenees, Catalonia, New Castile. Smaller than *alpina*, red more vermilion colour. Spots 5 and 6 confluent, occasionally all spots conjoined. The specimen illustrated is from BURGEFF's collection. Aberrations are: ab. **nigricans** Oberth. in Vol. 2, p. 23, (= *brunnea* Dziurz.) and ab. **flava** Oberth., yellow instead of red. — The following races are described: var. **centripyrenaea** Bgff. (= *alpina* Oberth.), differing from *centralis* by more truncate apex, especially of hindwings, duller colouration, heavier margins to hindwings and very long hairs on abdomen together with unusually long fringes to the wings. High Pyrenees (Vernet les Bains). — var. **centricataloniae** Bgff. (4 f) with much narrower and more pointed wings than specimens from the Pyrenees, with very dense scaling, deeply blue or green glossy with brilliant vermilion red spots and hindwings. Body smooth, but inner angle of hindwings often with long fringes. Spots small, 5 and 6 in fifty per cent of the specimens being confluent. Relatively deep black margins to hindwings. Catalonia (Mount Serrat; Mount Tagamanent, 50 kms north of Barcelona). The specimen illustrated is from the Collection of BURGEFF. — var. **philippsi** Romei (4 g) from New Castile (Cuenca), Huelamo, 1200 m, is the same size and colouration as the former, but spots 5 and 6 are separate and the margins of hindwings are narrower. The specimens illustrated were collected by O. QUERCI, the ♀ illustrated inclines to be confluent. — var. **hispana** Vrtz. based on a single specimen with locality label "Valencia" and therefore rather doubtful, looks similar to a typical *sorrentina*; the 6 spots of forewings have white circumscriptions. — BURGEFF gives the name of var. **aestivoprovincialis** to a *provincialis* (see below) form occurring in the summer (July) in the neighbourhood of Marseilles which is double as large and with much wider wings. — The var. **provincialis** Oberth. (Vol. 2, p. 442 as ab.) flies in September and is a pronounced autumn race from the delta of the Rhone and Var.

Here follows subsp. **occidentalis** Oberth. (4 g) (Vol. 2, p. 442 as ab.) from West France (Charente, Vendée, in May and in August). The specimen illustrated is from Auzay. Red vermilion colour. Spots often enlarged and consequently touching. Spot 6 attached to spot 5. There is an inclination to the formation of a red abdominal belt. Hindwings with narrow black margins. In ab. **vertebralis** Le Charles from Aignes the upperside of abdomen is scaled throughout the middle with red. The ab. **cingulata** Hirschke (= *micingulata* Oberth., *semicingulata* Seitz) and ab. **mitosa** Cand. belong here. The names *vigei* Oberth., *rosea* Oberth., *pallidior* Oberth. (Vol. 2, p. 442) are withdrawn.



A very large form was brought from the North Caucasus by KORB, which is represented both in BURGEFF's and my collections and which I should like to mention. The red is carmine with an admixture of yellow, ground colour black, almost without blue sheen; hindwings fairly heavily, but irregularly margined with black. Underside paler, cloudy streak present between the spots. Abdomen very long and heavy. The specimens belong according to their appearance to *transalpina*, but transition links with same are absent. As *korbi*. this interesting form deserves a name, I introduce same in honour of its discoverer as **korbi** (4 g). The question as to whether this is a subspecies of *transalpina*, I must leave unanswered.

The larva of *transalpina* feeds on *Hippocrepis comosa*, *Coronilla varia*, *montana*, *emerus* and *vaginalis*, as well as *Lotus corniculatus*.

*elegans*. **Z. elegans** Bgff. (4 g, h) (= *loti* Hbn., *angelicae* var. *Aschenauer*) from the Swabian Alb (Geislingen) is larger than *transalpina-jurassicola*; wings relatively narrower with very little blue or green gloss, six-spotted, bright carmine. Spots 5, 4 and especially 3 taper in a point towards the base, spot 3 generally cuneiform, varying to the shape of a comma. The spot formation reminds one strongly of *cilicica*; spot 6 is conjoined with spot 5 by a red bar. Underside of forewings is covered by a red cloud to somewhat beyond the spot area, like in *jurassicola* although less dense. Hindwings pointed, red with narrow black margin, only bulging faintly. Abdomen black; antennae slender with truncate tip and scarcely thickened club. The specimens illustrated are from Geislingen on the Steige. Aberrations named are: f. **sexmaculata** Reiss (4 h): spots 5 and 6 separate; f. **quinquemaculata** Reiss: Spot 5 round and without the attached spot 6; ab. **cingulata** Bgff. (= *cingulata* Reiss) with red abdominal belt; ab. **splendida** Reiss (4 h) (Hohenneuffen): Spot 1 and 2 confluent, Spot 3 and 4 enlarged and confluent, spot 5 and 6 generally conjoined to an enlarged almost round spot. The red diffuses chiefly along the media from the confluent spots 3 and 4 towards 5 and 6. Besides Spot 1 and 2 are generally united with 3 and 4 by red rays running chiefly along the veins. The ab. **confluens** Bgff. has all spots enlarged and conjoined by bold longitudinal streaks, being more rare than the frequent *splendida*; the ab. **extrema** Reiss (Hohenneuffen) has completely red forewings, only quite a narrow black margin is left on outer margin, apex black. — The hybrid illustrated by BURGEFF, *elegans* × *jurassicola* is denominated with **burgeffensis** Reiss.

The larva is larger than that of *jurassicola*, that occurs in the same localities. It is similarly marked to same with distinct black dorsal stripe, that can be absent in *jurassicola*. The hairs are shorter, about half as long as in the *jurassicola* larva taken for comparison. Food plants are firstly *Coronilla montana* Scop. and secondly *Coronilla varia* L. Cocoon similar to *jurassicola* but larger. The insect is very alert and shy and flies already in June at Geislingen and at the beginning of July at the Hohenneuffen. It sits by preference upon the flower heads of *Ligustrum vulgare*.

*angelicae*. **Z. angelicae** O. in Vol. 2, p. 22 and p. 442, plate 5 a, (= *latipennis* H.-Schäff.) from East Prussia (Osterode), Saxony, Bavaria westwards to the Isar, Bohemia, Moravia, Hungary, Poland, the northern Balkans to the greek frontier. In spite of particulars to the contrary from OBERTHÜR and VORBRODT *angelicae* does not appear to me to be definitely known to occur in Switzerland. OCHSENHEIMER mentions the localities of Dresden and Vienna and these represent the type race. I have not yet seen specimens from Dresden, but they are not likely to vary from the bohemian and austrian form. Besides the aberrations mentioned in Vol. 2, p. 22, the following occur: ab. **cingulata** Dziurz. (Vol. 2, p. 442); ab. **subdivisa** Std. with spot 4 distinctly divided into 2 spots. The name *carnea* Dziurz. is withdrawn. The ab. *doleschalli* Rühl (Vol. 2, p. 22) from the Carst is illustrated on plate 4 h.

*isaria*. The races to be mentioned are: var. **isaria** Bgff. so far the most western race from the Pupplinger-Au near Wolfatshausen, in the Isar valley and from Deisenhofen, S.E. of Munich. They are smaller, of opaque black with a regular green gloss in the ♀♀ and with almost pure carmine rose spots and hindwings. Only in a few individual specimens there is a trace of vermilion in the red. Colours are all dull, scaling not very dense. Varying from the normal larvae feed on *Hippocrepis comosa* in pine forests. — Then we have var. *transcarpathina* Hormuz. (Vol. 2, p. 22) from the Bukowina. — The subsp. **herzegowinensis** Reiss (= *balcani* Bgff.) (4 h) from the Herzegowina (Type race from Ubli), Bosnia (Korična) and Macedonia (near Hudowa) is darker and with wider margination of hindwings and more heavily haired. On the underside the red spots are no longer enveloped in a wide red cloud, but especially in the ♂♂ they are conjoined by a narrow red band. The ♂♂ with blue and partly green gloss, the ♀♀ faintly blue or heavily green glossy. Specimens from Bosnia and Herzegowina are larger than the type race of *angelicae*. The type is illustrated.

*rhatibonensis*. In the valley of the Danube around Regensburg (as Type race), Upper Palatinate, franconian Jura, the valley of the Main down to Gambach, we find subsp. **rhatibonensis** Bgff. (= *angelicae* Hbn.) (4 i). Smaller than the former purely 5 spotted races, six-spotted. The specimens illustrated are from Regensburg. The five-spotted form **pseudoangelicae** Reiss occurs fairly frequently; the ab. **elegantoides** Reiss has the same formation of spots as *elegans* Bgff. with spot 6 widely attached to spot 5, forming an open angle towards the



apex. — The hybrid from the crossing between *angelicae* subsp. *rhatibonensis* ♂ and *transalpina* v. *jurassica* ♀ was bred by PRZEGENDZA and named **angelicojurassica**.

*angelico-  
jurassica.*

The larva feeds on *Lotus corniculatus* L. and *Coronilla varia* L.

**Z. ephialtes** L. in Vol. 2, p. 23/24 and p. 442/443, (= *falcatae* Hbn.) from central and S.E. Europe (westwards to the Pyrenees), Balkans. Great difficulties are encountered in establishing races of this species. The polymorphism of the species, which is purely due to a combination of factors, obscures homogeneousness of local races in the formation of larger geographic groups. I mention the forms under which *ephialtes* can occur, as aberrations and then the races so far known without enumerating the forms. Besides the forms mentioned in Vol. 2 the following are named: ab. **herrichschaefferi** Bgff. (= *ephialtes* H.-Schäff., *costaflava-bipuncta* Le Charles, trans. diffusa) from Martigny-Ville, Valais. It has a 6th spot indicated in the hindwings that may be white or red and is situated below the white spot 5, which is always present; ab. **wulschlegeli** Oberth. from Martigny-Ville (Vol. 2, p. 443) (4 i), illustration according to OBERTHÜR; ab. **rubricauda** Bgff. ♂ with completely red anal clasp (Chwalynsk, Province Saratov); ab. **diffusa** Bgff. (Trautenau and Leipa in Bohemia, Martigny-Ville) with spots of forewings extending diffusely; ab. **atritella** Hirschke (Herculesbad): spot 3 of forewings absent (*trigonellae* form); ab. **ephialtoides** Reiss (Gera) the *ephialtes* form in mainly peucedanoid races; ab. **extrema** Reiss (Magdeburg) with brighter red, forewings with spot area liberally dusted over with red, also the abdomen almost to the tip; ab. **tringulata** Holik (Karlstein, Bohemia) with red abdominal belt on 3 segments; ab. **nigroictérica** Holik (Prague), the yellow *günneri*; ab. **nigroaeacus** Bgff., the yellow *metzgeri*; ab. **pseudocoronillae** Holik (Prague) six or five-spotted orange yellow ephialtoid form and ab. **acingulata** Francke. (Wiesenstein, Saxony) without red abdominal belt. The names *scheveni* Oberth., *esperii* Oberth., *pallida* Oberth., *adalberti* Oberth. and *pallens* Oberth., all in Vol. 2, p. 442/443 are withdrawn. Instead of *bahri* Hirschke (Vol. 2, p. 24) ab. **flavobipuncta** Favre is to be placed. The denomination ab. *peucedani* Esp. is only applicable to pronouncedly ephialtoid races. As a type race, the eastern race can be taken, which occurs principally in lower Austria and Hungary, especially in the forms *trigonellae* and *coronillae*. —

*ephialtes.*  
*herrich-  
schaefferi.*  
*wulschle-  
geli.*  
*rubricauda.*  
*diffusa.*  
*atritella.*  
*ephialtoides.*  
*extrema.*  
*tringulata.*  
*nigroie-  
terica.*  
*nigroaeacus.*  
*pseudo-  
coronillae.*  
*acingulata.*  
*flavo-  
bipuncta.*

The var. **borealis** Bgff. is the race from the north German lowlands (Magdeburg, Berlin) and the German Central mountains. It is found almost exclusively in the peucedanoid form with six deep coloured, almost carmine red spots. The white scaling even in spot 4 is almost always absent. Very rarely but nevertheless repeatedly found in the ab. *ephialtoides* Reiss; ab. *athamanthae* Esp. is not particularly frequent. — From central Bohemia (Karlstein) var. **bohemia** Reiss (4 i) has been nominated. This race, like the previous one, is most frequently found in the six-spotted peucedanoid form. Slightly smaller than *borealis*, spot 6 is strikingly reversional, often only minute, rarely quite absent, spot 4 is remarkably large and generally with white scales, also spots 3 and 5 often have white scales. Hindwings generally with wider black margins than *borealis*. In most specimens the red has a slight touch of yellowish. The race is extremely polymorphous, all forms occur with every kind of intermediary transition. The forms *coronillae* and *trigonellae* occur more rarely. The specimens of *bohemia* illustrated are the types. On plate 4 i and k we have illustrated the forms *prinzi*, *aeacus*, *ictérica*, *aurantiaca*, *metzgeri*, *günneri* and *herrichschaefferi* of the typical *bohemia* from Karlstein. — The var. **styria** Bgff. (4 l) from Upper Styria (surroundings of Thörl), Wachau is of very large build. The body is small in comparison with the very wide wings. Spot 6 is almost always absent. The red and yellow ephialtoid forms do not seem to occur in this race. The colouration is influenced by the considerable white admixture of the spots of forewings and the red thereby inclines to yellow. In more weakly developed specimens a more or less pronounced orange tinge occurs in hindwings. Melanic specimens are not rare in which the already very wide black margin of hindwings covers almost the whole space, only the place of spot 5 is left open. A ♂ from the collection of BURGEFF is illustrated.

*borealis.*  
*bohemia.*  
*styria.*

The var. **valesiaca** Bgff. (4 l) occurs in the Rhone Valley, in the Valais (Martigny-Ville) and is represented in many collections owing to the activities of Mr. WULSCHLEGEL. It occurs chiefly in red ephialtoid forms. The forms *coronillae*, *trigonellae*, as well as especially *peucedani* and *athamanthae* occur very rarely. The chief characteristic of this race is its variability, through which it differs considerably from the type race. The red dusting of the normal white forewing spots is unusually heavy. The ab. *sophiae* Favre (Vol. 2, p. 24) (4 l) with a second spot, that is always white on hindwings and that corresponds to the 4th forewing spot is not exactly rare here. The illustrated ♀ of *valesiaca* from Martigny-Ville is from the collection of BURGEFF, the illustrated ♂ of *sophiae* from the same locality is from my collection.

*valesiaca.*

The var. **albaflavens** Vrtz. (4 l) (= *meridionalis* Bgff., *praeocc.*; *meridiei* Bgff.) from the Etsch and Eisack valleys in the South Tyrol is typical there and occurs also in mid-Italy and the Balkan Peninsular, seems to be related to *styria*, although it almost always occurs in the *trigonellae* form. In regard to general appearance (size and wing contour) it is very similar to it. The sixth spot is sometimes indicated. A quite constant characteristic consists in the faint yellow colouration of the 2nd spot, that sometimes appears almost white. Illustration according to a specimen from Bolzano in my collection.

*albaflavens.*



The *ephialtes* larva feeds on *Coronilla varia* L. and in the South Tyrol besides also on *Coronilla emerus* L. A cross-breeding of *albaflavens* (Bolzano)  $\times$  *borealis* (Magdeburg) produced half in the *medusa* form and half in the *athamanthae* form.

- araratica*. **Z. araratica** Stgr. (Vol. 2, p. 24, plate 5 k) from Ararat in Armenia is at present mentioned as a species.
- dorycnii*. **Z. dorycnii** O. (Vol. 2, plate 5 d) from the Urals, Taurus, Armenia, Caucasus, North Persia. To the description of the type race from Russia (the Urals?) has to be added: Antennae and legs unicoloured blue-black. Forewings steel-green with violet brown fringes and 6 vivid red small spots. The spots are confluent on underside. Hindwings vivid red. Margin blue-black, narrower in the ♀ than in the ♂. As an aberration ab. **quinquemacula** Bgff. is mentioned, without the 6th spot; further the form **crocea** Schultz (Vol. 2, p. 442). — The var. **wagneriana** Reiss from Sultan Dagħ near Ak-Shehir is generally smaller than typical *dorycnii* and has considerably fainter blue gloss (instead of green gloss) on forewings. All forewings spots are red, but generally smaller than in *dorycnii*, especially in the ♂. The black margin to hindwings is occasionally very wide. — From Hadjin in the Taurus (as type) and from Erivan in Russian Armenia we have subsp. **senescens** Stgr. (Vol. 2, p. 23, plate 5 e). It is larger and with narrower wings than typical *dorycnii*. Spots 4 and 5 in dark specimens occur in the form of vertical streaks. Hindwings with wider black margins with a larger bulge. Spots reddish white, in worn specimens, white. Specimens with a red sixth spot from the Taurus are ab. **sextarubra** Bgff. and those with entirely red spots from Erivan are ab. **rubrimacula** Bgff. — The var. **crimea** (Bang-Haas i. l.) Bgff. (4 l) from Kertch in the Taurus is of half size with wide wings and very brightly coloured, with narrow margins to hindwings and roundish spots. The specimen illustrated is from the collection of BURGEFF.
- sextarubra*. **Z. johannae** Le Cerf from Morocco (Great Atlas), Jebel Tachdirt, 3000—3200 m: head black, palpi ochre-yellow; antennae blue-black, slightly clavate, truncate at tip. Collar and scapulae ochre-yellow; abdomen blue-black on top with scarlet red belt over 3 segments, tip ochre-yellow as also is the underside of abdomen and legs. Forewings are densely scaled, glossy green with 6 ochre-yellow spots. Spots 1 and 2 are oval, quite separate, 3, 4 and 5 are rounded off, forming a triangle. Spot 6 is in the shape of a narrow band, spot 2 is conjoined with spot 4. Underside with sparse scaling, spots enlarged and somewhat diffuse. Hindwings are scarlet with a wider black margin from apex to inner margin and narrowly margined with black at inner margin. The ♂ illustrated is a cotype from the National Natural History Museum in Paris. — The subsp. *rubrimacula*. **turbeti** Le Cerf (4 m) discovered on 1st July 1929 in Morocco (Middle Atlas), ich Bou Naceur, 3300—3400 m, is also illustrated from a ♂ cotype from the National Natural History Museum in Paris. It has a faint bluish sheen on forewings, the red is brighter, more carmine red. The spots of forewings are more yellow white, spot 1 on costa carmine red, spot 2 with a few carmine red scales, the round spots 3, 4 and 5 standing in triangle formation have fairly large carmine red dots in the middle, so that the yellow of the spots looks like a circum-scription, spot 6 also has similarly a narrow carmine red stripe. On underside the carmine red represses the yellow of the spots much more strongly than on upperside. The hindwings are slightly more widely margined with blue black. Underside of abdomen and tip of same shaded with blue black. Legs somewhat darker.
- crimea*. **johannae**. *turbeti*.

## Alphabetical List

of all palaearctic Zygaenidae mentioned in Supplement Vol. 2. Index and reference of original descriptions.

\* signifies that the form is also illustrated at the place quoted.

- |   |   |
|---|---|
| <i>abbastumana</i> Z. Reiss. Int. E. Z. Guben 1921, p. 176.             | <i>alba</i> (onobrychis) Z. Dziurz. Jahresber. Wien. E. V. 1906, p. 88. * |
| <i>abruzzina</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 25.           | <i>alba</i> (scovitzii) Z. Dziurz. Berl. E. Z. 1908, p. 13.               |
| <i>absoluta</i> Z. Dann. Lep. Rundsch. Wien 1927, p. 47.                | <i>albaflavens</i> Z. Vrty. Boll. Lab. Zool. Portici 1920, p. 39.         |
| <i>achaleea</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 70.            | <i>albana</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 78.                |
| <i>achillalpina</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 34.        | <i>albanica</i> Procr. Naufock. Verh. z. b. Ges. Wien 1924, p. 126. *     |
| <i>aeingulata</i> Z. Francke. Z. öst. Ent. Ver. 1920, p. 4.             | <i>albicincta</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1914, p. 63. *          |
| <i>actae</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 12.               | <i>albipes</i> Z. Vrty. Bull. Soc. Ent. France 1916, p. 289.              |
| <i>acticola</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 39.            | <i>albovittata</i> (azurea) Z. Vrty. Ent. Rec. 1920, p. 161.              |
| <i>adanensis</i> Z. Reiss. Int. E. Z. Guben 1928/29, p. 357.            | <i>albovittata</i> (stygia) Z. Vrty. Ent. Rec. 1920, p. 161.              |
| <i>adriatica</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 29.           | <i>alfacarensis</i> Z. Reiss. Int. E. Z. Guben 1921/22, p. 176.           |
| <i>adumbrata</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 22.           | <i>algarvensis</i> Z. Dziurz. Berl. Ent. Z. 1908, p. 52.                  |
| <i>adusta</i> Allopr. Draes. Iris 1926, p. 44.                          | <i>algecirensis</i> Z. Reiss. Int. E. Z. Guben 1927, p. 290.              |
| <i>aestiva</i> (orion) Z. Bgff. Mitt. Münch. Ent. Ges. 1914, p. 60. *   | <i>algerica</i> Procr. Rothsch. Nov. Zool. 1917, p. 345.                  |
| <i>aestiva</i> (zuleima) Z. Bgff. Mitt. Münch. Ent. Ges. 1914, p. 45. * | <i>allgaviana</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 82.            |
| <i>aestivalis</i> Z. Oberth. Lép. Comp. 1910, p. 642.                   | <i>alluandi</i> Z. Oberth. Lép. Comp. 1922, p. 159. *                     |
| <i>aestivoprovincialis</i> Z. Bgff. Mitt. Münch. Ent. Ges. 1926, p. 82. |   |



- alpestris* Z. *Bgff.* Mitt. Münch. Ent. Ges. 1914, p. 47. \*  
*alpina* Z. *Bsd.* Icones 1834, p. 65. \*  
*alpinoides* Z. *Reiss.* Int. Ent. Z. Guben 1922/23, p. 83.  
*alpiummicans* Z. *Vrty.* Ent. Rec. 1926, p. 102.  
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*alta* Z. *Reiss.* Int. E. Z. Guben 1921/22, p. 21.  
*altissima* Z. *Bgff.* Mitt. Münch. Ent. Ges. 1914, p. 51. \*  
*altitudinaria* Z. *Trti.* Boll. Lab. Zool. Portici 1910, p. 161.  
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## 2. Family: Epicopeidae.

### Genus: **Epicopeia** Westw.

Behind *E. mencia* Moore (Vol. 2, p. 35) insert:

**E. albofasciata** Djakonov (= albescens Moltr. i. l.). Somewhat similar to *mentia* but differing by the *albo-*  
wide white transverse bands and marginal spots. Forewings black, not brownish, hindwings with greenish *fasciata*.  
sheen, veins still darker and widely black. Forewings and hindwings with wide white middle band intersected  
by the black veins which towards the base touch the distal wall of the cell: proximally the band is straight,  
distally somewhat curved, stretching on upperside of forewings to vein 8, on hindwings extending from costa  
to inner margin in equal breadth and regularly curved, densely sprinkled with red along the costal margin and  
at the anal margin; subterminally there is a white band of large crescent shaped spots, the 2nd uppermost of  
which is displaced inwards. On hindwings there are 2 rows of large crescent shaped scarlet submarginal spots  
in same arrangement as in *mentia*. Palpi, scapulae and the lateral stripes of abdomen are red, the latter with  
black spots. Wing expanse 72 mm. Ussuri in the district of Spasskoje. A ♀ caught on the 5th July and a  
second ♀ in the collection of Dr. MOLTRECHT.

*E. hainesi* Holl. (= simulans Leech) (Vol. 2, p. 35, pl. 10 a). — **mipallida** Obth. from "Su-Chuan, on the *mipallida*.  
eastern frontier of Thibet", precisely resembles the ♀ illustrated as *sinicaria* in the above cited place, but the  
hindwings are ivory coloured on upperside and pure white on underside with the exception of a 4—5 mm wide  
sooty brown outer margin. — **pallesceus** Obth. from Siao-Ouisi is a *hainesi* (Vol. 2, pl. 10 a), but the basal 2/3rds *pallesceus*.  
of hindwings are paler whitish similar to *mipallida*, and the hindwings similarly show a considerably paler  
whitish patch in the disc.

*E. leucomelaena* Obth. has the form of *mentia* (Vol. 2, pl. 10 a), but the hindwings show small white  
spots behind the cell and red ones at the anal margin. From Yunnan, therefore not yet captured on palae-  
arctic territory.

## Alphabetical List

Index and Reference of original descriptions of all palaearctic Epicopeides mentioned.

\* signifies that the form is also illustrated at the place quoted.

**albofasciata** Epic. Djakonov Rev. Russ. Ent. 20, p. 384, 1926. \*

**leucomelaena** Epic. Oberth. Bull. Soc. Ent. Fr. 1919, p. 175.

**mipallida** Epic. Oberth. Lep. Comp. 17, p. 19, 1920. \*

**pallesceus** Epic. Oberth. Lep. Comp. 17, p. 20, 1920. \*







### 3. Family: Syntomidae.

We retain the name although HAMPSON latterly has introduced the name *Amatidae*. A great deal of attention has been given to this Family similarly to that of the *Zygaenidae* owing to the variation in the number of the spots. This has given us a host of names through which it is almost impossible to wade. It would of course have been better to introduce collective names, but unfortunately this has not been done. On the other hand through the conscientious studies of TURATI a large number of genuine species have been discovered. Nevertheless it is even to-day almost impossible to decide which is merely a form and which a species. Full recognition must be given to TURATI for the thorough way in which he has produced a classification table of the *Syntomis* species with 2 yellow abdominal belts. Generally speaking we have followed the lines laid down by him. In consequence of this we have been forced to slightly alter the sequence of the species from that given in the main Volume.

#### 1. Genus: *Syntomis* O.

TURATI has separated the palaearctic *Syntomis* with 2 yellow abdominal belts into 4 groups: 1. *phegea* group with small basal spot and larger preapical spot on the hindwings, 2. *melanocera* group with 2 equally large spots on hindwings, 3. *marjana* group with large basal and small or absent preapical spot and finally the 4. *bactriana* group in which the 2 spots on the hindwings are confluent forming a single large and often angular spot. For this reason we are classifying this group in a different sequence than in the main Volume. The spots of the forewings are counted as follows: spot 1 is the basal spot, spot 2 the one on the costa, spot 3 is the spot of the middle row that is situated on the inner margin, spot 4 is the apical spot, spots 5 and 6 the 2 spots below same situated at the outer margin.

##### A. Species with 2 yellow abdominal belts.

###### 1. *phegea* group.

**S. phegea** L. (Vol. 2, p. 38, pl. 9 a). With the extraordinary variability in the number and size of the spots one cannot be surprised that a correspondingly large number of names have been given, that might mostly be dispensed with. At the same time a number of races have been created in which naturally a similar number of aberrations might claim attention. — **repicta** Trti. is the form in which the costal spot of the antemarginal row, i. e. spot 4, is divided into 2 spots. — **septemmaculata** Müller has the middle of the 3 outer spots, spot 5, subdivided in 2. — **arcuata** Trti. has the basal forewing spot confluent with the inner marginal spot of the middle row, viz: spots 1 and 3. This aberration is shown in *kruegeri* as the illustration in Vol. 2, pl. 9 a. — **fenestrata** Ramme (Vol. 2, p. 444) has all spots increased in size and number. — **semidiaphana** Trti. is an extreme form where all spots of forewings are confluent. — **ornata** Skala also belongs to the *repicta* forms and exceeds *fenestrata* with supernumerary spots between Nos. 4 and 5 and below 6, as well as an increased number of spots on hindwings. — **orbiculifera** Zerny (= *phegea* ab. *Hafn.*, *punctulata* Vorbr.) has an unusually largely developed costal spot 2 with a black spot. The latter form has frequently been found in Carniola and Switzerland. — **divisa** Stdr. has the basal spot of hindwings divided. In contrast to the above, such forms with reduced number or size of spots have been named: — **monosignata** Trti. (5 a) with 6 forewing spots but with only the small preapical spot on hindwings. — **pfluemeri** Wacq. (Vol. 2, p. 38, pl. 9 a) with obliterated spot 6 on forewings and frequently only one on hindwings, this form occurs as an aberration in all localities of the main form and in fact in certain regions, as in the Riviera, in the Tyrol, may be described as a race. It is more delicately built and smaller than the aberrative *pfluemeri* of other localities. Another 5 spotted form from Trieste is: — **acelidota** Galv. with basal spot absent. — **phegeides** Spada also has only 5 spots on forewings in the pattern of an inverted "5". Here also the yellow collar mark is decidedly crescent shaped with the points towards the head; hindwings with 2 spots. — *phegeus* Esp. (Vol. 2, p. 38) has 4 spots on forewings, none on hindwings. — *sexmaculata* Gian.



*alveus*. (Vol. 2, p. 38) has only 3 on forewings, no spots on hindwings. — *alveus* *Dhl.* is similar on forewings but has 1—2 spots on hindwings. — *ochsenheimeri* *Trti.* has only 2 or one spot on forewings and one spot on hindwings. — *biga* *Stdr.* has only the 2 middle spots 2 and 3 on forewings, whilst hindwings are without spots. — *unipuncta* *Trti.* (Vol. 2, pl. 9 b as *cloelia*) has only one spot on forewings and no spots on hindwings. — *seminigra* *Spul.* (Vol. 2, p. 444) has no spots at all on forewings or one or the other is present in a minute size. Hindwings on the other hand have both spots. — *cyclopea* *Rag.* (Vol. 2, p. 38, pl. 9 b) is similar but hindwings only have one spot. — *cloelia* *Bkh.* is not correctly diagnosed in Vol. 2, p. 38, the description given there refers to *unipuncta* *Trti.* just described; *cloelia* has no spots on forewings and one spot on hindwings. — *iphimedia* *Esp.* (Vol. 2, p. 38, pl. 9 b) is correctly described quite black. — *analinigra* *Vorbr.* has uniformly black hindwings whilst forewings have the normal number of spots. — Finally all these spot variations can occur asymmetrically in the most varying combinations, as for instance right wings normal, left wings like *phegeus* or *cloelia* etc. DANNEHL has often observed such variations. Further specimens can occur as aberrations with entirely black antennae and this can occur in combination with all possible forms of spot markings: — *nigricornis* (*Dannehl* ? auct. nec. *Alph.*). This must of course be separated from the caucasian *nigricornis* *Alph.*, which is a genuine species and belongs to the *marjana* group. If the anterior yellow abdominal belt is missing it is named: — *puellula* *Stdr.*

The following races have been established quite apart from the above mentioned *pfluemeri* *Wacq.*: — *italica*. *italica* *Rocci*: is smaller than the typical *phegea*, more gracefully built, less densely scaled, especially in the ♀♀ which have therefore been compared with *herzi* by the author. In the ♂♂ the 6 spots are smaller and therefore placed further from one another. On the other hand in the ♀♀ the spots incline to be increased in size. *pfluemeri*. Specimens with 6 forewing spots and 2 hindwings spots are typical. We also have: — *pfluemeri* *Rocci* with 5 forewing spots and 2 hindwing spots, — *phegeus* *Rocci* with 4 forewing spots, the basal spot is absent, and one hindwing spot; — *monosignata* *Rocci* with 6 forewing spots and one hindwing spot; — *reducta* *Rocci* with 4 forewing and 2 hindwing spots, — *privata* *Rocci* with 5 forewing and 2 hindwing spots, in this case the first costal forewing spot is missing; — *parvipuncta* *Rocci* with minute spots, — *paupera* *Rocci* with 6 forewing spots and completely black hindwings without spots; — *repicta* *Rocci* with intersected apical spot on forewings, — *divisa* *Rocci* with subdivided basal spot on hindwings, here also occasionally in the ♀ the preapical hindwing spot can be double; finally we also have the — *fenestrata* form with increased number and size of all spots. This race occurs in Liguria to Genoa, in the Apennines of Piedmont and Emilia. A further race of Sorrento, but also in N. Italy further eastwards to Illyria is indicated as — *plinius* *Stdr.* According to its author it is a local race with definite characteristics, of large size and therefore remarkable to relate a contrast to the small *italica* also occurring in N. Italy! In this race *repicta* forms often occur, the basal mark of hindwings is generally cordiform. — Originally this was described as a genuine species but REVERDIN deems same identical with *pfaehleri*. *phegea* in accordance with his examination of the genitals: — *pfaehleri* *Krüg.* (5 c) limited to Lugano, in the Dolomite massif of the Monte San Salvatore; it is remarkable according to the indications of KRÜGER that *pfaehleri* occurs there end of May to middle of June, whilst from the end of June to the middle of July typical *phegea* and *pfluemeri* occur around Lugano. As *italica* *Rocci* was, also *pfaehleri* is compared with *herzi* *Trti.*: small thinly scaled, dull blue-black forewings with 6 spots, spot 3 cuneiform or comma shaped, spot 6 punctiform; the hindwings in ♂ with only one preapical spot, in ♀ with 2 spots. Wing expanse 25—35 mm. — *quinquemacula* *Krüg.* (5 c): spot 6 of forewings is absent. — *seminigra* *Krüg.* has hindwings entirely black. — In *quadrimacula* *Krüg.* spots 1 and 6 are absent, — *oblita* *Krüg.* spots 4 and 6. — *bipuncta* *Krüg.* only has spots 2 and 3, these are small and darkly dusted over. — *immaculata* *Krüg.* is unicoloured black-blue. — *centripuncta* *Krüg.* has spot 2 with a black dot. — *mixta* *Krüg.* (5 c) represents asymmetrically spotted specimens. The differences between *italica* *Rocci* and *pfaehleri* *Krüg.* do not appear to me to be clear. — *bessarabica* *Stdr.* shows a strong indication of relationship with the race from Sorrento *plinius* *Stdr.*, it has the same wing contour and large size, all the spots are enlarged and somewhat angular, otherwise they are similarly arranged as in *phegea*, the preapical spot on hindwings is large. It occurs in the district of Akerman in Bessarabia; similar specimens occur at Kieff only they are somewhat stumper in build.

## 2. *melanocera* group.

*melanocera*. **S. *melanocera*** *Hmps.* (Vol. 2, p. 445) (5 a) is the main representative of the small group in which the hindwings have 2 equally large round spots. Forewings short, apex rounded, black with slight violet-blue sheen, spots hyaline but not purely white, basal spot oval, spot 2 rectangular, spot 3 pear-shaped or trapeziform, the 3 marginal spots long and narrow, the apical displaced and nearer to the lower two. Antennae quite black. The yellow abdominal belts open on underside. N. China (Tsingtao, Wei-hai-wei) in July. Our illustration is from a specimen in the collection of TURATI.

*herzii*. **S. *herzii*** (*B.-H.* i. l.) *Trti.* (5 a). A smaller species which strongly resembles *phegea*, especially the forms of *italica* *Rocci* and *pfaehleri* *Stdr.*, like these it is not very densely scaled and not such a blue-black but rather inclined to be smoky brownish. Spots fairly large, those of the marginal row elongated. Hindwings with 2 spots of which the basal is usually larger than the preapical, therefore the classification here by TURATI does not seem to me to be completely plausible. Feelers quite black, the yellow abdominal belt open on the under-



side. Chingan Mountains (eastern Mongolia); Inn-Shan (Manchuria); province Chihli, Peking; occurring in July. The specimen for our illustration has been kindly placed at our disposal by Count TURATI, who gave the first description. On enquiry Mr. O. BANG-HAAS informs us that no other description exists.

**S. aequipuncta** Trti. (5 a) is exceedingly close to *phegea*; the wings appear to be somewhat more elongated, the apex of forewings more extended and acute, the blue gloss is slightly less distinct than in *phegea* but not so glossy as in *marjana*. The spots are pure white, fairly large, all more or less angular, especially the basal spot is obliquely quadrate; spot 3 is more vertically below spot 2 than in *phegea* and nevertheless closer to the anal angle because same is more flat, also spots 5 and 6 are not so obliquely under spot 4. On hindwings the basal spot is usually quadrate, often somewhat incised along the intersecting vein, even being bisected. Antennae whitish or grey at tips. Abdominal belts open on the underside. Occurs in Asia Minor and N. Syria (Eibes, Antitaurus; Lebanon; Malatia). — **parvipuncta** Trti. (5 a) has all spots reduced to half the size. Also from Eibes. Our illustrations are from specimens in the collection of TURATI.

*S. bicincta* Koll. (Vol. 2, p. 38, pl. 9 c).

3. *marjana* group.

**S. marjana** Stdr. (= *meridionalis* Stgr. and *B.-H.* i. l.) (5 b) is the main representative of this group in which the basal hindwing spots are always considerably larger than the preapical spots. The species is very large and robustly built, wing contour relatively sleek with acute apex of forewings, the black ground colour with very brilliant green-blue gloss, much more so than in *phegea*. Size 34—42 mm. Spots large to very large, pure white, semitransparent, spot 3 especially large and quadrate. Abdominal belt a brilliant reddish yellow open on underside; tips of antennae white or rather grey. Dalmatia, Monte Mariano near Spalato, Island of Lussin, Fiume, Istria. — **quercii** Vrt. (= *gigantea* Gian. i. l.; *macrophegea* S.-Rethel i. l.) (5 b) is the race from Central Italy (Monti Sibillini), Abruzzi and Sicily (Palermo). Of considerable size (36—47 mm), of wider wing contour, the forewings more deeply concave above the anal angle at outer margin. Forewings with less brilliant and more pronounced greenish gloss. — **repicta** Trti. spot 4 or also spot 5 intersected. — Specimens with reduced spots are named **parvipuncta** Trti. — **kammeli** Stdr. has only 5 spots on forewings. — **quadrigea** Stdr. has only 4 spots, spots 1 and 6 being missing. — **bimaculata** Stdr. has only spots 2 and 3 present. — **rebeli** Stdr. is 2—5 spotted on forewings, on the other hand the hindwings show a *repicta* form with a subdivided basal spot. — **degenerata** Stdr. is an especially small form with basal spot of forewings absent. — **cerberus** Stdr. has entirely black antennae. — **puellula** Stdr. has the anterior yellow abdominal belt missing. From Lagrado on the Isonzo STAUDER has described a — subsp. **sontiana** which looks like a dwarf form of *phegea* being small and stumpy, of narrower wing contour with more acute apex; apical spot reduced, spot 3 rhomboid. — **cataleptica** Stdr. is the black form entirely without spots “*iphimedia*” of *marjana* described from a ♀ from Spalato. — Larvae 40—42 mm long, black with 3 mm long brown tufts of bristles arranged in oblique rows with greyish silky gloss; head and legs claret-red; the 2 hemispheres of the head and the mouth being black.

**S. kruegeri** Ragusa (5 b) is now deemed to be a genuine species and should not be mistaken with the form of *phegea* which hitherto went under the name of *kruegeri* and which has now been renamed *arcuata* by TURATI. It is a very compactly built form, being close to *marjana*, but with much more truncate apex of forewings; less densely scaled with much duller metallic gloss, greenish violet. The spots not so clearly outlined being somewhat diffuse and faintly shaded over, not pure white; both hindwing spots very large the basal one being rounded trapeziform. In the name type spots 1 and 3 are confluent, in — **phegeoides** Trti. (5 c) they are separated; *repicta* forms as shown in our illustration also often occur. The smokey brown suffusion of the spots can be increased to such an extent that the 3 marginal spots almost entirely disappear under same and we then have: — **evanescens** Trti. If all the forewing spots disappear and only the large basal spot of hindwings remains, we have: — **cyclopea** Ragusa (Vol. 2, pl. 9 b). This form is only known from Sicily (Mte. Busambra). Count TURATI has kindly placed specimens at our disposal for our illustrations.

**S. ragazzii** Trti. (5 d) is a further species which outwardly reminds one more of *phegea*, but which is immediately recognisable by the curiously marked hindwings. Forewings a greenish blue-black with relatively little metallic gloss and densely scaled. Spots medium sized and therefore fairly far apart, spot 3 narrow and long, often almost only a streak, spot 6 usually very small or absent. On hindwings the basal spot is large, triangularly cordiform, the preapical spot very small. *repicta* forms also occur. — **pfluemeroides** Trti. (5 d) has only 5 spots on forewings, spot 6 being absent, on hindwings generally the distal spot is absent. — **phegeusida** Trti. has only 4 spots on forewings, only one on hindwings. — **pseudocloelia** Trti. has all spots on forewings absent or at the best 3 minute spots are present, on hindwings only the basal spot. — **mendax** Stdr. represents the form with typically spotted forewings, but with absent or only very minute basal spot on hindwings. — **inversa** Stdr. is similar to the *repicta* form on forewings, either with supernumerary spot between spots 4 or 5 or a spot 7 under spot 6; hindwings as in *mendax*. — **reinstalleri** Stdr. has hindwings without spots; on forewings only spot 2 is fully retained, spots 1 and 6 are absent and spots 4 and 5 are minute dots, spot 3 is absent or suffused with brown. — **pseudomarjana** Stdr. denotes a ♀ with spots elongated and rectangular, also the basal hindwing spot is widely rectangular, the preapical spot is dissolved into 2 cuneiform marks. — **decadica**



*Stdr.* the hindwings are typical, spot 6 is absent on the forewings whilst between spots 4 and 5 there are 2 additional dots inserted, the forewings therefore have 10 spots. From Naples, Sorrento, Calabria. The illustrations we owe to the kindness of Count TURATI.

*herthula.* **S. herthula** *Stdr.* (5 c). It still remains to be ascertained to what degree this insect has a right to claim to be a species. It certainly is apparently very close to *ragazzii* and is similarly built with the same wing contour, but the antennae are distinctly more delicate and shorter with a buff tip; abdomen shorter and somewhat weaker. Wings vary in colouration from blue-black to brownish, without gloss; abdominal belts are dull pale yellow. Basal spot of forewings very small, generally only punctiform, spot 3 narrow situate almost vertically. The subapical spot long, rectangular, generally larger than spots 5 and 6, the latter generally punctiform and near the margin. STAUDER differentiates meanwhile 2 local forms: — **salticola** *Stdr.* a delicate small high altitude form with almost extinct spots and: — **silvatica** *Stdr.* a larger more boldly spotted form from the lowlands with a greater blue sheen. According to the 3 types the following differences occur in the ground colours: — **danieli** *Stdr.* representing forms inclined to violet-blue, — **turbidepicta** *Stdr.* with wings inclined to brown and with suffused spots and — **cuprea** *Stdr.* with coppery brown tone to the wings. The following further names have been given: — **tenera** *Stdr.* with minutely small spots occurring chiefly among *salticola*. — **atavistica** *Stdr.* are exceedingly small *tenera* specimens from a partial 2nd brood that was bred; with elongated forewings and rudimentary hindwings. — **warneckei** *Stdr.* with basal mark absent on forewings; in — **phegeulus** *Stdr.* spot 6 is absent; in — **pseudoclelia** *Stdr.* only spots 2, 3 and 5 are present on forewings; — in **feuerherdti** *Stdr.* spots 2, 3 and 4. — **biga** *Stdr.* has only spots 2 and 3 on forewings, hindwings without spots. — **posticeprivata** *Stdr.* has normal spot marking on forewings, but hindwings without spots. — **felkeli** *Stdr.* has only spot 3 on forewings, hindwings only have basal spot, whilst: — **seminigroides** *Stdr.* has forewings without spots and hindwings with basal spot. — **philippsi** *Stdr.* corresponds to the completely black *iphimedia* form of *phegea*. — **puellula** *Stdr.* has the anterior abdominal belt missing. The extreme *silvatica* form is represented by — **marjanoides** *Stdr.* which is a specially large and boldly marked form. — **luetkemeyeri** *Stdr.* is a ♂ with especially well developed preapical mark on hindwings and finally — **repicta** *Stdr.* denominates various forms with supernumerary spots of forewings or hindwings. This entire series of forms is limited to the territory of Aspromonte. The illustrations are from specimens in the collection of TURATI.

*biga.* **S. nigricornis** *Alph.* (Vol. 2, p. 38 part.) (5 d) is smaller than the former. The preapical spot of hindwings is similarly very small, the basal spot large, roundish to cordiform. Wings black with blue metallic sheen. the 2 middle spots quadrate. Antennae quite black or dark black-grey. A form with spot 2 of forewings subdivided is named — **subdivisa** *Trti.* Caucasus (Borshom; Tiflis).

*rossica.* **S. rossica** *Trti.* (5 e). A small, pronouncedly brown species with faint coppery sheen. Hindwings with large well developed basal mark extending widely towards the inner and outer margins. Near to same a longish preapical mark; arrangement of spots on forewings is quite similar to that of *herthula*, but the spots are larger. Tips of antennae white. Described from a specimen from Saratov which was kindly placed at our disposal by Count TURATI for illustrative purposes.

*cocandica.* **S. cocandica** *Ersch.* (Vol. 2, p. 39) (5 d, ♀) is to-day no longer considered as merely a form of *maracandica* *Ersch.* as classified in the main Volume, but it is deemed to be a genuine species with pure white spots. In *maracandica* these have a yellowish tone. *cocandica* is a much larger species with wider wing contour and of more robust build. Wings with a vivid blue-violet gloss. Tips of antennae grey whilst in *maracandica* they are quite black. Abdominal belt is open on underside whilst in *maracandica* it is complete. Spots of forewings are smaller, especially the outer ones are round and not longish as in *maracandica*. Generally speaking *cocandica* appears to be more closely related to *ragazzii*. Hindwings only have a basal spot. Ferghana.

*caspia.* **S. caspia** *Stgr.* (Vol. 2, p. 39, pl. 9 d). The illustration is a good one; it must be presumed that this is a genuine species and similarly not merely a form of *maracandica*. It has pure white and not transparent spots.

*minuta.* **S. minuta** *A. B.-H.* (Vol. 2, p. 444) (5 e) with large quadrate basal spot on hindwings, entirely black antennae and yellow abdominal belt complete on underside. It can scarcely be merely a form of *caspia*. The pearly white spots of forewings are relatively large and slightly transparent. From Merw (Transcaspia).

*maracandica.* **S. maracandica** *Ersch.* (Vol. 2, p. 39 "maracandina" pl. 9 c) is as already mentioned under *cocandica* a genuine species with smaller round basal spot on hindwings, all spots yellowish and not transparent; a smaller species with elongated longer wings. The yellow abdominal belt is complete on underside; antennae quite black. Alai, Aulie Ata.

*postcaecata.* **S. sintenisi** *Stfs.* (Vol. 2, p. 39, pl. 9 d). A form without spots on hindwings is named: — **postcaecata** *Trti.*

*aurivala.* **S. aurivala** *Schaw.* is very similar to *sintenisi*. Ground colour metallic violet-black with the same yellowish spots as the previous species. Besides the golden yellow abdominal belt and the yellow spot at base of abdomen, also the thorax and collar are very strikingly coloured a golden yellow. It therefore can be presumed that this is a genuine species. Antennae extending to  $\frac{3}{4}$  of length of costa and yellowish at tip. In the name form the hindwings are without spots and violet-black, whilst in — **postmaculata** *Schaw.* they have a yellowish basal spot. Described from 9 specimens captured in May near Mosul.



*S. cyssea* Stoll (Vol. 2, p. 39, pl. 9 e).

4. *bactriana* Group.

*S. bactriana* Ersch. (Vol. 2, p. 39, pl. 9 c). — **repicta** Trti. is a form with supernumerary spot on forewings, *repicta*. subapical spot 4 having one or two minute adjoining spots. Sarafshan, Hissar Mountains, Samarkand.

**S. taurica** Hmps. (Vol. 2, p. 39) is a much smaller species, formerly considered to be a form of *antio- taurica*. *chena* Led. Forewings with little violet-blue lustre with small spots, especially the subapical spot 4 is very small, the hindwing spot is almost subdivided in two. Wing contour is relatively short and wide. The yellow abdominal belt nearly meets on underside. Antennae quite black. From Eibes (Antitaurus).

**S. antiochena** Led. (Vol. 2, p. 39, pl. 9 d) is larger than the former, with larger and clearer spots; of the *antiochena*. 3 outer spots, the middle one (spot No. 5) is usually the largest. The yellow abdominal belt forms a complete ring on underside. Tips of antennae white.

**S. libanotica** A. B.-H. (Vol. 2, p. 39) (5 e) is similarly a genuine species and not merely a form of *libanotica*. *mestralii* Bugn. or *antiochena* Led.; it is approximately an intermediate form; the shape of the spots is like *antiochena*, but they are larger, especially the spot on hindwings that almost reaches to the base. The spots show a somewhat impure white. The ♀ has better developed wings than either of the two forms mentioned above. Tips of antennae black or dark grey, the yellow abdominal belt forming a complete ring on underside.

**S. mestralii** Bugn. (= *kindermanni* Led.) (Vol. 2, p. 38, pl. 9 c) is larger than the former, spots very *mestralii*. large, creamy white, especially spot 3 is unusually large and trapeziform, also basal spot is large and angular. Contour of wings relatively wide, tips of antennae dark grey. — **gigantea** (Stgr. i. l.) Trti. (5 e) is a form with *gigantea*. exceptionally large spots, with predominantly creamy white hindwings with black margins. The tips of antennae are here inclined to be whitish. Also from Lebanon. — *palaestinae* Hmps. (Vol. 2, p. 39).

**S. turbida** Trti. (5 e) is a remarkable species, that belongs in the same group owing to the shape of the *turbida*. spot of hindwings. Thinly scaled, cloudy sepia brown with faint blue sheen. In the shape of the spots it corresponds most to *libanotica*, spots with more yellowish tone. Abdominal belt completely closed on underside, dull pale yellow. Tips of antennae dark grey, Lebanon. Count TURATI was so kind as to place the one of the two specimens so far known at our disposal for our illustration.

*S. fortunei* de l'Orza (Vol. 2, p. 39, pl. 9 d). In — **yezonis** Strd. spots 1 and 3 are confluent as in the *yezonis*. *curvata-kruegeri* forms. Japan.

*S. cingulata* Weber (= *anetta* Btlr.) (Vol. 2, p. 39, pl. 9 d).

B. Species without 2 yellow abdominal belts.

**S. hyrcana** A. B.-H. (5 f) is a very interesting species, forming in a way a transition from the related *hyrcana*. *mestralii* forms to the following species. The arrangement of the spots shows similarity with the latter but the basal spot is confluent with spot 3 and forms a wide longitudinal band; the spots show a decidedly yellowish colouration. Abdomen with a single yellow belt on segment 5. Antennae completely black. Persia (Sultanabad). Mr. OTTO BANG-HAAS kindly placed one of the only two known specimens at our disposal for our illustration.

*S. persica* Koll. (Vol. 2, p. 39, pl. 9 f).

**S. punkikonis** Strd. from Punkiko, Japan, is probably a form of *wilemani* Roths. (Vol. 10, p. 71) *punkikonis*. described from Formosa. Clypeus and breast are not pure white, but with creamy whitish scales; the veins are scarcely wider black submarginally than on the remainder of the wings; both wings have a creamy whitish inner marginal band. The small dark transverse band and the tip of abdomen are greenish black, as are also the 2 spots on thorax. Veins 4 and 5 of forewings and 3 and 5 of hindwings are subdivided at base.

**S. karapinensis** Strd. resembles *S. newara* Moore (Vol. 10, p. 70, pl. 10 i), but the wings are hyaline *karapinen- sis*. with only a faint yellowish sheen, veins, discal spot and margins jet black with faint greenish gloss; marginal band as narrow as a line, scarcely widening between 2 and 3; the 1st discal spot is curved convexly towards margin, a yellow spot at base. Hindwings with black marginal band of  $\frac{1}{2}$  mm width, extending somewhat as a dentation along vein 2; base and inner margin scaled with yellow. Body greenish black with yellow spots on scapulae, collar, middle and end of thorax, as well as 6 narrow abdominal belts. Antennae black. Forewings expand 16,5 mm. One ♂ from Karapin (Japan), captured in August.

*S. germana* Fldr. (Vol. 2, p. 40, pl. 9 g) illustrated from a chinese specimen, is once more illustrated here (5 f) from a specimen from Amur with almost completely yellow body and only exceedingly narrow black rings.



- takanonis*. **S. takanonis** Mats. Nearest to *germana*, but differing as follows: forewings of ♂ with very small hyaline spots scaled with yellow, a quadrate spot at base, much higher than wide; spot 2 oval, also spot 3 is oval almost vertically below spot 2; spot 4 is missing, 5 and 6 widely scaled with yellow; hindwings with large roundish basal spot incurved on outward edge on the submedian fold: fringes black, not yellow towards apex. Wing expanse: 30 mm. Honsho (Japan).
- genzana*. **S. genzana** Mats. closely resembles *perixanthia*. Body quite pale yellow, scapulae grey-yellow, legs brownish black. Forewings wider, hyaline spots larger, costa and inner margin grey; basal spot 1 is incurved outwardly, the cell spot truncate inwardly, spot 3 larger; subapical spot shortened. The basal hyaline spot on hindwings is not incurved on vein 2, the black apical area is much wider. Wing expanse: ♀ 39 mm. Corea (Gensan).
- changiana*. *S. acrospila* Fldr. (Vol. 2, p. 40, pl. 9 h). — **changiana** Strd. spots 1 and 3 of forewings are confluent as in the *krügeri* type. Huang-Mu-Chang (China).
- flavocincta*. *S. alicia mogadorensis* Blach. (Vol. 2, p. 444, Vol. 14, pl. 3 g). — **flavocincta** D. Luc. has the coppery red abdominal belts coloured yellow as in name type, but the spots of forewings agree with those of *mogadorensis*. Mogador, not rare.

#### 4. Genus: **Dysauxes** Hbn.

- punctata* F. (Vol. 2, p. 41, pl. 9 i). — *ragusaria* Zick. is now illustrated on pl. 5 g, also — *jamula* Frr. (5 f). — *modesta* Krul. is to be removed from the *punctata* forms, as according to SHELJUZHKO it is an *ancilla* form (vide there). — In *juncta* Hagn. (Vol. 2, p. 445) spots 3 and 4 are confluent with one another; occurs predominantly in Carniola, however elsewhere also among nametype form. — **quadripuncta** Stdr. has only 4 spots, the 5th in apex on costa is absent; not rare in the S. Tyrol. — **tripuncta** Stdr. is three-spotted, the upper basal spot and the costal spot at apex are missing; rare among specimens from Trieste. In the two-spotted — *bipuncta* Stdr. (5 g) there is only one basal spot and the “*juncta*” mark, viz: spots 3 and 4 conjoined. Rare, has been observed in the Etsch Valley and in Istria. — **depravata** Stdr. only has the basal spot, all others extinct; Trieste, Central Dalmatia; Batna (Algeria). — **lacrimans** Stdr. has unusually elongated spots, partially comma-shaped and also guttiform. Described from Gorizia. — **minuta** Stdr. (= *virinea* Dhl.) (5 g) in which the spots (in full number or partly absent) are reduced to minute and scarcely visible dots, these differ from — *parvigutta* Chr. (Vol. 2, p. 42, pl. 9 i) from Turkestan with a similar description, as the latter is larger and has more extended wing shape and is also paler in ground colour. — **ochrea** Mill (Vol. 2, p. 445) (5 f) has spots of forewings a deep ochreous yellow. S. France and Dalmatia. — **semidiaphana** Stdr. has spots of forewings hyaline, bestrewn with dark scales. — **herthina** Stdr. (= *scorteia* Dhl.) (5 g) is a form with ground colour of forewings changed from brown to buff or yellow with a “touch of light brown”, forewings and margin of hindwings with metallic gloss; fringes paler than ground colour and with golden sheen. S. Tyrol, Dalmatia and Istria. — **imperfecta** Dhl. (5 g) have no cell-end spots on hindwings. All these named forms occur in numerous variations and combinations, as STAUDER has mentioned in his monograph (Ent. Ztschr. 35, p. 9 etc.). — **ancillaeides** Stdr. from Sorrento (Mte Faito) is described as a robustly built race (23—25 mm) of pale to deep ochreous colour with spot markings as in *punctata* but minutely small, suffused with ochre. Hindwings on the other hand as in *ancilla* with two small yellow spots beyond the basal mark towards apex. STAUDER presumes that possibly this is a hybrid form with *ancilla*. This is not very probable as Dr. DENSO described as — **punctilla** forms bred by ROBERT SEILER in the year 1902, which were hybrids of *punctata* ♂ × *ancilla* ♀ and which differ in no way from *ancilla*. A reciprocal cross-breeding proved infertile. In Spain besides *servula* Berce (Vol. 2, p. 42) we find — **servulina** Fdz. a form in which in the ♂♂ there are 3 small pale yellow spots in cells 2—4 of hindwings, adjoining the yellow inner marginal spot. — **burgeffi** f. n. (5 g) denominates a small form with relatively narrow wings, which resembles an extreme *ragusaria* (Vol. 2, p. 42) which is much smaller than the latter and only retains the 2 spots in middle of margin and these are heavily suffused with brown; disc of hindwings hyaline, dusted with brown, only very little yellow retained at inner margin. The same form, only slightly larger is advised from Greece. Type in the State Museum at Munich. — **taurica** f. n. (5 g) forms a transition to the following form. It originates from Adana and Armenia, is large with wide wings, ground colour of forewings a rich dark brown, all spots large, sharply outlined, creamy white and not hyaline; on hindwings the orange-yellow colour is limited to a narrow stripe below the cell and behind end of same. Type from Adana in the collection of DRAUDT. — **kaschmiriensis** Rothsch. (5 g) differs by its larger size and wider wing shape, the hyaline white spots are larger and more prominent, the wide hindwing margin is much wider. Kashmir (Goorais Valley) from 7000 ft. altitude.
- modesta*. *D. ancilla* L. (Vol. 2, p. 42, pl. 9 i). — **modesta** Krul. (= *inops* Dhl.) is the type of KRULIKOWSKY in the collection of SHELJUZHKO in which the small subapical dots above the two spots are absent. It is described from the mountains of Kinel near Basuluk, but occurs everywhere among the type form. — **inornata** Stdr. is a continuation in development of the last form, in which also the two normal spots are much reduced in size



and suffused with brown. Described from Trieste. — *bipunctata* Buresch is probably the same, but in the *bipunctata* description it says that the two still existing spots are white and therefore probably not suffused with brown. Bulgaria. — *virago* Schaw. is a ♀ form without yellow central spot on hindwings, which are unicoloured brown-*virago*. black. From Mostar. In regard to the hybrids with *punctata* vide remarks under that species.

### 5. Genus: *Apisa* Wkr.

Of this purely ethiopian Genus, which has been dealt with more fully in Vol. 14, p. 51, a palaearctic representative has been discovered in Cyrenaica. They are heavy bodied insects which are found at light at night. Proboscis rudimentary, palpi porrect, hairy. Antennae of both sexes bipectinated, shorter in ♀. The entire body densely haired. Veins 4 and 7 of the small hindwings are absent. The only species resembles the Genus type: *canescens* Wkr. that occurs northwards of Sierra Leone and is possibly a subspecies of same.

*A. manettii* Trti. (5 f). Smaller than *canescens* Wkr. (Vol. 14, p. 52) with more truncate apex. Wings *manettii*. transparent, impure brownish white with somewhat darker veins, also the subcostal area is more densely covered with dark hairs; fringes of ♂ whitish, of ♀ brownish. Body densely covered with grey-brown hairs; shaft of antennae whitish, pectinations brownish. Bengasi (Cyrenaica); August to October.

### Alphabetical List

with references to the original descriptions of the forms of palaearctic Syntomidae.

\* signifies that the form is also illustrated at the place quoted.

*acelidota* Synt. *Galvagni* Verh. Zool. bot. Ges. Wien, 74/75, p. (2), 1926.  
*aequipuncta* Synt. *Trti.* Atti Soc. Ital. 56, p. 216, 1917. \*  
*alveus* Synt. *Dhl.* Ent. Z. 42, p. 85, 1928.  
*analinigra* Synt. *Vorbr.* Mitt. Schweiz. Ent. Ges. 13, 1920.  
*ancillaeides* Dys. *Stdr.* Ent. Anz. 9, p. 170, 1929.  
*arcuata* Synt. *Trti.* Atti Soc. Ital. 56, p. 215, 1917.  
*aurivala* *Schaw.* Verh. Zool. Bot. Ges. Wien 1923, p. 161.

*bessarabica* Synt. *Stdr.* Iris 38, p. 219, 1924.  
*biga* Synt. *Stdr.* (herthula) Ent. Anz. 1, p. 117, 1921.  
*biga* Synt. *Stdr.* (phegea) Ent. Anz. 1, p. 116, 1921.  
*bimaculata* Synt. *Stdr.* Ent. Anz. 1, p. 18, 1921.  
*bipuncta* Dys. *Stdr.* Ent. Z. 35, p. 16, 1921.  
*bipunctata* Dys. *Buresch* Arb. Bulg. Nat. Ges. 14, p. 19, 1914.  
*burgeffi* Dys. *Drt.* Seitz, Macrolep., Suppl. 2, p. 58. \*

*cataleptica* Synt. *Stdr.* Mitt. Münch. Ent. Ges. 14, p. 59, 1914.  
*centripuncta* Synt. *Krüg.* Soc. Ent. 34, p. 44, 1919.  
*cerberus* Synt. *Stdr.* Ent. Anz. 1, p. 118, 1921.  
*changiana* Synt. *Strd.* Arch. Nat. Gesch. 82, A, 2, p. 81, 1916.  
*cuprea* Synt. *Stdr.* Lep. Rundsch. Wien, 2, p. 217, 1928.

*dauieli* Synt. *Stdr.* Ent. Anz. 1, p. 118, 1921.  
*decadica* Synt. *Stdr.* Ent. Anz. 1, p. 116, 1921.  
*degenerata* Synt. *Stdr.* Ent. Anz. 1, p. 118, 1921.  
*depravata* Dys. *Stdr.* Ent. Z. 35, p. 16, 1921.  
*divisa* Synt. *Stdr.* (phegea) Ent. Anz. 1, p. 116, 1921.  
*divisa* Synt. *Rocci* (italica) Mem. Soc. Ent. Ital. 2, p. 10, 1923.

*evanesens* Synt. *Trti.* Atti Soc. Ital. 56, p. 217, 1917. \*

*felkeli* Synt. *Stdr.* Ent. Anz. 1, p. 117, 1921.  
*fenestrata* Synt. *Rocci* Mem. Soc. Ent. Ital. 2, p. 10, 1923.  
*feuerherdti* Synt. *Stdr.* Ent. Anz. 1, p. 117, 1921.  
*flavocingulata* Synt. *D. Luc.* Bull. Soc. Ent. Fr. 1924. \*

*genzana* Synt. *Mats.* 1. Coll. Agr. 19, p. 75, 1927. \*  
*gigantea* Synt. *Trti.* Atti Soc. Ital. 56, p. 222, 1917.

*herthina* Dys. *Stdr.* Ent. Z. 35, p. 16, 1921.  
*herthula* Synt. *Stdr.* Int. Ent. Z. 13, p. 204, 1920.  
*herzii* Synt. (*B.-Haas* i. l.) *Trti.* Atti Soc. Ital. 56, p. 224, 1917.  
*hyrcana* Synt. *A. B.-Haas* Iris 26, p. 107, 1912. \*

*inmaculata* Synt. *Krüg.* Soc. Ent. 34, p. 44, 1919.  
*imperfecta* Dys. *Dhl.* Ent. Z. 42, p. 86, 1928.  
*inornata* Dys. *Stdr.* Iris 29, p. 31, 1915.  
*inversa* Synt. *Stdr.* Ent. Anz. 1, p. 116, 1921.  
*italica* Synt. *Rocci* Mem. Soc. Ent. Ital. 2, p. 10, 1923.

*kaumeli* Synt. *Stdr.* Ent. Anz. 1, p. 118, 1921.  
*kaschmiriensis* Dys. *Rothsch.* Nov. Zool. 17, p. 441, 1910.

*laerimans* Dys. *Stdr.* Ent. Z. 35, p. 16, 1921.  
*luetkemeyeri* Synt. *Stdr.* Ent. Anz. 1, p. 117, 1921.

*manettii* Ap. *Trti.* Atti Soc. Ital. 63, p. 46, 1924. \*  
*marjana* Synt. *Stdr.* Ztschr. wiss. Ins. Biol. 9, p. 238, 1913. \*  
*marjanoides* Synt. *Stdr.* Ent. Anz. 1, p. 117, 1921.  
*mendax* Synt. *Stdr.* Ent. Anz. 1, p. 116, 1921.  
*minuta* Dys. *Stdr.* Ent. Ztschr. 35, p. 16, 1921.  
*mixta* Synt. *Krüg.* Soc. Ent. 34, p. 44, 1919.  
*monosignata* Synt. *Trti.* Atti Soc. Ital. 56, p. 215, 1917. \*  
*monosignata* Synt. *Rocci* Mem. Soc. Ent. Ital. 2, p. 10, 1923.

*oblita* Synt. *Krüg.* Soc. Ent. 34, p. 44, 1919.  
*ochrea* Dys. *Mill.* Cat. rais., p. 391, 1871—75.  
*ochsenheimeri* Synt. *Trti.* Atti Soc. Ital. 56, p. 215, 1917.  
*orbiculifera* Synt. *Zerny* Lep. Cat. 7, p. 18, 1912.  
*ornata* Synt. *Skata* Lep. Fauna Mähr. 2, p. 81, 1912.

*parvipuncta* Synt. *Rocci*, Mem. Soc. Ent. Ital. 2, p. 10, 1923.  
*parvipuncta* Synt. *Trti.* Atti Soc. Ital. 56, p. 216, 1917. \*  
*paupera* Synt. *Rocci* Mem. Soc. Ent. Ital. 2, p. 10, 1923.  
*pflachleri* Synt. *Krüg.* Soc. Ent. 34, p. 44, 1919.  
*pflumeri* Synt. *Rocci* Mem. Soc. Ent. Ital. 2, p. 10, 1923.  
*pflumeroides* Synt. *Trti.* Atti Soc. Ital. 56, p. 218, 1917.  
*phegides* Synt. *Spada* Nat. Siz. 12, p. 114, 1900.  
*phegeoides* Synt. *Trti.* Atti Soc. Ital. 56, p. 217, 1917. \*  
*phegeulus* Synt. *Stdr.* Ent. Anz. 1, p. 116, 1921.  
*phegeus* Synt. *Rocci* Mem. Soc. Ent. Ital. 2, p. 10, 1923.  
*phegeusida* Synt. *Trti.* Atti Soc. Ital. 56, p. 218, 1917.  
*philippsi* Synt. *Stdr.* Ent. Anz. 1, p. 117, 1921.  
*plinius* Synt. *Stdr.* Verh. z. b. Ges. Wien, 71, p. 13, 1921.  
*posteaecata* Synt. *Trti.* Atti Soc. Ital. 56, p. 220, 1917.  
*posticeprivata* Synt. *Stdr.* Ent. Anz. 1, p. 117, 1921.  
*privata* Synt. *Rocci* Mem. Soc. Ent. Ital. 2, p. 10, 1923.  
*pseudocloelia* Synt. *Trti.* Atti Soc. Ital. 56, p. 218, 1917.  
*pseudomarjana* Synt. *Stdr.* Ent. Anz. 1, p. 116, 1912.



- puellula Synt. *Stdr. Ent. Anz.* 1, p. 117, 1921.  
 punctilla Dys. (hybr.) *Denso Iris* 26, p. 135, p. 1921.  
 punctulata Synt. *Vorbr. Mitt. Schweiz. Ent. Ges.* 13, 1920.  
 quadriga Synt. *Ent. Stdr. Ent. Anz.* 1, p. 118, 1921.  
 quadrimacula Synt. *Krüg. Soc. Ent.* 34, p. 44, 1919.  
 quadripuncta Dys. *Stdr. Ent. Ztschr.* 35, p. 16, 1921.  
 quereii Synt. *Vrty. Bull. Soc. Ent. Ital.* 45, p. 233, 1913.  
 quinquemacula Synt. *Krüg. Soc. Ent.* 34, p. 44, 1919.  
 ragazzi Synt. *Trti. Atti Soc. Ital.* 56, p. 218, 1917. \*  
 rebeli Synt. *Stdr. Ent. Anz.* 1, p. 118, 1921.  
 reducta Synt. *Rocci Mem. Soc. Ent. Ital.* 2, p. 10, 1923.  
 reinstalleri Synt. *Stdr. Ent. Anz.* 1, p. 116, 1921.  
 repieta Synt. *Trti. Atti Soc. Ital.* 56, p. 215, 1917. \*  
 repieta Synt. *Rocci Mem. Soc. Ent. Ital.* 2, p. 10, 1923.  
 repieta Synt. *Stdr. Lep. Rundschau Wien* 2, p. 217, 1928.  
 rossica Synt. *Trti. Atti Soc. Ital.* 56, p. 219, 1917. \*  
 salticola Synt. *Stdr. Lep. Rundschau Wien* 2, p. 217, 1928.  
 semidiaphana Synt. *Trti. Atti Soc. Ital.* 56, p. 215, 1917.  
 semidiaphana Dys. *Stdr. Ent. Ztschr.* 35, p. 15, 1917.  
 seminigra Synt. *Krüg. Soc. Ent.* 34, p. 44, 1919.  
 seminigroides Synt. *Stdr. Ent. Anz.* 1, p. 117, 1921.  
 septemmaculata Synt. *Müller Int. Ent. Z.* 14, p. 77, 1921.  
 servulina Dys. *Fdz. Mem. Soc. Esp. Hist. Nat.* 15, p. 600, 1929. \*  
 silvatica Synt. *Stdr. Lep. Rundschau Wien* 2, p. 217, 1928.  
 sontiana Synt. *Stdr. Lep. Rundschau Wien* 2, p. 92, 1928.  
 subdivisa Synt. *Trti. Atti Soc. Ital.* 56, p. 218, 1917.  
 takanonis Synt. *Mats. I. coll. Agr.* 19, p. 74, 1927. \*  
 taurica Dys. *Drt. Seitz Macrolep. Suppl.* 2, p. 58. \*  
 tenera Synt. *Stdr. Ent. Anz.* 1, p. 117, 1921.  
 tripuncta Dys. *Stdr. Ent. Ztschr.* 35, p. 16, 1921.  
 turbida Synt. *Trti. Atti Soc. Ital.* 56, p. 223, 1917. \*  
 turbidepicta Synt. *Stdr. Ent. Rundschau Wien* 2, p. 217, 1928.  
 unipuncta Synt. *Trti. Atti Soc. Ital.* 56, p. 215, 1917.  
 virago Dys. *Schaw. Verh. z. b. Ges. Wien* 71, p. 163.  
 warneckei Synt. *Stdr. Ent. Anz.* 1, p. 116, 1921.  
 yezonis Synt. *Stdr. Arch. Nat. Gesch.* 82, A 2, p. 81, 1916.



## 4. Family: *Arctiidae*.

By Dr. M. DRAUDT.

The classification made in Volume 2 is retained here, although same does not completely comply with scientific principles. *Callimorphidae*, *Hypsiidae* and *Nycthemeridae* are not real *Arctiidae*, they differ in very material points, especially in the arrangement of vein 8 of hindwings. In the latter two families same is conjoined by a bar with costal wall of cell. In the *Callimorphidae* it is connected at the base directly with the upper cell nervure in a vesicular distension. On the other hand in genuine *Arctiidae* it rises independantly and attaches itself immediately to the costal wall of cell from which it only separates in middle of cell or behind same. The editor however laid stress on the fact (p. 43) that the classification he adopted was not supposed to be based on a scientific ordination of sub-families, but merely represented a lucid synopsis and sub-division. In order therefore to facilitate reference with the main Volume, we have retained the same sequence in this work.

The real *Arctiidae* are very subject to aberration which is natural when considering their vivid colouration and the arrangement of markings. In consequence an almost incalculable number of names have been created for the commonest species. Many of these are synonymous, because every happy collector or breeder has considered himself justified in giving his treasured specimen a name, without taking any trouble to find out whether a name had previously been given to this particular form. It is certainly very difficult to decide such a matter, as the publication of these particulars is made in numberless small local Journals, which are not easily accessible to everybody. In fact we ourselves are unable to guarantee that even in this work every single name has been conscientiously registered, although we have done our best in this regard. Generally speaking the aberrations take definite and similar directions and we have tried to arrange the many denominations to accord with the tendency and direction of the various variations.

### 1. Group: *Nolinae*.

#### 1. Genus: *Nola* Leach.

*N. tutulella* Zerny (5 h) should be classified behind *cucullatella* L. (Vol. 2, p. 44, pl. 10 b) to which it is *tutulella*. very close; antennae are similarly built, palpi somewhat shorter. It is slightly smaller with more pointed and purer grey forewings; the 1st transverse line is closer to the margin and more deeply curved and regular in its course; the outer transverse line is more oblique. Genitals differ considerably. From Albarracin in Spain. June and July. Larvae on *Crataegus*.

*N. distributa* Wkr. (= major *Hamps*.) (Vol. 10, p. 108, pl. 13 c and Vol. 14, p. 52, pl. 8 c as "magna"). *distributa*. This species that is known from indo-australian and african territories is well illustrated in the places cited above and seems to me to be very close to the subsequent species. It is advised as occurring in China.

*N. banghaasi* West (5 h) is described as being very close to *tristica* (Vol. 10, p. 108, pl. 13 a). Body *banghaasi*. white, abdomen brownish. Forewings white, sparsely dusted with brown with a black inner marginal spot at base and a similar one in centre; apex brownish; before and behind centre faint sinuate transverse markings consisting of streaks along the veins. Hindwings white, slightly cloudy at apex. From Ussuri. Mr. O. BANGHAAS was so kind as to place the cotype in his possession at our disposal for illustration.

*N. trilinea* Marumo is only known to me by description and illustration. As many authors do not *trilinea*. mention the generic name when giving their descriptions and as the collective name of *Nola* seems to be preferred, I cannot say, whether this species should really be classified here. It is white, palpi laterally brown; antennae bipectinated almost to the tip. Costa of forewings brown, marginal area suffused with brown, appressed



scales in centre and upper end of cell faintly brown; inner line fine, brown, angulated outwards in cell; from lower angle of cell there is a brown middle line to inner margin, the brown elbowed line is more or less punctiform, excurved below costa and on vein 5; the very indistinct subterminal is lined with brownish on inner side; fringes brownish with dark subdividing line. Hindwings white, clouded towards margin, fringes brown. Wing expanse 18 mm. Tanegashima (Japan).

*pulchella*.

**N. pulchella** Leech (6 b) is also only known to me by illustration and description. Yellowish white, palpi, clypeus and front legs, tarsi ringed with white. Abdomen with dark bands. Forewings with an oblique black and silver scaled small spot before the heavily undulate black antemedian line; a similar silvery scaled costal spot before the heavily excurved postmedian line and behind same there are several more similar spots in the postmedian area; marginal area brown in which is situate a white subterminal line consisting of three arcs with black spots in the arcs. Margin of hindwing cloudy. Japan.

### 1a. Genus: **Dialithoptera** Hmps.

This Genus is closely related to *Nola* and we would refer to what is written in regard to same in Vol. 10, p. 113. The difference is merely the presence of vein 4 on hindwings, which is absent in *Nola*; veins 6 and 7 are not stalked. On forewings vein 6 arises somewhat below the upper angle of cell. Antennae in both sexes bipectinated, serrated in apical third.

Type: *D. gemmata* Hmps.

*stellata*.

**D. stellata** Wilem. is very close to *gemma* Hmps. (Vol. 10, p. 113, pl. 13 g) from Sikkim. Head and thorax are white, abdomen darker; forewings with silky gloss, white, yellowish towards base, costal margin and area behind the postmedian brown, the latter itself is black and curved; subterminal line whitish, undulate and behind same a brown marginal line; both transverse lines are somewhat metallic with blue scales and there is a black appression of scales at close of cell. Hindwings grey-brown. Wing expanse: 26 mm. From Hondo (Japan).

### 2. Genus: **Roeselia** Hbn.

*R. albula* Schiff. (Vol. 2, p. 45, pl. 10 c). We are giving a better illustration (5 h).

*mesotherma*.

**R. mesotherma** Hamps. (6 a) is to be placed behind *albula* Schiff. (Vol. 2, p. 45, pl. 10 c). Body white, legs brownish. Forewings white, peppered with brown in basal costal area and in middle of margin, ochreous in discal area with exception of patch at inner margin which is peppered with darker brown; in middle of costal margin an ochre-brown spot with white edge; transverse lines ochreous brown, as is the inner edge of the white subterminal line. The white hindwings faintly clouded. Central China (Chungking).

*R. strigula* Schiff. f. *monachalis* Haw. (Vol. 2, p. 46) is now illustrated (5 h).

*grisea*.

**R. grisea** Hamps. (6 b) is classified by the author to the indo-australian Genus *Zia* Wkr. (Vol. 10, p. 112) which differs from *Roeselia* through vein 10 arising free from cell of forewings. In order not to introduce a further Genus, the species is retained here; it should be placed behind *strigula* Schiff. (Vol. 2, p. 46). Body grey-white admixed with brown. Forewings pale grey, peppered with darker scales; transverse lines blackish, the posterior one curved round close of cell touching the lower angle of cell; in centre and at close of cell dark appressions of scales; a blackish streak in centre of costa, from lower end of cell an undulate line continuing to inner margin; a dark subterminal line is indicated. The white hindwings dusted with brown. Central China (Hupeh, Lui-Shin-Tze).

### 3. Genus: **Mimerastria** Btlr.

*M. mandschuriana* Obth. (Vol. 2, p. 46, pl. 10 e). The rather too mathematically exact illustration is replaced here by a better figure (5 h). — subsp. **tygankovi** Kozh. established from 2 ♂♂ from the Sajon mountains at an altitude of 945 m, differs from the name type by a wider discal area on forewings, that is only faintly shaded with pale brownish at costa, further by the sharply pronounced reniform stigma, which is edged at each side with white and by darker hindwings.

### 5. Genus: **Celama** Wkr.

*leukostieta*.

*C. cicatricalis* Tr. (Vol. 2, p. 47, pl. 10 e). — **leukostieta** Schaw. is a form with pure white ground colour without darker scalings, from Bosnia. — The main type form, of which the illustration in the main Volume was not very successful, is being figured here again (5 h).



*C. confusalis* H.-Schäff. (Vol. 2, p. 47, pl. 10 f). — **fuscocurvata** Dhl. is an aberration with wide sinuated transverse band with black-brown centre, bordered by strikingly outstanding edges. Described from S. Tyrol. *fuscocurvata*.

*C. centonalis* Hbn. (Vol. 2, p. 47, pl. 10 f) (5 i). We are giving a fresh illustration of both sexes owing to the indistinct illustration in main Volume. — ab. **fasciata** Rebel has an outstanding dark central band. — **fumosa** Berger (= spitzzi Schaw.) is quite uniformly cloudy brown in contrast to the pure white *atomosa* (Vol. 2, p. 47, pl. 10 f). The 3 tufts of scale appressions are clearly visible. From around Vienna. — **holsatica** seems to be a separate race. Nicely marked with more pointed apex to forewings, hindwings with a fairly large shaded band before the margin from  $\frac{4}{5}$ ths of the costa to closely before the anal angle, which is absent in name form. It occurs on the Lüneburger Heaths to Holstein; very typical specimens are before me from Worpswede ex the collection of SOHN-RETHEL. *fasciata*, *fumosa*, *holsatica*.

*C. cristatula* Hbn. (Vol. 2, p. 48, pl. 10 f) (5 i). — **kindervateri** Schaw. has forewings suffused with smokey brown, only before the dark margin there is a fine white line. From Lower Austria (Piesingtal). — **praetexta** Chrét. is a form described from S. France with pure white forewings with very delicate but clear and sharply distinct markings. *kindervateri*, *praetexta*.

**C. subchlamydula** Stgr. (Vol. 2, p. 48) (5 i) is certainly a genuine species and not a form of *cristatula*. It has more elongated forewings with more oblique outer margin, is larger and decidedly more sleekly built; in consequence of the different shape of the wings, the antemedian runs more obliquely and at the same time is straighter; forewings not by any means darkly suffused; incrassation of scales at close of cell densely white. Hindwings paler than in *cristatula*. — **infantula** Kitt is smaller with still paler forewings and almost extinct darker central band with very sharply distinct black dots in the subterminal. Probably a genuine race from Corsica. *subchlamydula*, *infantula*.

**C. kruegeri** Trti. (5 h) of which a specimen was kindly lent to us by Count TURATI for illustrative purposes, is placed between the former and *thymula*. Forewings long, pointed and relatively narrow, pale ash-grey, incrassations of scales in centre and at close of cell densely brown; transverse lines of same form as in *cucullatella*, the outer one widely shaded with brown inwardly; marginal area as in *subchlamydula*; fringes grey with brown dots basally. Hindwings ashy grey with faintly indicated cell dots reflecting through. Sardinia (Cagliari) at the beginning of April. *kruegeri*.

**C. parvula** Chrét. is very close to *centonalis* but smaller, with yellowish white forewings with a heavy and distinct spot in disc on underside of forewings. Forewings peppered with ochreous brownish especially in subterminal area; the basal quarter of costa is brown, transverse lines delicate, white, the middle one widely shaded with brown forming a transverse band peppered with black; 2 black incrassations of scales, the 1st at the inner line, the 2nd in the central shade at close of cell; in front of the margin an undulate white subterminal and behind same a brown spotted marginal line. Hindwings white with brown cell spot. From Biskra. — Larvae are greenish or yellowish grey with wide silvery white dorsal line edged with brownish yellow. Subdorsal line is dark brown with warts of the ground colour. They feed on Heliotropium, Helianthemum and Rumex hiding on underside of leaves and pupating in a boat-shaped cocoon. *parvula*.

*C. chlamitulalis* Hbn. (Vol. 2, p. 48, pl. 10 f). — **lathonialis** Mill. is a very large form with dark brown central band which contrasts with the pure white postmedian. Barcelona. *lathonialis*.

**C. euphaea** Hmps. (6 a). Body grey peppered with brown; forewings grey-brown densely peppered with brown and black with faint traces of an oblique inner line, the appression of scales in centre of and at end of cell is black-brown; elbowed line is black with fine dentations, curving inwards under vein 3; a fine dark line at margin. Hindwings grey-brown with dark marginal line. W. China (Moupin). *euphaea*.

**C. squalida** Stgr. (Vol. 2, p. 48, pl. 10 g). Of this small species that is subject to such great variations a specimen from Egypt is illustrated which is white with dark bands and very different from the illustration in the main Volume. Wings of same were too acutely pointed. To the synonyms we have to add: (= *pumila* Snell., *griseus* Roths.) and to remove: *desmotes* Turm. *squalida*.

*C. innocua* Btlr. (Vol. 2, p. 48, pl. 10 g) is not synonymous with — **costimacula** Stgr. from Amur; in the name form there are rusty brown costal spots on the anterior and posterior transverse lines to the inner margin, these are absent in *costimacula*; the illustration in the main Volume refers to the latter. — **japonibia** Strd. (= subsp. 1 Hamps.) is the Japanese form in which the inner line is less angulated below the cell. *costimacula*, *japonibia*.

*C. thymula* Mill. (Vol. 2, p. 48, pl. 10 g); we are giving a better illustration here (5 i).

### 5a. Genus: **Kitanola** Mats.

Differing from *Roeselia* by the long upstanding palpi; antennae filiform, not ciliate. Scapulae with upright hairs. On forewings veins 4—6 arise from the disco-cellular nervule in equal distances, otherwise the same as *Roeselia*, viz: veins 7—10 arise stalked. Only one species:



*sachalinensis*. **K. sachalinensis** Mats. Only known to me from the description and an illustration that seems doubtful. Forewings pale yellowish grey with whitish lattice markings and a silky gloss; in centre of wings and near apex a few brownish scales. Hindwings clouded with paler fringes. Body yellowish white. Wing Expanse: 11 mm. S. Saghalin (Ichinosawa) from 1 ♀.

## 2. Group: **Lithosiinae**.

### 1a. Genus: **Hypeugoa** Leech.

Stunted proboscis; palpi porrect, short, not extending beyond clypeus; ♂ antennae with fine cilia; tibiae with long spurs, abdomen with glossy scales. Forewings with costa bulging at base, then almost straight, margin somewhat rounded; vein 2 arises from middle of cell, 3 from lower angle of cell from which 4 and 5 arise; 6 and 7 are stalked, similarly 8 and 9, 10 and 11 from the cell. On hindwings 6 and 7 with short stalk. Only 1 species:

*flavogrisea*. **H. flavogrisea** Leech is a fairly large species, head and thorax grey, peppered darker, antennae brownish. Forewings grey densely peppered with black-brown with darker discal band, somewhat narrower at inner margin, angulated outwards on its inner edge below the costa, the cell and on vein 1; the outer marginal line dentate; there is an irregularly dentate subterminal line. Hindwings reddish yellow like abdomen, the former peppered with darker scalings. Wing expanse: 44 mm. W. China (Ta-Tsien-lu).

### 3. Genus: **Psilopepla** Turn.

*yatungiae*. **P. margaritacea** Wkr. (Vol. 2, p. 51, Vol. 10, pl. 18 k). — **yatungiae** Strd. (= ab. 1 Hmps.) has a purer white ground colour, the brown transverse lines boldly developed in ♂. Yatung.

### 4. Genus: **Nudaria** Haw.

*alpina*. **N. mundana** L. (= *transparens* Retz., *nuda* Hbn., *hemerobia* Hbn.) (Vol. 2, p. 52, pl. 11 b). — **alpina** Uffeln is the larger (up to 13 mm expanse of forewings) and more intensively dark form from higher altitudes in Switzerland. The adumbration chiefly affects the margins of all the wings and the veins. — *dilucida* Spul. (Vol. 2, p. 52). We are illustrating (5 i) a specimen from the Abruzzi.

### 4a. Genus: **Meteugoa** Hmps.

*japonica*. **M. ochrivena** Hmps. (Vol. 10, p. 165, pl. 17 b). Of this small grey species with darker central band that is known from Assam and Borneo, a form — **japonica** Strd. has been discovered in Japan, which only varies slightly through having a darker median band. From Karapin.

### 5. Genus: **Comacla** Wkr.

*tramontana*. **C. senex** Hbn. (Vol. 2, p. 52, pl. 11 b). — **tramontana** Dhl. is the southern alpine race with deeper impure brown colouration, the central spot on both wings large and bold, also the row of spots is more prominent, scaling coarser and denser. Underside more dusky than name type form, the rows of spots before the outer margin clearer, generally being confluent forming a small band. Occurs especially in S. Tyrol. — ab. **karvajszyi**. **vajszyi** Dioszeghy is characterised by darker buff colour, densely peppered with black; forewings with 5 black lines and shaded submarginal band clouded with smokey blackish. It is not clear whether it is a race or an aberration. Hungary (Comitat Arad). — **fumosa** Bankes is a uniformly dusky smokey brown form from England.

### 8. Genus: **Parasiccia** Hmps.

*atroalba*. **P. punctatissima** Pouj. (Vol. 2, p. 54). — **atroalba** Strd. (= ab. 1 Hmps.) is a form of purer white, peppered with black both on thorax and forewings. — **atrosuffusa** Strd. (= ab. 2 Hmps.) on the contrary is heavily dusted with black. Both forms from China.

*perirrorata*. **P. perirrorata** Hmps. (6 a). White heavily peppered with black-brown, palpi spotted with black. Forewings with extinct subbasal band, a curved antemedian band that expands forming a spot on costa and a brown band before the postmedian line; a dot in centre of cell and above same a costal spot, a discal lunule at close of cell; subterminal irregularly angulated, a row of dots on margin. The white forewings are dusted with grey. W. China (Kia-ting-fu, Omei-shan).



11. Genus: **Miltochrista** Hbn.

*M. miniata* Forst. (Vol. 2, p. 55, pl. 11 d, e). A number of aberrations have been named; we illustrated in the main Volume the colour variation — *crocea* (not "crogea") Bign. (5 k) with pale yellow forewings with no trace of red, *flava* Krul. is presumably the same. — *virginea* Delahaye seems to be a similar form with *virginea*. lemon-yellow forewings and very distinct black markings and almost pure white hindwings — *deleta* Höfer *deleta*. (= *destrigata* Dhl. has no dentate transverse line in the disc and no basal strigula whilst the row of dots at margin is retained. From the S. Tyrol, Drautal and Vienna and probably occurring elsewhere. — *fasciata* *fasciata*. *Rebel* is a form in which the space between the transverse line and the outer row of dots is suffused with blackish whilst in — *philippsi* Costantini the narrow discal area is blackened, the two central lines are closely *philippsi*. approximated and become confluent on discoidal nervure; instead of dots in the submarginal area it is marked with fine lines. From 1 ♀ from Regium. — *confluens* Lamb. is a form in which the dentate line is confluent *confluens*. with the marginal dots. — *rosaria* Btlr. is being illustrated afresh (5 k).

*M. rufa* Leech (Vol. 2, p. 56, pl. 12 c). O. BANG-HAAS would prefer to see this classified in the subsequent Genus *Nudina* Stgr., and it might quite well be placed there, as outwardly it closely resembles *artaxidia* Btlr., as will be seen in comparing our two illustrations (5 k). — *ussuriensis* O. B.-H. (5 k) is not rose-red like the *ussuriensis*. chinese name type, but of orange colour with a grey band extending from the 1st third of costa to the centre of the wing, merging with the wide antemarginal band. There are black dots in the interstices of the somewhat reddish margin. Hindwings orange-yellow with black marginal band. S. Ussuri (Sutshansk). — ab. *flava* O. *flava*. B.-H. is denominated from a straw coloured ♀ from the same locality.

12. Genus: **Nudina** Stgr.

*N. artaxidia* Btlr. (Vol. 2, p. 56, pl. 11 f). We are giving a fresh illustration (5 k).

13. Genus: **Apaidia** H.-Schäffl.

*A. rufeola* Rbr. (Vol. 2, p. 57, pl. 11 f). The rather poor illustration of this rare insect is being supplemented by a better one from a perfect specimen from Rome (Coll. SOHN-RETHEL). (5 k).

13a. Genus: **Schistophleps** Hmps.

Of this Genus which has been dealt with in Vol. 10, p. 129 and which comprises 10 indo-australian species, a representative has now been found in palaearctic territory in Japan. It is very close to *Nudaria* from which it chiefly differs by the very wide costal area with supplementary veins. Besides subcostal nervure 6 is not stalked with 7 and 8 but rises below upper angle of cell and there is a No. 9 which is stalked with 10.

*S. bipuncta* Hmps. (Vol. 10, p. 129, pl. 15 h). This delicate transparent insect with brownish yellow *bipuncta*. lines and cell dots and which reminds one in its appearance of *N. mundana* L. (Vol. 2, p. 52) has also been found in Japan.

15. Genus: **Paidia** Hbn.

*P. murina* Hbn. (Vol. 2, p. 57, pl. 11 f). — *fuliginosa* Reisser denominates the race from Sierra Nevada, *fuliginosa*. of dark grey ground colour like *P. muscerda* without any yellowish admixture; hindwings are scarcely any paler. — *conjuncta* Shzo. (Vol. 2, p. 57) is being illustrated here (5 l) and also the large white form — *albescens* Stgr. (5 l) from Syria.

*P. bodenheimeri* sp. n. (5 k) reminds one somewhat of the form *albescens* Stgr. of the preceding species, *boden-* but it is only half the size and much more daintily built and more thinly scaled. Besides it can be immediately *heimeri*. recognised by the entirely different antennae, which in the ♂ are shortly pectinated, very dense and coarsely on dorsal side, scaled with brownish yellow, whilst in *murina* they are bluntly serrate with tufty cilia each with long pinnae. White; head and collar faintly suffused with brownish yellow, palpi black-brown. Costa of forewings black-brown to centre; arrangement of spots very similar to *murina*, but the spots are not so distinct and black, but more diffuse, very small and grey-brown, the large heavy spot in middle of cell is often only minute and diffuse; there is often a longitudinal streak of grey-brown in fold of cell, in fact all spots inclined to be distorted forming longitudinal streaks; a wide brown-grey spot is situate above close of cell. Hindwings devoid of markings. Described from 4 ♂♂ from Dilb near Jerusalem taken at light and kindly placed at our disposal by Dr. FRITZ S. BODENHEIMER.



17. Genus: **Asura** Wkr.

- discisigna.* **A. discisigna** Mr. (Vol. 10, p. 153, pl. 17 k). This species that occurs in Assam and further in Borneo has been discovered in China (Szechuan), Kwantung and Omi-hsien by the expedition under STÖTZNER. Forewings pale yellow, not orange, with a discal dot; specimens from Shantung show beyond same a suffused wide dark band and a similar submarginal band. Hindwings quite yellowish white without markings.
- diluta.* **A. diluta** Draes. To be classified between *metamelas* Hmps. (Vol. 10, p. 144, pl. 17 d) and *dasara* Mr. (Vol. 2, S. 59, pl. 11 h). Thorax yellow with black dots over collar and thorax, abdomen blackish with yellow hairs. Forewings with black basal spot on and below costa, the one on the costa extends in a dark streak; discal area pale slate, base and margins, apex and fringes yellow, also a costal spot in the posterior 3rd of cell which is edged with a narrow dark spot. Hindwings yellow-grey, dusky towards apex; inner margin and anal angle and fringes, yellow. China (Ta-tsien-lu, Kwantung).
- intermedia.* **A. intermedia** Marumo is related to *obsoleta* Mr. (Vol. 10, p. 146, pl. 17 e). Yellow, thorax without black dots, tibia and tarsi ringed with black; forewings with black basal spot, subbasally and before the centre two rows of black dots, with an oblique row in centre and a transverse band posterior to same forming long indentations on upper median and 2 subcostal nervures; subterminally there is a row of black dots, the one on upper median nervure being displaced towards the base. Hindwings transparent yellow. Wing expanse: ♂ 18 mm, ♀ 21 mm. Yakushima (Japan).
- irregularis.* **A. irregularis** Hmps. (6 a). Body white with a black mark at vertex, anterior tibia with brown band. Forewings white, costa with reddish shade in middle, at base dusted with black; with black streaks subbasally below cell and above inner margin, with 3 black transverse lines anterior to, in and posterior to centre, the last named being heavy and irregularly dentate; a black spot at close of cell and an arched row of dots subterminally on veins. Hindwings white with rosy hue, similarly underside of forewings. Hainan.

18. Genus: **Philea** Z.

- Ph. irrorella* Cl. (Vol. 2, p. 59, pl. 11 i). — There are the following synonyms to the coffee-brown form *fumosa* Sandbg. (Vol. 2, p. 59): *fumata* Strd., *brunnescens* Hirschke, these dusky forms occur occasionally over the entire territory in which this species occurs; if this dark colouration occurs in the form *andereggii*, we have — **brunnea** Vorbr. Still darker melanic specimens are named — **rica** Frr., these occur for instance in the Engadin. An interesting small form — **pseudokuhlweini** Vorbr. is more densely scaled and a deeper yellow than name form but is identical with same in formation of antennae and neurulation; black spot-marking on wings bold and clearly outlined, but not so heavy as in *kuhlweini* Hb., with which it might be mistaken.
- brunnea.*  
*rica.*  
*pseudo-*  
*kuhlweini.*  
*pontica.* From warm localities in S. Switzerland (Airolo, Chiasso etc.). — **pontica** n. (5 m) are small specimens with remarkably narrow and acutely pointed wings with oblique outer margin, a pale form from Pontus. The forms — *lata* Christ. and — *flavicans* Bsd. are illustrated (5 l) from typical specimens.

19. Genus: **Cybosia** Hbn.

- C. mesomella* L. (Vol. 2, p. 60, pl. 11 k). The type is the pale ivory-yellow form. Specimens that are darker yellow to orange-yellow are named — **flava** Preiss. (= *mesomellula* Strd.). Pure white specimens also occur and these are named — **albescens** Closs (= *albida* Cathérine) (5 l). — **cremella** Krul. (= *eremella* Vorbr.) is a pale whitish form in which the two black discal spots are entirely absent; it is to be met with occasionally everywhere.

20. Genus: **Endrosa** Hbn.

- E. roscida* Schiff. (Vol. 2, p. 60, pl. 11 k). — **brunnea** Vorbr. are dusky deep brown specimens which are to be found everywhere, more frequently in Switzerland. In — **transversa** Vorbr. the central row of spots forms a transverse band. — **baltica** Wahlgr. is paler, yellowish white, costa, outer and inner margins pure yellow; hindwings deep yellow with blackish at base. Described from Oeland. — **bosniaca** Rebel is similar to **brunnea** but the wings are not dusky deep brown, although forewings and hindwings are adumbrated blackish; from the Maklen Pass (Bosnia). — **signifera** Rebel corresponds to *signata* of *irrorella*, viz: there is a short longitudinal streak below costa and above inner margin and further an excurved angular mark in the disc. Described from Hungary.
- brunnea.*  
*transversa.*  
*baltica.*  
*bosniaca.*  
*signifera.*
- E. kuhlweini* Hbn. (Vol. 2, p. 60, pl. 11 k, l). — **complutoides** Strd. now takes the place of *compluta* Hbn., because a former illustration of HÜBNER (Fig. 108) has been proved to be synonymous with *aurita*, whilst *compluta* Hbn. (Fig. 292, 293) is our form of *kuhlweini*. — **brunnea** Closs is the form that is more or less suffused deep brown such as occurs in all *Endrosa* species. *clossi* Heinrich based on a specimen that is heavily suffused with dark brown on upper and undersides and which was captured in the neighbourhood of Berlin
- complutoides.*  
*brunnea.*



(Strausberg) is probably the same. — **paucipuncta** Closs are specimens with reduced black spots. — **radiata** Closs has the median nervure of hindwings heavily dusted with black in the shape of a prong and is denominated from a ♂ captured in the neighbourhood of Berlin (Strausberg). — **fasciata** Spul. denotes specimens in which the spots of the inner row are enlarged whilst those of the outer row form a line.

**E. alpestris** Z. (Vol. 2, p. 60) (5 l) is according to the researches of M. HERING decidedly a separate species with a different genital apparatus and by no means a form of *kühlweini*; *alpestris* has also distinctly much heavier antennae than *kühlweini*; the individual sections are thicker at their extremities and separated from one another by deep grooves. The species is larger than *kühlweini* and with brighter colour, the abdomen has heavier black bands. — ab. **mutans** Dhl. like *aurita-transiens* and *irrorella-signata* has the spots of the two inner transverse rows conjoined by fine black streaks.

**E. aurita** Sulz. (= *compluta* Hbn. 108, *irrorella* Sulz.) (Vol. 2, p. 60, pl. 11 l). — **fuliginosa** Blach. has wings suffused with blackish brown, the spots are grey-brown, not black. — **cathérinei** Oberth. (= *brunnea Heydem.*, *fumosa* Seitz) is a deep brown form, belonging to the form *imbuta* F. with black dusted veins, which however does not extend to the marginal dots, whilst this is the case in *ramosa*. Possibly — **sagittata** Rätz. (5 m) is a separate species, to which probably also — *transiens* belongs, as well as — **transversa** Vorbr. so heavily blackened that only narrow yellow longitudinal streaks of ground colour are left; sometimes also there are delicate black ray-like streaks on hindwings extending from base and with heavier marginal spots. Described from 8 ♂♂ from the Stilsfer Joch. — **marginata** Rocci from the southern slopes of the Simplon has scarcely any traces of the basal and central row of spots on forewings, whilst the marginal row is large, so that a band is almost created, this extends on hindwings almost to anal angle. — **seminigra** Rocci only retains the yellow at outer margin on both wings, the basal area is black and brownish extending from the veins. From Exilles. — **semipunctata** Rocci only has the submarginal row of spots on forewings, hindwings are unicoloured yellow. Piedmont.

**E. arterica** Trti. (5 m) is larger than *ramosa* whilst otherwise outwardly it strongly resembles same; scaling is considerably denser, colouration intensive ochreous orange, in quite fresh and alive specimens with a faint violet sheen. Veins widely deep black, marginal spots very heavy, cuneiform, partly confluent. Hindwing spots similarly very large. Abdomen quite black without yellow bands but with a few ochreous orange hairs only at tip. — Larva with much longer hairs, deep red ventrically, upperside black-brown with bright chrome-yellow stripes. Genital apparatus differs from that of *ramosa*. According to recent researches it is probable that besides *sagittata*, also *imbuta* Hbn., *pallens* Mill and also *ramosa* F. are genuine species, which will be found to differ slightly in the genital organs from *aurita*, but the last word has not yet been said on this theme.

## 21. Genus: **Chionaema** H.-Schäff.

**C. alba** Moore (Vol. 2, p. 61, pl. 12 a). — **corea** Strd. is a form discovered at Gensan (Corea) in which the apical portion of costa and the margin of forewings are more widely coloured with scarlet and also the outer marginal area of hindwings is suffused with red.

## 24. Genus: **Oeonistis** Hbn.

**O. quadra** L. (Vol. 2, p. 63, pl. 12 d). — **obscura** Schaw. are ♂♂ from the N. Tyrol (Kufstein) in which the forewings, especially in central area are heavily adumbrated with blackish, only the basal area remaining yellow. — **extensa** Closs established from a ♀ specimen from Berlin, but which also occurs no doubt elsewhere, with the metallic blue spots of forewings considerably increased in size and extended lengthwise. — **depauperata** Henriot (= *insolata* Dhl.) are ♂♂ specimens in which the metallic blue-green costal streak at base of forewings is absent; the form is generally paler than usual and besides the adumbration of outer area is almost entirely absent, also that on costa of hindwings. This form was first observed among specimens from France (Gironde) but later has also been described from the S. Tyrol. — **luteomarginata** Lamb. from Belgium are similar specimens in which the adumbration of the outer area is missing, it is unicoloured yellow.

## 26. Genus: **Agylla** Wkr.

**A. holochrea** Hmps. (Vol. 2, p. 64). We are giving an illustration of this species (6 b).

**A. stötzneri** Draes. is very close to *A. ramelana* Moore (Vol. 10, p. 200, pl. 15 i) from Sikkim etc., but forewings are not white but yellow-grey with a brown-black spot on costa just beyond centre and a second one between veins 1 and 2. Hindwings white with darker apex and outer margin. Head, thorax and abdomen, costa of forewings from base to the black spot are more or less grey to whitish. Fringes of forewings yellow-grey, of hindwings white. A large brown spot on underside of forewings that covers nearly the entire



surface, only leaving a quarter of the length of wings free at outer margin. It closely resembles *Oe. quadra* ♀. Szechuan (Omi-hsien, Ta-tsien-lu, Kwantung).

*subinfusata.* **A. subinfusata** *Draes.* Closely resembles *holochrea* *Hmps.* (Vol. 2, p. 64) differs by the yellowish antennae, yellow-brown forewings with diffuse dusky hue. A few specimens have 2 dark indistinct spots, one in the cell, before angle of same, the other nearer the base between nervures 1 and 2. Hindwings creamy yellow. On underside forewings have a dusky discal area. Szechuan (Omi-hsien, Ta-tsien-lu).

## 26a. Genus: **Parabitecta** *M. Hering*

Very similar to the indo-australian Genus *Bitecta* *Heyl.* (Vol. 10, p. 203). Vein 5 of forewings is almost extinct, completely so in hindwings. On forewings vein 2 rises at base strongly curved from centre of cell, 3 and 4 are stalked, 7, 8 and 10 stalked, 9 is absent; 6 rises from a spot with the stalk of 7—10; 11 is heavily curved approximating 12 but not anastomosing; an areola is absent, the cell is narrow. On hindwings 3 and 4 as well as 6 and 7 are stalked, 8 rises from middle of cell. ♂ antennae ciliate, palpi short, porrect.

*flava.* **P. flava** *Draes.* denominated from a ♂ from Ta-tsien-lu. Body and forewings ochreous yellow, the latter with 2 black spots between veins 3 and 4 and between vein 1 and inner margin. Hindwings paler yellow. Underside of forewings darker in disc and on upperside at this spot densely scaled with long hairy scales.

## 28. Genus: **Lithosia** *F.*

*foeminea.* *L. deplana* *Esp.* (Vol. 2, p. 65, pl. 12 g). — **foeminea** *Guen.* is a ♂ form with ♀ colouration and unicoloured grey hindwings without marginal band. — **unicolora** *Guen.* is a ♀ form with bright ochreous yellow forewings as in *unita*, with lighter hindwings even more so than in *ochreola* *Hbn.*

*rondoui.* *L. griseola* *Hbn.* (Vol. 2, p. 65, pl. 12 g, h). — **rondoui** *Oberth.* is a sub-form of *flava* *Haw.* = *stramineola* *Dbl.* with somewhat darker and deeper grey hindwings, otherwise a yellow form from the Pyrenees.

*okiensis.* **L. okiensis** *Miyake* is to be classified after *griseola* (Vol. 2, p. 65). It is close to the american species *pallida* *Pack.* and *uniformis* *Dyar* (Vol. 6, p. 290, pl. 36 g and h) which is placed in the purely american Genus *Crambidia* *Pack.* It is unicoloured grey-brown, underside being somewhat more brownish and has a wing expanse of 22 mm. Saigo (Japan).

*jacobsi.* **L. jacobsi** *Hmps.* (6 b) to be classified after *bipuncta* (Vol. 2, p. 66, pl. 12 h). Head, thorax and abdomen brownish grey; femur and tibiae of front legs blackish on upperside, the two hinder femora and tibiae and the tarsi being blackish at their extremities; tip of abdomen red-brown. Forewings brownish grey, black spots on discal and submedian folds beyond centre of costa. Hindwings pale yellow. Morocco (Tangiers); besides widely distributed in Africa extending to the Gold Coast and S. Nigeria.

*spodeola.* *L. caniola* *Hbn.* (Vol. 2, p. 67, pl. 12 k). — **spodeola** *Zerny* denotes the andalusian subspecies which differs by the darker grey forewings with brighter yellow and considerably wider costa. Mid to end of May at Algeciras, Chiclana, Malaga, Gibraltar and Tunis; specimens from Taormina in Sicily form a transition. — **complanoides** *Fuchs* is a darker form being as dark mouse-grey as *lurideola*, somewhat paler at apex; scapulae, mesothorax and abdomen being also mouse-grey excepting a yellow anal tuft. — *vitellina* *Bsd.* is renamed — **vitellides** by STRAND, because a *unita* form was named *vitellina* *Tr.* (Vol. 2, p. 67).

*nigrogrisea.* *L. lutarella* *L.* (Vol. 2, p. 68, pl. 13 a). — **nigrogrisea** *Peets* from the moors around Hanover appears to be a good local form; it is distinguishable by the unicolourous blackish grey forewings and hindwings; on the former only the costa and fringes are yellow; also the body is grey only anal tuft being yellow. PFENNIG-SCHMIDT later described transitions from the same locality. These approach *lutarella* and have more or less yellow forewings, whilst hindwings always remain grey-black with at the best a yellowish anal angle. Very similar specimens to this are described by STRAND as — **postmelanica**. In this the forewings are yellow, rather paler at costa. Hindwings black with ochreous fringes and marginal line which expands somewhat towards anal angle; body and head black, collar and also scapulae yellow. From Ignalino (Lithuania). PETERSEN also mentions similar specimens from Esthland under the denomination: *pygmaeola*; however the real *pygmaeola* *Doubl.* (Vol. 2, p. 68) which is classified under *pallifrons* in the main Volume, is probably a genuine species. It is very small; body pale ashy grey with yellowish tinge, forewings similarly, pale straw-yellow at costa; hindwings whitish with wide ashy-grey patch at costa. — **diluta** *Rothsch.* is devoid of yellow, fore and hindwings are pale stony grey inclining to yellowish white. Algeria.

*grisea.* *L. pallifrons* (Vol. 2, p. 68, pl. 13 a). — **grisea** *Fuchs* from the Rheingau has grey wings and body, only the fringes are yellow.



**L. predotae** *Schaw.* A small, very striking species on account of its dark colour. Smaller than *pyg-maeola* being only 21—26 mm wing expanse. Narrow winged and of frail build, forewings only 3 mm wide. Grey-black, forewings somewhat paler with a tinge of yellow, blackish to ochreous grey, with narrow yellow to reddish yellow streak along the costa to apex. Hindwings deeper grey-black, occasionally with yellowish patch in anal region with blackish grey fringes, the latter often with yellowish hue. Head, thorax and anal tuft are bronze to yellow-brown, the rest of the abdomen grey-black. Apex of forewings is rounded, apex of hindwings more pointed, the outer margin scarcely convex; hindwings are only double as wide as forewings; antennae with very fine pectinations. The ♀ which was discovered later is somewhat paler grey-yellow on forewings and is smaller, only 18 mm; also hindwings are paler grey with yellowish tinge, only somewhat darker grey at costa. Captured in August at Albarracin in Spain.

**L. sordidula** *Rbr.* (Vol. 2, p. 68, pl. 13 a) occurs according to FRITZ WAGNER at Ain Draham in Tunis. *sordidula*.

**L. sericeoalba** *Rothsch.* (6 a). Head and thorax yellowish white with the exception of scapulae which are white; pectus white, legs ochre-yellow; abdomen pale yellowish grey laterally with yellow tinge especially on the last 3 segments. Forewings silky, glossy white, hindwings faintly reddish yellow. Underside of forewings dusted with brown except at apex, costal area of hindwings similarly dusted with brown. Wing expanse: 36 mm. From Kopet Dagh near Askhabad. *sericeo-alba*.

**L. sororcula** *Hufn.* (Vol. 2, p. 68, pl. 13 b, c). — **plumbea** *Rebel* has lead-grey forewings, only the costa and fringes retaining the yellow. Described from Herculesbad. *plumbea*.

**L. interpositella** *Strd.* (= *interposita* *Rothsch.* nec *Hamps.*) (6 a as “*interposita*”). Head and thorax are pale grey-white, abdomen reddish buff. Forewings silvery white with black-brown at base of costa, hindwings milky white with reddish grey hue. Underside of forewings brownish excepting costal area and costa of hindwings. Wing expanse: 28—34 mm. Algeria (Guelt-es-Stel). *inter-positella*.

**L. gibrati** *Oberth.* is very like *caniola* but much larger and deeper grey; upperside of forewings pale mouse-grey, hindwings paler grey; head, collar, anal tuft of abdomen and costa of forewings yellow; underside grey, only pale yellow at apex of forewings and margin of hindwings. From Morocco (Mrassine). *gibrati*.

## 29. Genus: **Pelusia** *Hbn.*

**P. muscerda** *Hufn.* (Vol. 2, p. 70, pl. 13 d). — **concolor** *Schultz* is an aberration in which the oblique band of black dots behind the centre and the two spots over centre of inner margin of forewings are absent. Captured at Berlin and near Oisterwijk (North Brabant). — **desaburrata** *Dhl.* denotes an unimportant transition to *concolor* that occurs fairly frequently in S. Tyrol. The spot markings are reduced in size and number. Such specimens are usually somewhat paler in shade and with less pronounced costal margin. *concolor*. *desaburrata*.

**P. albicostrata** *Hmps.* (6 b). Grey-brown or blackish brown; vertex, legs, underside of abdomen and tip yellowish white. Forewings with faint yellow-white streak along costal margin, fringes of both wings of the same shade. Japan. *albi-costata*.

**P. sachalinensis** *Mats.* reminds one in its form of *ramosula* *Stgr.* (Vol. 2, p. 70, pl. 13 e) differing by the smaller size, being only 16 mm wing expanse. Further the inner margin of forewings is not darkened, whilst veins stand out prominently and are darker. Hindwings dusky grey-brown with pale yellowish fringes. Front and 1st pair of hindlegs and antennae excepting their base are brown-black. From S. Saghalin (Ichin-sawa). End of July. *sachalinensis*.

## 29a. Genus: **Manoba** *Wkr.*

This Genus, formerly designated *Stictane* *Hmps.*, is described in the indo-australian Part (Vol. X, p. 195) embraces a species that is also found in China north of 30° latitude. They are small *Nola*-like insects with well developed proboscis, porrect sleek palpi; antennae serrate and with tufts of cilia. Wings short and wide with very convex costa.

**M. rectilinea** *Snell* (Vol. 10, p. 196, pl. 16 a) has grey forewings in the type form with blackened costal base, 3 black spots anterior to centre, oblique black central line and a black spot at lower angle of cell; posterior to the centre a row of black dots and beyond same a black-brown costal mark; hindwings pale brownish. The form — **chinesica** *Strd.* differs by having a wide band of black-brown shading beyond the central line. From Shanghai; the type form from Siam and Celebes. *chinesica*.

## 29b. Genus: **Scaptestyle** *Wkr.*

This is mainly an indo-australian Genus described in Vol. 10, p. 181. Proboscis well developed, short porrect palpi, ♂ antennae ciliate. On forewings lower median nervule arises from lower angle of cell, 4 and 5 rising stalked from same; similarly 7—9 stalked, 10 and 11 from cell. On hindwings 3 and 4 are stalked, similarly 6 and 7.



*szetschwana*. **S. szetschwana** *Draes.* very like *tricolor* *Wkr.* (Vol. 10, p. 181, pl. 16 d) but not only the apex of hindwings, but the entire margin is widely black; only the scapulae but not the collar are yellow; otherwise the wings are golden yellow, forewings with large coppery red marginal spot that is edged with black. Szechuan.

### Genus: **Lepista** *Willgrn.*

**L. arabica** *Rebel.* This species that actually does not belong to palaearctic territory, occurring at Ras Fartak (on the southern coast of Arabia) has erroneously been illustrated on pl. 6 a.

### 30. Genus: **Gnophria** *Steph.*

*canescens*. **G. rubricollis** *L.* (Vol. 2, p. 70, pl. 13 e). — **canescens** *Strd.* (= ab. 1 *Hmps.*) has pale grey hindwings. *parva*. Locality is not stated. — **parva** *Schaw.* is a very small high altitude form from Sellajoch having wing expanse of only 23 mm, not varying otherwise.

### 30a. Genus: **Phryganopsis** *Fldr.*

An african Genus that is dealt with in Vol. 14, p. 86. It differs materially from *Lithosia* by the absence of the proboscis. The only palaearctic species has been dealt with in the place just cited.

*unipuncta*. **Ph. unipuncta** *Hmps.* (Vol. 14, p. 86, pl. 11 f) is again illustrated here (6 a). Head and thorax are brownish ochre, front and first pair of hindlegs brown-black, abdomen yellow white. Forewings ochre-yellow with brownish dusting, with small round black cell end spot. Hindwings yellow-white. Algeria (Hamman es Salahin).

### 4. Sub-family **Micrarctiinae.**

### 32. Genus: **Coscinia** *Hbn.*

*C. striata* *L.* (Vol. 2, p. 72, pl. 13 f). WARNECKE has taken the trouble to classify the forms of this species systematically; we are adopting his classification. He separates: 1, paler forms: — **pallida** *Btlr.* (= *xanthoptera* *Oberth.*, *bipunctata* *auct.*, nec *Stgr.*) (Vol. 2, p. 72, pl. 13 f) with yellow and yellowish white forewings, the dark streaks on forewings completely extinct, only 1 or 2 dots at close of cell retained; hindwings somewhat less blackened than in normal specimens. — **laetifica** *Strd.* are ♀ specimens also of yellowish white colour in which also the dots at end of cell are absent. Hindwings are ochre-yellow with faintly indicated central streak and marginal band. — 2, adumbrated forms: — *intermedia* *Spul.* (Vol. 2, pl. 13 f [not "b"]) with darker hindwings, specimens forming a transition to *melanoptera*. — *melanoptera* *Brahm* (Vol. 2, pl. 13 f) (6 b) has completely black hindwings. — **nigrociliata** *Schaw.* are *melanoptera* in which the otherwise yellow fringes are also black. — **funerea** *Warn.* (= *funerea* *auct.* nec *Ev.*) are the rare completely black specimens in which the abdomen however retains the yellow ringlets. — **nigra** *Spul.* (= *aterrima* *Gaede*) are similar black specimens but with completely black abdomen without yellow ringlets; described from the neighbourhood of Berlin. — 3, compound forms: — **pfeifferi** *Strd.* has quite white forewings without streak markings and without cell end spots with approximately normal hindwings, which may, however, be slightly adumbrated. Only found among specimens from the Karst. — **commerelli** *Strd.* is marked similar to the former or *laetifica* on forewings having, however, completely black hindwings; a very striking form from Istria. — **albida** *Schulze* has the entire yellow colouration of wings and body on upper and undersides replaced by white with normally retained streak markings. Established from specimens from Spreewald, but probably occurring occasionally everywhere. — **incompleta** *Oberth.* closely resembles the preceding *pallida* form but forewings are quite white, whilst *pallida* inclines slightly to yellowish on forewings. — **extrema** *Rocci* described from Piedmont exceeds *pfeifferi*, forewings the same but hindwings with only a very small pale cell spot.

*bipunctata*. **C. bipunctata** *Stgr.* (Vol. 2, p. 72) is according to WARNECKE certainly a genuine species and not merely a form of *striata* that occurs also in the Amur territory, being of regular size with typical *striata* markings. forewings somewhat paler yellow, hindwings more heavily black. According to STAUDINGER's original diagnosis *bipunctata* was decidedly smaller than *striata* (wing expanse: 29—35 mm), ground colour paler, generally yellow-white, at all events the basal area of forewings was paler; 2 large well separated black spots at end of cell one above the other, occasionally united forming a lunule; the black streaks are partially somewhat obscured, generally only in disc, at their extremities they appear as separate black striations, in front of which there are the black outer marginal streaks as separated extensions. Hindwings with very wide black costal area, filling out the entire cell, beyond same a yellow patch, which at lower edge is separated from the remaining yellow ground colour by a black streak; also the submedian nervure is streaked with black in the basal area.



The antennae are black with brownish tips and are more heavily pectinated than *striata*. — **funerea** Ev. (Vol. 2, *funerea*, p. 72, pl. 13 e) is a black aberration of same and does not belong to *striata*, the black forms are characteristic of this species.

**C. miranda** Oberth. (Vol. 2, p. 72, pl. 13 f) is certainly to be deemed a genuine species; characteristic of *miranda*. it are the exceptional large size and the pale veins with widely black edges, which are especially prominent on hindwings where they contrast boldly. This does not occur otherwise in any known *striata* form. Besides it has scarlet-red laterally on abdomen. — **lugens** Oberth. has extensively widened black markings on veins *lugens*. so that only very narrow yellow stripes are left on forewings, hindwings completely black. Ta-tsien-lu. — **dubernardi** in contrast has very restricted black, the orange-yellow colour is predominant, veins only narrowly *dubernardi*. black. From Tse-ku. Perhaps the species is actually a *Callimorphide*.

**C. cribraria** L. (Vol. 2, p. 72 and 445, pl. 13 g). If we follow the same plan of aberrations of the various forms varying from type as was the case in *striata*, viz firstly the paler forms and then the darker ones, we have — **unicolor** Closs; forewings white without any markings. Described from a ♀ from Spandau. Of dark *unicolor*. forms we should mention — **infuscata** Rey powdered all over with grey-black, the black markings only faintly *infuscata*. indicated. — **fasciata** Closs has the black spots on forewings confluent forming a wide band. — **reducta** Closs *fasciata*. *reducta*. forms a transition in which the inner and outer rows of spots are confluent, whilst the sublimbal row of spots is absent. Specimens showing the reverse form of variation are — **pseudobifasciata** Dhl.; the black spots, *pseudo-* *bifasciata*. chiefly those of the transverse bands are extended forming long streaks alongside and between the veins; especially beyond the cell there is a long streak, which extends from base to just before the outer margin. Hindwings of ♂ pale grey-white extending from base turning to black, in ♀ completely black. Bred from the Rhine valley, but occurring everywhere. — **pseudozatima** Krul. Here forewings are adumbrated completely *pseudo-* *zatima*. with brown-black and only the veins are white. Established from a specimen from Jelabuga. — **splendida** *splendida*. Dhl. are especially large and brilliantly white *candida*, all spots are missing, even the row of black spots at extremities of veins is absent. Hindwings pale grey with wide white fringes and without a separating line or row of dots. A local race from the southern Abruzzi. — Of the well characterised southern local forms: *punctigera*, *candida* and *chrysocephala* aberrative variations have not hitherto been named, whilst of the forms derived from *rippertii* Bsd. (6 c) a good number have already been mentioned in the addenda to the second Volume (p. 445). To these belong: — **nevadensis** Oberth. a large form with pale reddish yellow ground colour with *nevadensis*. brownish interstices; from Sierra Nevada. A form described by RIBBE under the same name from Andalusia seems to me to be different and this should be renamed: — **ribbei** n. nov. (= *nevadensis* Ribbe nec Oberth.). *ribbei*. It is also a large form with especially elongated and pointed forewings being more pronounced than in *cribraria*. General colouration white and silky with a slightly greyish tinge; the entire wing with a greater or lesser suffusion of black. This blackish tinge becomes more dense in 2 distinct longitudinal streaks and also between the veins it is more apparent; the one extends from just beyond the base to shortly before the outer margin passing 2—2½ mm below the costa, the second similarly parallel to the inner margin and 3 mm above same; along the outer margin there are small black dots, also at close of cell 2 black dots. Hindwings unicoloured grey-white on upperside, much paler than in *cribraria*, similar to the palest patches of the *candida* hindwings. Underside grey, paler than in *cribraria*, a slight brownish tone on upperwings; body grey-white, scapulae somewhat darker, generally without a black dot. Bred from larvae from a bush-like plant from above Alhambra. RIBBE deems it quite probable that this is a separate species and there is a certain probability in this supposition because *candida* and *chrysocephala*, as well as specimens similar to *rippertii* occur there. The question requires further research. — **anglica** Oberth. is ashy grey, black spots large, blackish longitudinal streaks *anglica*. through the cell and along the submedian. In — **vernetensis** Oberth. the ♂ is reddish grey, the ♀ creamy white, *verne-* *tensis*. markings reduced to minute dots. — **rondoui** Oberth. are *rippertii* specimens with especially large black dots *rondoui*. and rather blacker hindwings. — ab. **murina** belongs to same; the middle band is displaced towards the posterior *murina*. transverse line, the wide central area remains pale, the subterminal is quite absent. — **leucomelas** Oberth. is *leucomelas*. also like *rippertii*, the subterminal of forewings is especially pronounced, the hindwings are faintly reddish yellow with dusky marginal band. — **canigulensis** Oberth. is a *rippertii* with a brownish tone, the ♀ paler grey- *canigu-* *lensis*. white. — **transversata** Bubacek similarly belongs to *rippertii*; here the entire area between posterior transverse *trans-* *versata*. line and subterminal is covered with blackish. — **fumidaria** O. B.-H. resembles *canigulensis*; colour of all wings smokey brown, on forewings along the costa, as well as below the cell and at inner margin the white *fumidaria*. colour is faintly indicated in streaks. Hindwings unicoloured dark, only the white fringes contrast distinctly; Tannuola Mountains, Shawyr.

**C. bifasciata** Rbr. (Vol. 2, p. 72, pl. 13 h) is certainly a genuine species, even if same may have evolved *bifasciata*. from *cribraria* through insular isolation; the illustration in the main Volume is not very recognisable and we are illustrating same here again (6 b). The name type has interrupted brown-black longitudinal streaks on a white ground and 2 generally also interrupted oblique bands. — **fortestrigata** Schaw. are specimens with wide *forte-* *strigata*. continuous longitudinal and transverse bands, so that the white ground colour is considerably repressed; related to the main type by innumerable transition forms. — In **paucisignata** Schaw. the longitudinal marks *pauci-* *signata*. and transverse bands are considerably reduced, so that the white of the ground colour is predominant. **transversata** Schaw. is quite white with 2 black-brown very pronounced transverse bands; only rudimentary *trans-* *versata*.



traces of the longitudinal stripes are present before the outer margin, but even these can be absent; fringes checked with black. — **isochroma** *Bubacek* are extremely white specimens quite devoid of markings. — **brunnea** *Reisser* are brownish grey with faint markings and without a trace of white. Limited to Corsica.

*libyssa*. **C. libyssa** *Püng.* (= *powelli* *Oberth.*) (Vol. 2, p. 72, pl. 13 i) (6 c) is not in any way connected with the previous species. The remarkable bronze-black costa separates it definitely from *cribraria*. It is more gracefully built. Forewings grey on upper and undersides, hindwings darker on upperside, paler on underside; head yellow, collar with 2 black dots as have also the scapulae. Abdomen yellow with black ringlets, legs yellow-grey. The ♀ has more pointed forewings, white on upperside, with deep black streak on costa, very finely peppered with blackish in centre of wings. Hindwings grey-black with white fringes. Head and thorax white, abdomen yellow with black spots on upperside, whitish below. Algeria. — **punctata** *Oberth.* (Vol. 2, p. 72, pl. 13 i) (6 c) has 3 rows of black dots on grey forewings and is illustrated here once more. Besides occurring in Algeria it is found in Sicily. — **haroldi** *Oberth.* (pl. 13 i) has uppersides of forewings white with 5 transverse rows of black dots, of which one at base, the 2nd and 3rd in central area, the 4th subterminal and 5th at margin are angular, besides it has a black basal spot and another one between 1st and 2nd row. Hindwings black on upperside. Algeria. — **caligans** *Trti.* (6 c, d) is a large form from fairly high altitudes in Sicily (Aetna). It has paler or darker bronze-brown forewings with much darker hindwings. Head yellow, body as the wings, abdomen more yellowish with black dots on the last segments. Forewings with fine black rows of dots. In the ♀ the ground colour is much paler, yellowish white.

*romeii*. **C. romeii** *Sagarra* (6 d). Forewings of ♂ ivory-yellow peppered with dark brown and without further markings, a dark brown streak along costa gradually expanding towards apex, costa itself orange-yellow, also inner margin, fringes similar but paler. Upperside of hindwings dull reddish ochreous, somewhat darker along the veins and towards apex, a dark spot at end of cell; base of fringes brown, extremities yellowish. Underside reddish ochreous, brown posteriorly. Vertex, frons and palpi orange-yellow, both the latter admixed with black; thorax yellowish peppered with blackish; abdomen orange on upperside with black spots, ivory-yellow on underside. The ♀ is much smaller and more stumpy built, forewings much paler and only sparsely peppered without the dark costal streak; hindwings dark brown at anal angle, yellow at inner margin; it is incapable of flight and sits on the grasses, whilst the ♂♂ fly in the daytime in the sun. — The young larva resembles the *cribraria* larva according to *PREDOTA*. When full grown it is brown with darker to black dorsal hairs, lateral lines and hairs orange; on underside paler and head glossy black. Up to May on low growing plants; pupa in a frail cocoon in which the larva rests for 2 months before changing. Albarracin (Spain).

*lionvillei*. **C. lionvillei** *Le Cerf* replaces *striata* which does not occur in Morocco. ♂ not yet known. ♀ with somewhat deformed wings and very heavy abdomen. Forewings brownish yellow with a black spot at base of costa, 2 spots at angles of cell and a fine streak below the costa from centre of cell to apex; hindwings somewhat paler with diffuse longitudinal streak in cell and between veins. Wing expanse: 20,5 mm. Middle Atlas.

### 33. Genus: **Utetheisa** *Hbn.*

*flava*. **U. pulchella** *L.* (Vol. 2, p. 73, pl. 13 k). — **flava** *O. B.-H.* is a form in which the red of the patches is changed to yellow. Originally described from N. India (Darjeeling) as not palaearctic but meanwhile recorded by *SOHN-RETHEL* as occurring at Capri. — **arcuata** *Oberth.* represents an asymmetrically marked specimen in which the black dots are confluent forming more or less complete arcuate transverse lines. — **bicolor** *Oberth.* are specimens on which all the black spots are absent, the forewings have only red markings on white ground. Occurs as an aberration in all localities.

### 40. Genus: **Ocnogyna** *Led.*

*rosea*. **O. corsica** *Rbr.* (Vol. 2, p. 76, pl. 14 a). — In place of the name *rosacea* *Spul.* (ibid., pl. 14 a) the older name should be superseded: — **rosea** *Mill.*

*adaena*. **O. pieretti** *Rbr.* (Vol. 2, p. 76, pl. 14 a). For this the older name: — **adaena** *F.* should be reinstated. *pallida*. — **pallida** *Rothsch.* has very pale forewings, hindwings grey-white, not yellow or orange; the ♀ is impure grey, not black. From Tunis.

*albescens*. **O. baetica** *Rbr.* (Vol. 2, p. 76, pl. 14 b). — **albescens** *Oberth.* is the form from Algiers designated as *meridionalis* *Seitz* in Vol. 2 in which also on forewings white is by far the predominant colour. Probably this name should be withdrawn in favour of *meridionalis* as it was only given in 1917. Also occurs in Andalusia. *prieta*. — **prieta** *Ribbe* in contrast are specimens in which the entire upper side of forewings and almost the entire hindwings are black-brown. From Andalusia. — **ramburi** *Oberth.* has the white colour of forewings reduced to a short longitudinal band in the basal half of the submedian fold and a small subcostal spot before the centre. Hindwings with only a little white near the base; an unnecessary denomination of a slight variety forming a transition to *prieta*.



*O. loewii* Z. (Vol. 2, p. 77, pl. 14 c). — **andresi** *form. nov.* (6 e) denominates a form bred by the late *andresi*. ADOLF ANDRES from the desert of Mariout. It is peculiar by the paler grey-yellow markings in the ♂ with an extension of the white colour. This is especially prominent on hindwings. Also the ♀♀ are pale buff in contrast to the ♀ of the name type which is black (6 d).

**O. mutabilis** Trti. (6 d) is without a doubt closely related to *loewii*; the light markings on head and *mutabilis*. thorax are rose coloured as the base of wings, also abdomen is rose with a wide olive-brown dorsal stripe. The markings of forewings, as will be seen from the illustration are somewhat differently shaped and especially the markings near the margin are intersected by the pale nervules and the submedian pale longitudinal stripe is much narrower. Hindwings with rosy hue, otherwise similar to *loewii*. — **mutata** Trti. (6 d) shows paler *mutata*. markings which appear more brownish owing to interspersation of rose, only their fine edges remain darker. The ♀ has a vivid rose thorax and rudimentary wings, the rest of the body is impure rose. — The larva differs from that of *loewii*, it is jet-black even the warts not being paler but with bluish sheen: underside and prolegs white and rose; dorsal hairs brilliant rusty yellow. Bengasi (Cyrenaica) in November. A specimen from Egypt illustrated by ANDRES and SEITZ in „Senckenbergiana“ 5, plate 1, fig. 4 as *loewii* corresponds exactly with *mutata*, which would therefore also occur in Egypt, unless possibly they are identical species.

*O. zoraida* Grasl. (Vol. 2, p. 77, pl. 14 d, e). — **henricus** Rbb. denominates specimens with 3 complete *henricus*. black transverse bands on forewings from lower median nervure to inner margin. Also on hindwings the dark outer marginal markings are confluent forming bands. — **olaria** Rbb. has on the other hand the black costal *olaria*. spots of forewing confluent forming a longitudinal streak on costa extending to base. — **blanca** Rbb. denotes *blanca*. specimens with hindwings devoid of markings.

**O. nogelli** Led. (Vol. 2, p. 77, pl. 44 d). This is deemed by HAMPSON to be a genuine species and I would *nogelli*. like to subscribe to this opinion as the insect makes a totally different impression to *parasita* (ibid.). — **albo-** *albobrun-*  
**brunnescens** Strd. (= ab. 1. *Hmps.*) is much paler, more of a whitish brown ground colouration, mixed with *nescens*. ochreous on thorax. Lydia.

**O. rothschildi** A. B.-H. (6 e) has narrower wings than the very similar *parasita*, very rounded at inner *rothschildi*. margin and with bolder black markings; the black costal streak is only very rarely dissolved into separate spots, the heavy inner marginal streak extends right to the anal angle; in marginal area there are 3 distinct black spots; ground colour is dark grey with slight brownish tinge. Hindwings rather sparsely scaled with 3 roundish bold black marginal spots and a further one at apex. Bred ♀♀ have rudimentary wings of 4—5 mm length with distinctly separate black spots which are sometimes edged with white. Abdomen with black edges to the segments. It occurs at the end of March in Province Samara on the meadows around the Volga. The ♂♂ fly in the sunshine.

*O. leprieuri* Oberth. (Vol. 2, p. 77, pl. 14 d). — **morisca** Oberth. (6 e) has a black, not ochreous body and *morisca*. also the costa of the forewings which show much more black, has no trace of yellow.

*O. pudens* Luc. (Vol. 2, p. 77, pl. 14 f, 16 a). — **denigrata** Strd. (= ab. 1. *Hmps.*) shows the black mark- *denigrata*. ings on the wings considerably reduced.

**O. houlberii** Oberth. Body with brownish grey hairs; forewings fulvous, 2 transverse bands of black *houlberti*. dots in disc; outer marginal area to an extent of 2½—3 mm depth slightly darker brown, although in some specimens this is scarcely perceptible; the dot markings vary in strength. Hindwings somewhat paler with faintly rosy hue and black marginal band, fringes reddish. Size approximately as *leprieuri*. Ta-tsien-lu.

*O. latreillei* Godt. (Vol. 2, p. 78, pl. 14 e). — **ochracea** Th.-Mieg has forewings with ochreous bands. — *ochracea*. *millierei* Th.-Mieg with yellow hindwings is synonymous with *aurantiaca* Spul. (ibid.). — **berthina** Th.-Mieg *berthina*. has whitish forewings and white hindwings with faint rosy tinge.

*O. pretiosa* Stgr. (Vol. 2, p. 78, pl. 41 e). As already mentioned in the main Volume, this should be classified as a form of *Micrarctia kindermannii*.

**O. oberthueri** Rothsch. seems somewhat isolated; HAMPSON places it next to *Tancrea pardalina* Püng. *oberthueri*. (Vol. 2, p. 75, pl. 14 b, 16 a). Head and thorax black-brown, admixed with greenish yellow or whitish. Underside of thorax and tarsi yellow; abdomen black, underside and laterally with yellow hairs. Forewings yellow, densely peppered with brown in basal area and brown veins; a diffuse brown oblique band before the centre, a black lunule at cell end and a yellow spot in front of same; beyond the centre a brown band and an undulate brown subterminal band, margin and fringes suffused with brown. Hindwings yellow, brown at base and inner margin with wide brown marginal band and yellow fringes. Wing expanse: 30 mm. Thibet (Kuku-Nor).

**O. joiceyi** Talb. does not closely resemble any known species and is easily recognisable by the yellow *joiceyi*. ground colour and wide black margins to hindwings. Forewings smoky brown with 3 black confluent basal spots.



beyond same a transverse row of 5 spots separated by the veins. There is then a wide black discal band formed of 5 conjoined spots, constricted below the cell; postdiscally there are 4 spots of which the 2nd below the costa is the largest. In front of the smoky brown margin there are 10 spots conjoined and forming a band, all these spots are edged with yellow and between veins 4 and 6 and 2 and 3 they touch the margin. Also the costa is yellow. Hindwings yellow with black marginal band and a basal black longitudinal streak to vein 2 where it unites with another streak which extends to costa; a small black spot at cell end. Body black-brown, abdomen with yellow rings. Extent of forewings: 13 mm. Great Atlas, Morocco in May.

#### 41. Genus: **Cletis** Rmb.

*C. maculosa* Gern. (Vol. 2, p. 78, pl. 14 f). It was erroneously stated in Vol. 2 that the specimens illustrated were from Frankfurt whilst GERNING especially remarked that the specimens presumably were from Vienna but were only diagnosed in Frankfurt. — A great number of unimportant aberrations have been named meanwhile: for forms with yellow hindwings — *flava* Spul. can claim priority and there are the following synonyms: — *cathlava* Th.-Mieg and *flavescens* Oberth.; STRAND quite unnecessarily wishes to alter the name *pallidula* Aign. into *pallidula*, similarly *paucimaculata* Oberth. (Vol. 2, p. 446) into *dignensis* Strd. — **rosina** Oberth. are specimens with forewings suffused with rose. — **punctata** Kraml. has no discal spot on hindwings. — **rischeri** Kraml. has discal and costal spots absent on hindwings. — **circummaculata** Kraml. has the 2 costal spots of hindwings conjoined with discal spot forming a ring. — **fasciata** Kraml. has the basal costal spot of hindwings extended forming a band which almost reaches to inner margin. — **mediorosea** Kraml. has red streaks or spots along the veins on the clay-yellow or grey hindwings. — **magnifica** Kraml. has the black spots of hindwings edged narrowly but very pronouncedly with yellow on the red ground. — **grisea** Kraml. has grey instead of red hindwings. — **subnigra** Kraml. has ground colour of all wings suffused with black, as if covered by soot, so that the red looks like deep purple. — **clarimarginata** Kraml. has ground colour of forewings adumbrated in basal and discal areas whilst the outer area contrasts sharply by its paler colouration. All these last named forms were bred from larvae from the heaths around Neusiedlersee. — We are illustrating the form *stertzi* Schultz (6 f) and also — **immaculata** Oberth. (6 e) from a fine specimen with sparsely spotted forewings and hindwings devoid of spots; in the State Museum of Munich. — **kindervateri** Schaw. has jet-black markings on grey-brown forewings, hindwings are almost completely black and show only a small dull rose spot in disc. Described from Bruck on the Leitha. — Of the characteristic form: *latina* Trti. (Vol. 2, p. 78, pl. 14 g) we are illustrating (6 e) a fine specimen of the rare ♀, and the ♂. STRAND classifies this form under *mannerheimi* Dup. (Vol. 2, p. 78, pl. 14 g) in his catalogue, but I consider the latter to be a genuine species. — **marsicana** Dhl. (6 f) are especially pale *latina* with quite pale whitish rose ground colour with a tinge of yellowish, richly and often extensively spotted with black; hindwings also are very pale, much interspersed with yellow and with spot markings varying to an extraordinary degree; this is a mountainous race from the Montagna Grande at an altitude of 1000—2000 m, occurring just after the snow has dissolved in April and May. — **sojota** Tschetv. is very similar to *dahurica* (Vol. 2, pl. 14 f) but has much deeper chestnut-brown coloured forewings; south of the Sajan mountains, at the Irbeck river; Minussinsk. — **insularia** Kozhant. is a much smaller form, forewings of the colour of *simplonica* but more heavily spotted, the spots short, angular, almost quadrate and not elongated as in the *reticulata* forms; hindwings delicate rose with very heavy black spot marking. ♀ much darker red-brown with bright red hindwings. From the Tagarskij Island near Minussinsk.

#### 43. Genus: **Phragmatobia** Steph.

In his Supplement II of the Cat. Lep. Phal. HAMPSON combines the Genera: *Hyperborea* Gr. Grsh., *Oroncus* Seitz and *Micrarctia* Seitz together under *Phragmatobia*; besides *breveti* is now also placed here. As *Trichosoma* Rmb. (not Oberth.!) is pre-occupied (Vermes Rud. [1819]) we follow the same classification as HAMPSON and include *breveti* here. The other 3 Genera we leave as before, so as to facilitate reference with the main Volume.

*flava*. *Ph. breveti* Oberth. (Vol. 2, p. 79, pl. 16 b). — ab. **flava** Rothsch. has yellow instead of pale carmine hindwings. — **occidentalis** Rothsch. (= *emmanueli* Oberth.) is held by HAMPSON to be a genuine species. The spots of forewings are not edged with yellowish, fringes and abdomen are deep yellow, the latter with a brown dorsal stripe. Wing expanse: 34 mm. From Mazagan and Massine (Morocco). The larvae feed on Smilax and Asparagus.

*powelli*. **Ph. powelli** Oberth. (Vol. 2, p. 446, pl. 56 k) resembles *breveti*, but the spots of forewings are elongated and not round and have no yellow edges. Forewings are rosy yellowish brown with 4 rows of black spots. Hindwings pale carmine with black spots in centre of cell and at end of same and a marginal band which does not extend to the anal angle. Thorax rosy brown, admixed with black, tegulae with black spots. Abdomen pale red-brown with a dorsal row of black diffuse spots. Antennae somewhat shorter and coarser than in *breveti*. The ♀ has very narrow rudimentary crippled wings, the body is more reddish than in the ♂. Wing expanse: ♂ 36 mm, ♂ 28 mm. Géryville (Algeria).

*nisseni*. **Ph. nisseni** D. Luc. closely resembles *breveti* and *powelli* but is larger with more heavily pectinated antennae and a longer and more narrow wing contour. Forewings yellowish brown with 3 more or less indistinct



faintly curved yellow transverse lines, at end of cell there are 2 clear black dots. Hindwings red with small black discal lunule and 3 rows of irregular black submarginal dots. Head and thorax brown admixed with red, abdomen red with brown dorsal line. Antennae red, thorax with dense woolly hairs. Wing expanse: 37 mm. Morocco (Saffi) in April.

**Ph. faroulti** *Rothsch.* has a dark brown body admixed with grey hairs especially on collar and ends of tegulae; hindlegs yellow-white with scarlet tarsi. Forewings grey-brown with 5 bands of dark brown spots, the 1st oblique subbasal, the 2nd before centre interrupted below the cell; the 3rd in the centre consists of 3 small spots at costa, on the median and at inner margin, beyond same a 4th oblique row of small dots along the veins between 6 and 1; subterminally there is still a diffuse band that is more or less confluent with a marginal band. Hindwings pale ochreous yellow with dark brown marginal band, a dark brown antemedian band from costa to below the cell and a band of spots from costa to the lower angle of cell. Wing expanse: 34 mm. Bou Saada (Algeria).

*Ph. fuliginosa* L. (Vol. 2, p. 79, pl. 16 b). — As synonym to *flavescens* *Schultz* there is: — *flavida* *Oberth.* — **clara** *Sibille* is based on a pale specimen with 5 black dots at outer margin of hindwings instead of marginal band. In place of — *fervida* *Stgr.* (pl. 16 b) — **lurida** *Rothsch.* should be substituted, as there is a *Ph. fer-lurida* *Wkr.* from Guatemala. In — **totirubra** *Vorbr.* there is no vestige of the black bands on hindwings, so that these and abdomen are all unicoloured ruby. Switzerland. — **pallida** *Rothsch.* is a pale yellow reddish form suffused with pale carmine from Kuku-Nor and Kansu. Quite unnecessarily *STRAND* has changed the name to *thibetica* as there is already a *pallida* *Aigner*, which however is a form of *maculosa*, which we classified in the Genus *Cletis* *Rmb.*; therefore *thibetica* should be withdrawn. — **japonica** *Rothsch.* has dull chocolate brown forewings dusted over with grey and pale carmine hindwings with wide black subterminal band. Japan (Yokohama). — **kroumira** *Oberth.* has only 2 small black spots at disco-cellular nervule on hindwings and no subterminal spots on the two folds and above the anal angle. Tunis. — **melitensis** *O. B.-H.* (6 f) has very pronounced cell end spots on forewings and in the ♀ 3 further black dots just before the apex. Hindwings pale carmine with heavy marginal spots, the cell end spot has the shape of a "7". From Malta. — **harterti** *Rothsch.* is larger than *kroumira* and has deeper colour. Forewings a bright golden cinnamon-brown. Hindwings deep salmon-pink with enlarged black spots. Wing expanse: 38 to 47 mm. From Morocco. Finally some pathological forms have been named: — **furcula** *Bryk* with a very noticeable fork in the veins ex the upper angle of disco-cellular and — **atropha** *Bryk* in which the lowest of the 3 discal veins is atrophied.

#### 44. Genus: **Eucharia** *Hbn.*

*E. casta* *Esp.* (Vol. 2, p. 80, pl. 16 c). — *nigrata* *Schultz* is illustrated (6 f). — **obscurior** *Oberth.* denominates a ♀ with adumbrated forewings. — **preisseckeri** *Schaw.* The black discal band is confluent with the base, basal area therefore black; marginal band of hindwings is wide. — **unita** *Rostagno* is probably identical with *preisseckeri* where the discal band converges with the black of the base; *unita* is the older name and has priority. — **vittata** *Niep.* has dark brown forewings with white postdiscal band. Marginal band of hindwings dark brown, double as wide as in typical specimens. — The alterations made in the denominations by *STRAND* on the plea that the same names occur in other Genera, would seem to be superfluous, they are: *roseana* for *rosea* *Oberth.* (nec. *Lorez*) (Vol. 2, p. 446), *obscurascens* for *obscura* *Oberth.* (nec. *Lorez*) and *pseudoflavescens* for *flavescens* *Oberth.* (nec. *O. Schultz*). — The following races have been described: — **centralasiae** *O. B.-H.* (6 f). Ground colour of all wings pure white, rarely with roseate hue; markings are very constant in contrast to mid-european specimens, base and central band blacker than the brownish marginal band; specimens with interrupted central band (*mediodivisa*) have yet to be discovered. Hindwings rosy white with pale brown costal spots and narrow marginal band; in **triangularis** *O. B.-H.* the costal mark of hindwings is triangular extended downwards to the cell. Juldus; Issykkul; Ili; Djarkent; Saisan. — **sibirica** *Kozhant.* differs from typical *casta* by the rose coloured (not white) hindwings, sometimes also the forewings have a roseate hue. Minussinsk.

#### 45. Genus: **Euprepia** *O.*

*E. rivularis* *Mén.* (Vol. 2, p. 80, pl. 16 c). We are illustrating a ♀ of the name type (6 g) from Helenendorf ex the collection of *SOHN-RETHEL*. — **dannehli** *Trti.* (*Sohn-Rethel* i. l.) the form occurring in the South-ern Abruzzi in Italy differs from name type when shown in long series. It is generally somewhat larger and more heavily built, forewings a purer white, costa brownish yellow, the black spots deeper black and larger; above all the thorax and collar are much more heavily marked with black, as also is the abdomen. — **abconnexa** *Dhl.* has confluent spots on forewings, especially those in basal area which merge with those on costa, so that a wide triangle is created. — **marginata** *Dhl.* In this the spots before the outer margin are confluent forming a black submarginal stripe. — **posteripunctata** *Dhl.* has black dots on the nervules at margin of hindwings and a small black costal spot. The ♀♀ are smaller than those of specimens from Asia and very variable.



*perversa*. pale yellow-grey to blackish brown-grey with wide black dorsal line of spots. — *perversa* Dhl. has rather better developed wings, they extend to 6 mm and are of the same colour as the body with black spot markings.

*haroldi*. **E. haroldi** Oberth. Head and thorax yellow-white admixed with blackish, abdomen rose, yellowish white at base and anal extremity with black dorsal stripe, Forewings yellow-white with black spots in quite similar formation to those of the subsequent *pudica*: subbasally there is an oblique curved band, which does not extend either to costa or inner margin, before the centre an irregular costal and a quadrate inner marginal spot, a long curved spot beyond same and below this a large quadrate spot; then follows a curved postmedian band interrupted between 3 and 4, partially merging with the triangular subterminal spots. Hindwings scarlet, yellow-white at costa with brown-black costal spots before and beyond the centre and a subterminal band that reaches to the margin on lower median nervure. In aberrative specimens the black spots more or less merge. ♀ with narrow crippled wings with reduced black spots. Wing expanse: ♂ 24—32 mm, ♀ 18 mm. Algeria (South Oran, Aflou, Guelt-es-Stel).

*nigerrima*. *E. pudica* Esp. (Vol. 2, p. 80, pl. 16 c). Besides the forms mentioned in Vol. 2, p. 446: *flavescens* Oberth. and *fumosa* Oberth., the first of which is now held to be synonymous with *flaveola* Schultz (Vol. 2, p. 80) the following has been named as an extreme form of the blackened *gradli* Schultz (Vol. 2, p. 80): — *nigerrima* Trti. with completely jet-black forewings, only the fringes are rose, hindwings pale rose, all spots enlarged and partially merged, not black but dusky sooty, diffuse; abdomen rose with heavily increased black transverse bands. — *bayardi* Le Charles is a pathological specimen, an asymmetrical aberration of the form *flaveola*, i.e. yellow instead of roseate, on the right side the black spots are quite extinct except for one disco-cellular spot and a few subapical diffuse streaks, whilst on the left side the markings are more or less of normal shape, only they are much reduced in size. Hindwings on both sides quite devoid of spots. Bred in France. — *denudata*. *denudata* Dhl. is a similar form of aberration with normal markings in outer area, spots in the central area being absent, as also the dots in basal area. From specimens from the Campagna and the Sabine Mountains. *magnifica*. We are illustrating a specimen from Capri (6 g) of this form. — *magnifica* Roths. is claimed to be a subspecies from Algeria and Tunis. It cannot be admitted as a race. It comprises large specimens such as occur also elsewhere with a deeper rose tone and no enlargement of the black spots. — *rosina* Zerny (6 g) from Spain (Albaracin) could lay greater claim to being a race. It is not larger than typical *pudica* but much more intensively rose with enlarged black spots, so that the light patches on the forewings form a sort of a trellis. Hindwings similarly enlarged. Specimens from Capri are about half-way between these forms, large, of intensive red colouration with enlarged black spots. Our illustration shows one of these Capri specimens.

*lutescens*. *E. oertzeni* Led. (Vol. 2, p. 80, pl. 16 c). — *lutescens* Culot has a yellow hue instead of the rose colour. *cremonae*. Beirut. — *cremonae* Culot also described from Beirut, is devoid of black spots on the vividly rose coloured hindwings.

*powelli*. **E. powelli** Oberth. resembles *oertzeni* and *pudica*; it is smaller and much duller in colour. Forewings and thorax blackish brown, tegulae with narrow white edges, forewings with rosy white striations as in *oertzeni*. Hindwings vivid carmine-rose with black discal spot, oblique postmedian band from costa to below vein 5, merging at upper end with an apical spot, a triangular spot in middle of margin and a further one that is extended inwards on submedian nervure; fringes black at apex, yellow beneath. — The larvae feed on grass and corn, especially barley. Wing expanse: 32—38 mm. Géryville and Guelt-es-Stel (Algeria).

#### 46. Genus: **Parasemia** Hbn.

*P. plantaginis* L. (Vol. 2, p. 81, pl. 16 d, e) is a favoured subject for denominations! Pale, more or less albinotic specimens are named: — *laemmermanni* Oberth. forewings brownish in tone, hindwings pale reddish; described from Alsace. — *gradli* Meyer has pale yellowish forewings with only faintly reflected ochreous markings, only costa and inner margin and the apical markings are slightly darker. Hindwings pale brownish with markings just a shade darker. From a single specimen. — *rondoui* Oberth. has completely yellow-white forewings, only traces of blackish markings at costa and apex; hindwings unicoloured orange. — *alba* Kaucki is the extreme of this form, as all wings are unicoloured white and almost devoid of any sign of markings. — *schawerdae*. *schawerdae* Heinrich is a transition form to the blackened forms. All the yellow-white markings of forewings and the yellowish colour of hindwings are suffused with dusky blackish, also on the underside. Described from the Grisons. — *confusa* Stgr. is dull black on forewings with impure yellowish markings; in outer area these do not form "x"-shaped marks but there is a short apical band and in front of same a parallel transverse band, which does not unite with the white innermarginal band. Hindwings impure grey-yellow with diffuse black markings in which the 3 spots before the outer margin merge. From Baden. Very similar, if not synonymous we have — *pallida* Schoenfeld, which is characterised by its dull colouration; instead of deep black markings they are grey-black, the brilliant yellow of hindwings is substituted by a dull ochreous. From Egerland. — *albidior*. To the forms grouped around *hospita* we have — *albidior* Heinrich with a considerable increase in the extent of the white colour, especially in marginal area, a counterpart to the yellow form *henrichoviensis*. Specimens



of the ♀ type in which on the hindwings the basal black is confluent with the lowest black marginal spot so that an isolated round red spot encircled by black is created at the anal angle, are named **insulata** Siegel. — *insulata*. **seminigra** Schwing. has an almost completely black basal area, the marginal area is bright yellow with a few *seminigra*. minute black spots. — **impunctata** Höfer is a form in which the discal spot of forewings is almost entirely ab- *impunctata*. sent. — **interrupta** Schaw. is widely marked with pale patches, the long innermarginal streak is interrupted. *interrupta*. Bosnia. — **fulva** Fetting is a ♂ form with vivid yellow-red hindwings and a transition to the form *fulva*. — **auriantia** Schaw. is probably the corresponding ♀ form with orange-yellow or orange-red hindwings. — **flavoradiata** *auriantia*. Schaw. has quite black hindwings with orange streaks through the cell and at inner margin. — To the *hospita* *flavoradiata*. forms there are to be added — **scalena** Derenne with increased black on forewings, whilst hindwings show an *scalena*. extension of white. — **uralensis** Krul. is similar to *hospita* with local characteristics, the black margin of hind- *uralensis*. wings is reduced. Urals. — **patruelis** Jach. is similar, but the abdomen and underside of hindwings are yellow *patruelis*. with very minute black spots, on forewings the white spots are small. Also from the Urals. — **stötzneri** O. *stötzneri*. B.-H. (6 h) belongs to *floccosa* Graes. It has considerably reduced white markings on forewings of ♂♂, the costal spot, apical spot and the transverse band extending to the anal angle are separate; hindwings with wide-cell spot. The ♀ has yellow hindwings with black basal area. Szechuan. — **sachalinensis** Mats. (6 h) belongs *sachalinensis*. to the subspecies *macromera* with enlarged white discal spot, which is widely united with the inner margin. Very common on Saghalin. — **araitensis** Mats. from the Kurile Islands has black hindwings in the ♀ with wide *araitensis*. orange-yellow marginal band with a black spot near the end in cellule 2.

#### 47. Genus: **Orodemnias** Wallgr.

*O. quenselii* Payk. (Vol. 2, p. 82, pl. 16 g). — **norvegica** Strd. (= *gelida* Schöyen nec Möschl.) is the *norvegica*. northerly form which is distinguishable from the Swiss type by its more considerable size and deeper, bolder yellow markings, hindwings with yellow-white streak markings. — **integra** Dhl. is a ♂ form with completely *integra*. black hindwings. Rare in the Glockner and Ortler territories. — **pseudoliturata** Dhl. (6 h as „falloui“) is a ♀ *pseudoliturata*. form in which on the forewings the black stripes are more or less extinct, so that they appear as elongated streaklike dots; in extreme specimens there are only 2—3 dots at base of wings, a transverse row in central area and a submarginal row of dots in the interstices. Hindwings yellow with 3 central spots, a further one at apex and in the centre of outer margin. This latter form is named — **gelpkei** Dhl. From the Stifiser Joch *gelpkei*. and Piz Umbrail. — **daisetsuzana** Mats. resembles *liturata* in colour and markings; the streaks along the veins *daisetsuzana*. and the submarginal zigzag band are pale yellowish, hindwings dark, with pale yellowish spot in disc, so that the dark disco-cellular nervule is clearly marked. In the ♀ the markings are white. Hokkaido. — HAMPSON'S classification of *quenselii* and *cervini* in 2 separate Genera is justified, as the two species are quite differently built anatomically and are in no way closely related, *quenselii* belongs to *Apantesis* Wkr. (on forewings vein 6 rises below the upper angle of cell, 10 free out of the cell), whilst *cervini* belongs to *Phragmatobia* Steph. (6 rises from angle of cell, 10 together with 7, 8 and 9 occasionally even more rise on a common stalk). According to this *Orodemnias* could actually be withdrawn.

*O. cervini* Fall. (Vol. 2, p. 82, pl. 16 g). — **rougemonti** O. B.-H. is a form in which the ground colour *rougemonti*. is ochreous as in *hnatecki*, but the markings are as bold and black as in the type form. From the Angstbord Pass (Valais). — *hnatecki* Frey has meanwhile been discovered in the Inner Oetz valley near Vent.

**O. püngeleri** O. B.-H. (6 i) is a highly interesting discovery from the Sajon mountains, which is very *püngeleri*. close to *cervini*; it is much larger and more sleekly built, the body being relatively small in comparison to the wide wings. Forewings thinly scaled, black, markings in the same formation as in *cervini* but more distinctly and clearly outlined, the veins all daintily yet distinctly yellowish white. Hindwings grey-white in the type with 3 marginal spots and a central spot below the cell, collar and tegulae edged with yellow. Body black with yellowish abdominal rings. The ♂ has narrow ochreous costa and fringes and vivid ochreous yellow anal hairs; hindwings with 3 large round submarginal spots and beyond same a narrow black marginal band which is extended inwards in a triangular dentation on vein 4. Obo Sarym, Munku Sardyk, Mondy. Mr. O. BANG-HAAS very kindly sent me a number of varieties. — **immaculata** O. B.-H. i. l. has grey-white hindwings devoid of markings. — *immaculata*. **flava** O. B.-H. i. l. (6 i) has pale ochreous yellow hindwings. — **bicolor** O. B.-H. i. l. (6 i) denotes specimens with *flava*. pure white markings on a jet-black forewing whilst the yellowish hindwings have a small black marginal spot *bicolor*. between veins 2 and 7.

#### 48. Genus: **Oroncus** Seitz

The classification of the species of this Genus under that of *Phragmatobia* Steph. seems justified as there are no anatomical differences.

*O. tancrei* Sigr. (Vol. 2, p. 83, pl. 16 h) is no doubt the same species as *urania* Püng. (ibid.) which was described much later. During the last years a large number of specimens have been captured among which



- neptunus*. all transition forms have been found. — *neptunus* O. B.-H. has a completely transverse oblique white band from the tip of the costal streak to the inner angle, joining up with the apical band. — *fulminans* O. B.-H. has red instead of yellow hindwings. — *fumosa* O. B.-H. has dusky suffused hindwings. — *fasciata* O. B.-H. (6 i) is described as a subspecies, it has only a mildly rounded curve in the yellow-white undulate line at vein 4 instead of the sharp angle as in *tancrei*, hindwings deeper yellow-red. This race is said to be constant at Djar-kent. — ab. *pura* O. B.-H. has unicoloured hindwings devoid of spots. — *alaica* O. B.-H. is similarly claimed to be a subspecies, it only has traces of a subapical band in an indistinct pale costal spot, the yellow-white oblique band from the end of the costal streak to the outer margin forms quite a straight line to the anal angle and is frequently dissolved into 3 separate spots; the costal streak, especially distinctly in the ♂, has 1—2 black spots or is quite interrupted before the oblique stripe. Ferghana (Transalai and Alai).
- wagneri*. **O. wagneri** Püng. (7 b) is very close indeed to the form *alaica* of the preceding species and is presumably a *Phragmatobia* according to HAMPSON's classification and not a *Micrarctia*. Forewings grey-black with white markings, which are similarly shaped to those of *M. glaphyra* but somewhat more widely formed and more diffuse, partially extinct. Hindwings a bright yellow without discal spot, the veins somewhat darker, a black longitudinal streak on vein 2 and 3 black spots submarginally, the margin narrowly black in the apical half, fringes yellow. The ♀ is larger, the white markings more extensive, hindwings more reddish yellow. Thian Shan (Sary Djas) captured by RÜCKBEIL.
- secreta*. **O. secreta** sp. n. (6 i) is still closer to *tancrei* than the preceding species and is similarly certainly a *Phragmatobia* and I am only placing same here in order to group similar species together. Contour of wings wider and more pointed, thinly scaled, grey-black with pale yellow costal streak in which is situate a blackish basal spot and it is interrupted in the outermost sixth by a spot which is indistinctly extended downwards to vein 6, a similar dark spot is placed at end of cell. Hindwings ochreous yellow, base blackened, behind the cell there is an angulated costal spot extending downwards to vein 5 and a black marginal band with yellow patches between 2 and 6. Fringes yellow. Body black with yellow spotted collar and ochreous lateral hairs on the 4 last segments. Described from 2 identical ♂♂ from N. Kansu captured by STEYLER missionaries and placed at our disposal by Mr KOTZSCH of Dresden-Blasewitz.

#### 49. Genus: *Micrarctia* Seitz

From an anatomical standpoint *Micrarctia* should also be grouped under *Phragmatobia* Steph. we are only retaining same here so as to assemble the various small species that are relatively so similar and closely related.

- glaphyra*. **M. glaphyra** Ev. (Vol. 2. p. 83, pl. 16 i). We are illustrating (7 a) a ♂ of this species. Mr. O. BANG-HAAS has taken the trouble to classify the many forms of this species scientifically. The ♂ has ochreous yellow hindwings, the ♀ reddish. The type form occurs in the Tsungaric Ala Tau in the N. E. Thian Shan and not in Altai and Siberia. In order to have a better survey we are enumerating here again all the forms mentioned in Vol. 2. — *obscurata* Böttcher (= *tristis* Seitz, *fumosa* Niepelt) with adumbrated forewings. — *amabilis* Böttch. (p. 84) with wide white transverse band through centre of forewings. — *rosearia* Seitz (p. 83) ground colour of forewings rose instead of white. — *flava* O. B.-H. from the southern Thian Shan, Juldus, has yellow hindwings in all shades from reddish to lemon-yellow. — *illustrata* O. B.-H. has white ground colour to both wings. — *nigroradiata* O. B.-H. Here the black marginal spots of hindwings are joined up to the base by black streaks. — *püngeleri* Böttch. (p. 84) has completely black hindwings. We are illustrating this form (7 a). — *nigromarginis* O. B.-H. from Margelan is described: marginal spots of hindwings joined together forming a wide marginal band. — *gratiosa* Böttch. (= *gratiosa* Seitz, Vol. 2, p. 83, pl. 16 i) (nec *gratiosa* Gr. Grsh.) has no central spot on hindwings. — *manni* Stgr. (Vol. 2, p. 83, pl. 16 i) is a remarkably large form with scarlet hindwings which are paler in ♀; markings of forewings pale sulphur yellow. From Kunguesse in N. E. Thian Shan; this form may be a local race. — *aksuensis* O. B.-H. (7 a) from the mountains of Aksu is very pale, poor in markings with especially narrow and pointed wing contour and thinner scaling, the ♀♀ especially pale. — *naryna* O. B.-H. is a very large form that is close to *manni* with deep scarlet hindwings and heavily reduced black spot-markings; on the other hand the black ground colour of forewings is very extended, the pale yellowish line markings are therefore very narrow. From the mountains around the town of Narynsk, south of Issyk-Kul. — *dublitzkyi* O. B.-H. (6 k) is larger than all other forms, its form like that of *naryna*, ground colour of forewings bright golden yellow. From mount Koum-Bel near Alma Ata. — ab. *victori* Dublitzky is based on a specimen with reduced black markings. — *gratiosa* Gr. Grsh. (nec *gratiosa* Seitz, Vol. 2, p. 83, pl. 16 i) differs from the *gratiosa* dealt with in Vol. 2 and about which we reported above, by the heavy marginal spots of hindwings which conjoin forming a marginal band (as in ab. *nigromarginis*) and similarly the central spot of hindwings is absent or only very faintly indicated. Ferghana. — ab. *flava* O. B.-H. is the same form with yellow hindwings. Margelan. — *rupicola* Gr. Grsh. (Vol. 2, p. 83, pl. 16 k). From a single ♂ from Transalai (Aram River) caught at an altitude of 10 000', was illustrated in Vol. 2 from a copy and is not identical with *glaucica* Stgr. which has faintly violet-grey forewings, whilst in *rupicola* they are white-grey with faint roscate hue. — *postflavida* Hamps. (Vol. 2, p. 83) which was enumerated as a genuine species in Vol. 2, should also be classified



here; forewings black-brown, whitish markings reduced to narrow lines. Hindwings orange-yellow, peppered with blackish and with wide black marginal band. Kashmir.

**M. buraetica** O. B.-H. (7 a) is a newly described species, which no doubt is very close to the preceding. *buraetica*. Ground colour of forewings white to yellowish white, the black spots separated from one another by fine white lines, more constant in form and colouration than in *glaphyra*; 2 acute points touch the margin and two fine lines, one ending before the apex, the other at anal angle; hindwings bright yellow, base and inner margin black with 3 large black marginal spots which almost conjoin with marginal band and a heavy roundish central spot. Abdomen black, segments with yellow edges and a dorsal stripe. Tannuola mountains, Shawyr and Sajan mountains, Mondy; in July at an altitude of 2500 to 3000 m. — subsp. **validus** O. B.-H. from Trans-baikal is much larger than the type form, wing expanse 31 mm, markings of wings purer white, perhaps slightly wider, the spots on margin of hindwings somewhat further apart from one another. — subsp. **elwesi** O. B.-H. *elwesi*. is smaller with narrower forewings, marginal spots of hindwings completely conjoined forming a wide marginal band. From Ongodai in the S. E. Altai.

**M. kindermanni** Stgr. (Vol. 2, p. 84, pl. 16 k) like *glaphyra* this is an uncommonly migratory small *kindermanni*. species. The origin of the type, stated to be the Urals, appears to be wrong, as the species has never been rediscovered there. Two specimens are mentioned from Minussinsk which are said to be from there. Smaller, otherwise marking and colouration as in *mongolica* (Vol. 2, pl. 16 k), hindwings pale orange-yellow. — *pomona* Stgr. has very wide white markings on forewings and lemon-yellow hindwings. Apfel mountains. — **roseni** O. *roseni*. B.-H. (6 k) is an unusually large, very nice form, the ♂ with red hindwings, black base and 2 large marginal black spots; ♀ very light with wide yellow-grey bands of spots and dull ochreous hindwings with relatively small spots. Closely resembles *pretiosa*. From Chita. — *pretiosa* Stgr. (Vol. 2, p. 78) should be classified as a form here and not to *Ocnogyna*. — **ussuriensis** O. B.-H. (6 k) is very like *pretiosa* and the illustrations in Vol. 2, *ussuriensis*. pl. 14 e as *pretiosa* represent this form. Larger than these with more extensive black spots, ground colour of ♀ is dusky brownish, the yellow of hindwings peppered with black. Ussuri territory. — **albovittata** Rothsch. *albovittata*. should similarly be classified as a form of *pretiosa*, it has pure white bands on forewings instead of the yellow-grey. From Kuku-Nor.

**M. erschoffi** Alph. (Vol. 2, p. 84, pl. 16 k). As already stated in main Volume it is better to deal with *erschoffi*. this insect and its group of forms, as a species, which normally differs by having red instead of yellow hindwings. — ab. **flava** O. B.-H. is the rare form with yellow hindwings from Kuldja. — *issyka* Stgr. (Vol. 2, pl. 16 k) *flava*. has ochreous yellow instead of white ground colour and larger marginal spots on forewings. — **serarum** Gr. *serarum*. Grsh. (= *schottlaenderi* Strd.) (7 b as *schottländeri*) differs by the absence or almost complete absence of the spots of hindwings and on the forewings it has a very wide pale transverse band through the disc. From Naryn. — ab. **infrapicta** Strd. has a faintly roseate hue to markings of forewings. — **korlana** O. B.-H. is half-way be- *infrapicta*. *korlana*. tween *serarum* and *mongolica* differing from the latter by white ground colour to forewings and smaller black spots. Spots of hindwings reduced in size. From Korla. — *mongolica* Alph. (Vol. 2, pl. 16 k); the markings of forewings should be a shade more yellow than shown in our illustration in main Volume. — **selmonsi** Böttch. *selmonsi*. (7 a) is a very small form, close to *ferghana* but with yellowish ground colour with small black spots. Hindwings intensively red, also on underside. West of Narynsk on the Naryn river. — ab. **transversata** Böttch. has *transversata*. the 2nd band of forewings (from base) extended to inner margin. — *ferghana* Stgr. (Vol. 2, pl. 16 k) differs from *selmonsi* by the pure white ground colour with larger black spots and less intensively red hindwings with yellow underside. — **marxi** O. B.-H. (7 a) from the Himalayas, N. E. of Simla is still more intensively yellow than *marxi*. *selmonsi*, all transverse bands extending to the inner margin; upper and undersides of hindwings deep scarlet with heavy black basal dusting and 3 small marginal spots. Abdomen black on top and yellow underneath.

**M. ladakensis** O. B.-H. (6 k) from Ladak can scarcely be called palaearctic. Forewings deep black with *lada-* *kensis*. 4 yellowish white bands, the conjoining longitudinal streak of the previous species is absent, otherwise very similar; the 1st and 3rd bands extend to the inner margin, respectively anal angle. Hindwings reddish yellow in ♂, red in ♀ with 2 black marginal spots and in the ♀ with central spot and a faint transverse band. Body black, abdomen with red longitudinal stripe. It certainly does not belong to *Oroncus*.

##### 5. Subfamily: Spilosominae.

#### 50. Genus: **Spilarctia** Btlr.

**S. lutea** Hufn. (= *lubricipeda* auct.) (Vol. 2, p. 84, pl. 15 a as „*lubricipeda*“). By the utilisation of the *lutea*. name *lubricipeda* for *lutea* and also for *menthastri* a great deal of confusion has been caused among the forms. For instance — *walkeri* Curt. is referred to by many authors and also in the main Volume (p. 87) as a form of *menthastri*, whilst actually it is a transition to *zatima* and belongs here. It differs from the latter by the presence of the yellowish spots of the ground colour behind the cell; hindwings remain light. — A further variety of *zatima* has been obtained from cross-breeding of Heligoland strains and named — **frisja** Müller, only the *frisja*. wings are with typical *zatima* markings whilst the body is ochreous yellow as in the main type form. — **hip-** *hipperli*. **perti** Lamb. is a form of the ♂ as pale yellow-white as the ♀. — When hindwings are devoid of markings but



- paupera*. forewings like type form, it is **paupera** Hoffm. — **semiunicolor** Vorbr. denotes the same form, but the central spot is still retained. — **ustula** Krul. has thorax and apex of forewings blackened. — **laxi** Lax is a transition to same, only the apex of forewings is grey-brown and a few of the black spots of forewings and hindwings are absent. From a single specimen from Graz. — **nigrita** Mannes denominates a strange ♀ from Augsburg; the forewing is suffused with black from outer margin to the centre with irregular yellowish spots therein, hindwings are asymmetrically spotted with black. — **hartigi** Dhl. are extreme *fasciata* specimens in which the spots that form the transverse band are extended forming more or less dense radial streaks and with a wide black costal stripe from costal spot to base. From around Bolzano. — **namurica** Strd. (= *fasciata* Dufrane nec Tugwell) from one ♀ is darker yellow than normal with black band which is intersected by light coloured veins, extending from inner margin to the central costal spot and not to the apex, forming a sharp angle in the middle; the black marginal spots are extended forming streaks. From Belgium. — **guerinii** Guart resembles the preceding form on forewings, but also the hindwings have a similar band, although same is not such an intensive black. Belgium. — subsp. **japonica** Roths. is paler yellow than name type, forewings have the black antemedian costal spot, a dot in the upper angle of cell, the oblique row of spots; on underside the black streak below vein 2 is absent. From Ussuri and Japan.
- flexomaculosa*. *S. casigneta* Koll. (Vol. 2, p. 85, pl. 15 b). — **flexomaculosa** Kard. Forewings with 3 black basal dots under the black costal streak, a small black dot at end of cell; the postmedian spots form heavy streaks from costal margin to inner margin and in an arc to apex; hindwings with distinct discoidal spot. Isle of Narwa (Amur).
- japonensis*. *S. inaequalis* Btlr. (Vol. 2, p. 86, pl. 15 c). We are now illustrating the ♀ (7 b).
- tsingtauana*. *S. rhodophila* Wkr. (Vol. 2, p. 86, pl. 15 c). — **japonensis** Roths. (Vol. 10, p. 239, pl. 21 e) is close to the west chinese *unilinea* Roths. (ibid.) but is smaller with more rounded wing contour and the 2nd transverse band of forewings is interrupted. Japan.
- aurantiacana*. *S. robusta* Leech (Vol. 2, p. 86, pl. 15 c). — **tsingtauana** Roths. is a still larger form, forewings pure white and spots reduced in size. From Tsingtao.
- aurantifemur*. *S. stigmata* Moore (Vol. 2, p. 86, pl. 15 d). — **aurantiacana** Strd. (= *aurantiaca* Roths. nec Holl.) with orange-yellow hindwings occurs in W. China on palaearctic territory, similarly — **aurantifemur** Strd. (= *Hmps.* ab. 1) where the femora and upperside of abdomen are orange coloured. Omei-shan.
- simplicipennis*. *S. nehallenia* Oberth. (Vol. 2, p. 446) is illustrated (7 b as „*lewisi*“).
- postmedialis*. *S. imparilis* Btlr. (Vol. 2, p. 87, pl. 15 f). — **simplicipennis** Strd. (= ab. 1 *Hmps.*) has forewings devoid of markings, only a black spot is retained in the middle of costa of forewings. Japan.
- pallivenata*. *S. infernalis* Btlr. (Vol. 2, p. 87, pl. 15 f). — **postmedialis** Strd. (ab. 1 *Hmps.*) has a postmedian row of spots on forewings from vein 5 to inner margin and a subterminal spot placed above vein 5. Hindwings without spots. Japan. — **pallivenata** Mats. has black-brown forewings with light coloured veins and no other markings. Head and thorax yellowish grey. Hokkaido.
- obliquizonata*. **S. obliquizonata** Miyake. Ground colour of ♂ pale reddish yellow, abdomen red with rows of black spots, dorsally and laterally. The inner band of 3 black spots forms a straight row, costa narrowly black from base to 1st spot; a row of broad black spots extends from apex to the centre of inner margin, intersected only by the light veins; a short row of spots extends from threequarter way along the costa obliquely outwards merging with the main band. Hindwings whitish, tinged with brown at inner margin with dark spots at discoidal nervure and 3 submarginal spots. The ♀ is larger and more boldly marked. Wing expanse: ♂ 42 mm, ♀ 52 mm. Japan.
- hirayamae*. **S. hirayamae** Mats. closely resembles *obliquizonata* Miyake; the black costal marginal spot on forewings is absent in the ♀, at discoidal nervure there are 2 small black-brown spots, the central band of spots is interrupted between veins 4 and 5 and separated from the oblique apical band that bends slightly towards the margin; on inner margin there are 2 black dots. Hindwings with black spot between veins 5 and 6 near the margin. Abdomen spotted with black on upperside between the 2nd and 4th segments. Wing expanse: 50 mm. Tokyo.
- jezoensis*. **S. jezoensis** Mats. similarly described from a single ♀. It has pale yellow-white forewings with a brownish spot at upper angle of cell. Hindwings scarcely paler, without spots. Head and thorax yellow-white, base of palpi orange, tips black-brown; neck and edge of collar orange. Abdomen orange, yellow-white at apex, the 3rd segment has a black spot in middle of upperside, yellow-white on underside. Legs black, hindlegs black-brown with whitish tarsi. Wing expanse: 60 mm. Hokkaido.

51. Genus: **Spilosoma** Steph.

- brunneoides*. *S. menthastri* Esp. (Vol. 2, p. 87, pl. 15 f). — *brunnea* Oberth. is changed into — **brunneoides** by STRAND, because of there a being *brunnea* Mr. in the Genus *Diacrisia* Hamps. (sensu latiore). — **transitoria** Oberth.



is a transition to same with faint brownish tone. — *walkeri* Curt. is, as already mentioned under *Spil. lutea*, to be removed from here and classified under the latter species. The analogous group of forms of *menthastris* would be: **godarti** Oberth. (= *albiramis* Strd., ab. 3 *Hamps.*) in which the interstices between the veins are streaked with black, so that only the veins, narrow streaks between same and a row of spots at margin remain white. — **costa nigra** Lamb. has costa including apex, the upper half of outer margin and fringes a dusky black. — **marginestriata** Mezger is very similar but it has also black striations in the interstices at margin extending into the fringes. Neuilly-sur-Seine. — **drueti** Derenne is an asymmetrically marked dusky pathological variety of ab. *costa nigra* Lamb. — **tripuncta** Lamb. has only 3 black dots near base on forewings and hindwings devoid of markings. — **unipuncta** Strd. has only one central spot on hindwings. Oslo. — **apicistrigata** Kard. has only fine black apical streaks on forewings, all other spots are absent; hindwings pure white. Vladivostok; Narwa Island. — **fasciata** Closs has spots partially confluent forming transverse lines, the reverse form to *godarti*. From a single specimen from the neighbourhood of Berlin. — **pura** Vorbr. (*Krüger* i. l.) is pure yellow on upper-side of abdomen, only the last segment is white and all black spots are absent. — **flavotergata** Kard. is probably very similar. The black spots on abdomen are missing. Amur territory, Narwa Island.

*S. punctarium* Cr. (Vol. 2, p. 87, pl. 15 g) is certainly a genuine species. — **opulenta** Kard. is a more richly spotted form; black spots on forewings enlarged, a marginal row of black dots from apex to anal angle, also on hindwings to halfway across. Amur territory, Narwa Island.

*S. urticae* Esp. (Vol. 2, p. 88, pl. 15 g). Specimens quite devoid of markings are — **blanca** Schaw. (= *peralbata* Dhl.). — **nigrostriata** Schaw. the rows of black dots are conjoined forming 3 black longitudinal streaks, one at costa with 2 below. — **radiata** Spul. is probably the same, it is described as having black rays at costa, at posterior and anterior edges of disc and a row of black dots between veins 1 and 2. — **alexandri** Pászsky denotes specimens with pure white wings on upper and undersides. — **anomala** Maslowscy has the apical part of forewings divided by a short oblique row of black dots as in *menthastris*.

**S. mandli** Schaw. (7 b). The ♂ resembles the ♀ of *menthastris*. Antennae are purer white, pectinations much shorter than in *menthastris*, more like in *urticae*. Forewings narrower, 4 small black streaks, not spots, in basal area; a row of black streak-like spots in centre, forming a sharp angle pointing outwards, behind centre a further row of spots and streaks, which almost forms a line, 3 small double streaks at apex; 3 smaller ones in centre of outer margin; fringes white. Hindwings white, a black double streak sometimes in the middle. Abdomen ochreous yellow with 2 rows of black dots. From Nikolsk Ussurijsk, but apparently widely distributed, having been captured also in Hungary (Igló) and probably only not observed owing to its similarity to other similar species.

**S. irregularis** Rothsch. Head and thorax pure white, vertex, collar and tegulae and centre of thorax spotted with fawn. Palpi and antennae brown, femora of forelegs carmine-red on upperside; abdomen pale carmine-rose on upperside with brown bands, white underside, basally and at tip. Forewings pure white with pale brown subbasal band and with a row of small irregular dots before the centre; in the centre a wide irregular band, beyond same a band of small dots and spots and posterior to same an irregular band, interrupted between veins 3 and 4. There is a row of sagittate marks subterminally and a row of dots on margin. Hindwings white with pale brown discal dot and a subterminal band of spots, which expand towards anal angle. Wing expanse: 60 mm. Central China.

**S. rostagnoi** Oberth. (Vol. 2, p. 446). Thorax white with black spots on tegulae and metathorax. Abdomen scarlet with black dorsal and lateral spots, underside white. Forewings white, a black streak at base of costa, a curved row of spots before centre, an oblique row of partially conjoined spots in centre; posterior to same a further row of spots from costa to vein 3, the uppermost of which is conjoined with an oblique band of spots extending to apex; subterminally there are 4—5 spots and black dots on the fringes. Hindwings white with black discal spot and 5 small subterminal dots; extremities of fringes black in centre. In the ♀ the spots are increased in size, hindwings have a black subterminal band of spots. Wing expanse: 58—62 mm. W. China (Siao-lu).

### 53. Genus: **Lacydes** Wkr.

*spectabilis* Tausch. (Vol. 2, p. 89, pl. 15 i) which was classified here, is now placed to the Genus — **Volgarctia** Alph. — *semiramis* Stgr. (Vol. 2, p. 89), which it appears was originally described from Egin, Asia Minor, seems to me to belong to the Genus *Phragmatobia*.

### 57. Genus: **Areas** Wkr.

*A. galactina* Hov. (Vol. 2, p. 91, pl. 17 b). — **ochracea** Mell. has all spots yellow-brown, which in the name type form are carmine-red; the black spots on the body are larger; margin of forewings is more or less



black. On hindwings this is only the case at anal angle. Kwangtung.

### 58. Genus: **Arctinia** Eichw.

*furcula*. *A. caesarea* Goeze (Vol. 2, p. 91, pl. 17 b). — **furcula** Bryk is a pathological aberration with pronounced stalks to veins at the upper angle of cell.

### 59. Genus: **Diaphora** Stph.

*mendicana*. *D. mendica* Cl. (Vol. 2, p. 91, pl. 17 b). — **mendicana** Strd. (= ab. 2 *Hmps.*) is a form, more or less covered with brownish black streaks and spots. — **sabulosa** Derenne denotes a large ♀ with sandy coloured forewings, the milky white hindwing as in type and spot marking also. — **venosa** Adkin from Ireland is pale grey in both sexes, the veins standing out slightly darker and usual black spot marking. — **hibernica** Oberth. *micheli*. is probably the same, a pale grey form without other variation, from Ireland. — hybr. **micheli** Grosse denotes an interesting cross between *menthastri* ♂ + *mendica* ♀ with very variable results. The moths are smaller than *mendica* and *menthastri*, the ♂ pale sandy to ashy grey with the markings of *mendica*, the ♀ like normal *mendica* ♀♀ only smaller and with shorter hairs on abdomen. The larvae only moulted three times.

*curula*. *D. sordida* Hbn. (Vol. 2, p. 92, pl. 17 c). — **curula** Th.-Mieg. denotes a pale grey ♂ with blackish apex and margin to forewings.

*djamila*. *D. luctuosa* Hbn.-G. (Vol. 2, p. 92, pl. 17 d). — **djamila** Schaw. is a form with heavier spots, especially the subterminal row on hindwings is heavily developed. Herzegowina. — **janeckoi** Schaw. is a large form of same, the ♀ pale yellow-grey, the ♂ more an impure grey with fainter markings, abdomen devoid of spots. *pantherata*. From Trebevic. — **pantherata** Schaw. are extreme specimens of *djamila* in which the black spots are partially conjoined forming transverse bands, the 3. basal indicated, the premarginal band of spots incomplete.

### 60. Genus: **Rhyparia** Hbn.

*R. leopardina* Mén. (Vol. 2, p. 93, pl. 14 g) has been renamed *leopardinula* by STRAND, because HAMPSON had placed this species and *leopardina* Koll., which is older, in his Genus *Diacrisia*. As we deal with these species in quite different Genera, we retain the previous name.

*R. purpurata* L. (Vol. 2, p. 93, pl. 14 h). — *flava* Stgr. (= *rhypariella* Strd.) is illustrated (7 c). — *transiens*. Transition forms are: — **transiens** Spul. with hindwings discoloured yellow from inner margin and margin *flavescens*. and — **flavescens** Spul. with pale yellow-red hindwings. — **uralensis** Spul. is very close to *caucasica* Alph. with *uralensis*. black markings strongly reduced, only costal spots and remnants of a marginal band of cell spots on forewings, hindwings with sparse black spots, with intensively orange yellow hindwings in ♀ with discal spot, dorsal spots of abdomen faint, sometimes quite absent. From the S. Urals. — **ochrata** Wagn. belongs to the generally adumbrated forms, thorax, forewings and abdomen show a richer deeper ochreous yellow colouration. — *obscura*. **obscura** Rehberg has deep black forewing spots of normal size; the band at base of hindwings is dissolved into 2 dots or distinctly constricted; the specimens are somewhat smaller. Bremen is indicated as origin. *obscuras-* Probably the name replaces *atromaculata* Galv. — **obscurascens** Strd. is a name given by STRAND in place of *cens*. *obscura* Schultz, which has only recently been given and should not be confused with *obscura* Rehberg just *paradoxa*. mentioned and with which it is not identical. — **paradoxa** Philipps (7 c) illustrates the degree to which these aberrations can go. The spots of forewings and hindwings are compressed to marginal bands of half the width of the wings. Thanks to Dr. PHILIPPS we are in a position to illustrate this remarkable form. — **marchica** Closs is stated by its author to be a subspecies from the neighbourhood of Berlin. It is said to be smaller with more acutely pointed wings. Spots smaller and blackish, not grey, with inclination to be absent. In comparison to *berolinensis* Fuchs a further subdivision seems unjustified nor is there any reason to claim the rank of a sub- *rubescens*. species. — **rubescens** Closs are specimens of *marchica* with forewings suffused with reddish. — **griscenscens** Closs *griscenscens*. denominates a ♂ bred from Berlin in which the red of hindwings is replaced by grey, there is only a faint *gerda*. reddish hue left at base, spots diffuse; underside of forewings is red. — **gerda** Warncke on the other hand seems to be a genuine subspecies. The grey-black spots in inner and central areas of forewings are very small, partially extinct, whilst at outer margin they are wide and contiguous, especially in the ♀; similarly in the ♀ the black spots of hindwings in front of the outer margin are very large. The black spots on abdomen are very *barteli*. small or quite absent. Underside only suffused with red to a very small degree. Amur territory. — **barteli** Krul. from the southern Urals also has reduced spots, but even those of the outer area of wings are not enlarged, the colour of same is dull. Later on the author himself admits that this form coincides with *uralensis* Bartel.



61. Genus: **Rhyparioides** Btlr.

*B. amurensis* Brem. (Vol. 2, p. 94, pl. 14 i). — **obliterata** Kard. Both wings devoid of markings, only *obliterata*. with a faint ochreous stripe and spots and one dark dot near the middle of inner margin. Hindwings with small diffuse pale brown spots with yellow surrounds. Barabash (Amur). July.

*R. subvaria* Wkr. (Vol. 2, p. 94, pl. 14 k). — **flavidior** Oberth. is a form with much brighter ochreous *flavidior*. yellow colouration from W. China.

**O. okinawana** Mats. Described from a single ♀, is said to be very like *metelkana* (Vol. 2, pl. 14 i). Fore- *okinawana*. wings yellow-brown with 6 diffuse brownish spots, one in centre of cell, one in centre of mediana, one each at angles of cell, two subterminally between veins 2 and 3; between veins 5 and 6 of hindwings scarlet with black discocellular spot with a black line from its lower extremity to the base; 5 subterminal spots, the two subapical ones being smaller than the others. Underside orange-yellow with black spots. Head and thorax yellow, abdomen orange with black dots dorsally and laterally. Legs scarlet, tibiae and tarsi black-brown. Wing expanse: 37 mm. Okinawa (Japan).

62. Genus: **Diacrisia** Hbn.

We consider HAMPSON's separation of *sannio* from the large group classified under the Genus *Diacrisia* to be correct. The characteristics mentioned in the main Volume, the sleeker build and the sexual dimorphism among others, suffice to separate same; *sannio* is the original type for the Genus *Diacrisia*.

*D. sannio* L. (Vol. 2, p. 94, pl. 14 k). In this species we have the following further denominations: — **vulpinaria** L. denotes the northern race according to BRYK, separating same from *sannio*, the mid-european *vulpinaria*. type. The latter has paler undersides to the wings. The following forms belong to the former: — **bohmanni** *bohmanni*. *Bryk* with dark cell spot on hindwings, — **lativittata** *Bryk* with wide outer margin to hindwings. — **karelica** *lativittata*. *Bryk* with completely red cell spot on forewings. — **nebulosa** *Bryk* (7 e) has ashy grey-brown hindwings without *karelica*. spots. — **derosata** *Closs* denotes a ♂ from the neighbourhood of Berlin without any rosy-red colouration. — *nebulosa*. *derosata*. **schawerdae** *Anger* is a nice aberration with normal forewings and hindwings densely and uniformly dusted *schawerdae*. with rosy red; from Cervignano. — **krejai** *Closs* (= *krejae* *Strd.*) differs from *karelica* by its completely brown- *krejai*. black cell spot. — **immaculata** *Oberth.* are aberrative specimens without any central spot. Such specimens *immacu-* *lata*. were already mentioned in Vol. 2 from the Valais, similar to *moerens* *Strd.*, but in the former the hindwings are only adumbrated in the ♀ sex. Similar specimens occur in the Aosta Valley: — ab. ♀ **montana** *Gian.* In *montana*. Turin very pale specimens occur: — **pezzi** *Rocci*; here the ground colour of the ♂ is pale yellow with faint *pezzi*. rose markings on forewings; hindwings are scarcely pale yellowish, almost white, the dark submarginal band and central spot are totally absent. The original description gives no particulars of the ♀. — **aestiva** *Costantini* *aestiva*. are smaller specimens of the 2nd generation from the Emilian Apennines; here the hindwings are scarcely brown, quite yellow. — **hilaris** described by SPULER denotes deep yellow specimens without red and faintly developed *hilaris*. hindwing band of grey colour; from Turkestan. — **mortua** *Stgr.* is illustrated (7 e). — **caucasica** *Schaposchnikoff* *caucasica*. are specimens from the Caucassus with increased black. STRAND has unnecessarily altered the name into *caucasiana*; as we consider this Genus to have but the one type and as the other *caucasica* *Alph.* refers to *purpurata* of the Genus *Rhyparia*, this new denomination should be rejected. The same applies to the proposed alteration of *moerens* in *pseudomoerens* *Strd.* (nec *moerens* *Btlr.* as a form of *Arctinia caesarea*) and of *uniformis* *B.-Haas* in *syrdarja* *Strd.* (nec *uniformis* *Mr.* as a form of *Spilosoma punctata* *Mr.*).

63. Genus: **Hyphoraia** Hbn.

*H. festiva* Bkh. (Vol. 2, p. 95, pl. 17 e). Of this species which has been captured more frequently of late years, a number of forms have been named: — **diplosema** *Stich.* are smaller, more thinly scaled specimens *diplosema*. which therefore look paler; the postdiscal markings are conjoined forming an "X" or "R" shaped mark. — **lemniscata** *Stich.* is larger, all bands of forewings strikingly wide, the 2nd costal spot broad, conjoined in an *lemniscata*. angular band with the posterior marginal spot. Hindwings ochreous yellow, only reddish outwardly. — **ery-** *erythema*. **thema** *Stich.* denominated from a single ♀ with intensive red hindwings, the black spots of hindwings outlined by rusty brown. All these 3 forms from the Vilui territory. — **rosea** *Shelj.* has rosy red hindwings extensively *rosea*. dusted with darker scales, the red-brown colour of forewings is darker. From Alexandrowsk (Murmansk coast).

**H. ornata** *Stgr.* (Vol. 2, p. 95, pl. 17 e). Of this beautiful and very variable species, larger quantities *ornata*. seem to have been captured of late years. Mr. O. BANG-HAAS was so kind as to send some of his varieties for illustrative purposes. — **pallida** *form. nov.* (*O. B.-H.* i. l.) (7 d) is a form with whitish hindwings faintly suffused *pallida*. with grey. — **flavescens** *form. n.* (*O. B.-H.* i. l.) has yellow hindwings. — **rosacea** *form. n.* (*O. B.-H.* i. l.) has *flavescens*. *rosacea*. hindwings with yellowish ground colour suffused with rose towards margins. — **atropurpurea** *O. B.-H.* has fore- *atro-* *purpurea*. wings inclined to violet-black ground colour, the yellow spots somewhat reduced in size. Hindwings greyish white with heavily enlarged and confluent spots, so that almost the entire inner marginal area is greyish black. All these forms from Irkutsk Province.



*sub-  
nebulosa.* **H. subnebulosa** Dyar (Vol. 6, p. 325, pl. 42 b). This small species, which was first found in Alaska and which closely resembles *festiva*, differing by its ochreous grey hindwings and the reduced size of spots of forewings, has now also been discovered in northern Siberia at the mouth of the Jenisei. The only ♂ known from there has somewhat more extensive yellow spot marking than the ♀ type, the spots in the centre of costa are confluent, abdomen reddish brown, underside and tuft of abdomen orange red.

*sibirica.* **H. alpina** Quens. (Vol. 2, p. 95, pl. 17 e). We are illustrating again (7 d) this beautiful species from a perfect specimen from Sajon, which has been very kindly placed at our disposal by Mr. O. BANG-HAAS. The species is so variable that scarcely any two specimens are alike, the hindwings occur in all shades of red to yellow. — **sibirica** O. B.-H. from the Altai is more daintily built, the wings somewhat narrower and elongated, colouration of hindwings pale rose. — **johanseni** O. B.-H. is the form from arctic America from Collison Point (North Alaska). It must be mentioned here and it is interesting to find its occurrence in circumpolar regions, just as is the case in *subnebulosa*. It is most similar to *sibirica*, spots of forewings creamy yellow, basal black of hindwings reduced to 2 streaks.

*khumbeli.* **H. seitzi** A. B.-H. (Vol. 2, p. 95, pl. 56 g). As synonyms must be mentioned: *strandī* Niepelt and *niepelt-tiana* Strd. — **khumbeli** O. B.-H. differs from the name type by the dull yellow colouration of the spots of forewings, which are confluent, forming bands, hindwings with duller red colouration. From the northern Central Thian Shan (Alma Ata) at 3080 m. altitude, captured at end of July.

*souliei.* **H. souliei** Oberth. placed by HAMPSON in his group of Genus *Arctia* in juxtaposition to *alpina*. Head red, neck yellow, thorax black with yellowish red streaks, abdomen red with black spots. Forewings dark brown with 6 yellowish red costal spots, a curved stripe from base of innermargin to the centre of the submedian fold and an oblique irregular postmedian band between 3 and the inner margin; an oblique band extends from 4 to the margin along submedian nervure and between veins 6 and 4 there is a subterminal spot with 2 sharp points. Hindwings red with black streak on submedian nervure, minute spots in centre and at end of cell and a subterminal band of spots. In the ♀ the markings of forewings are more extensive and more contiguous, hindwings a purer orange. W. China (Ta-t sien-lu).

*rishiriensis.* **H. aulica** L. (Vol. 2, p. 95, pl. 17 e, f). We are illustrating the forms *hamata* and *radiata* (7 d) mentioned in the main Volume. — **rishiriensis** Mats. has much larger yellow spots, the one at anal angle resembling that of *testudinaria*, the spot behind the cell, as large as the one at end of cell, a small yellow spot between same and the anal spot; hindwings with smaller basal spot, which is separate from the longitudinal streak at inner margin. Wing expanse 34—40 mm. Hokkaido.

*flaveo-  
fulgens.  
perilypa.* **H. testudinaria** Fourcr. (Vol. 2, p. 96, pl. 17 f). — **flaveofulgens** Dhl. is a form from the S. Tyrol in which the rich brown of the forewings is changed to a pale reddish yellow. — **perilypa** Schaw. on the other hand has very dark brown forewings with reduced yellow markings; hindwings with wide black continuous, not interrupted, marginal band, the basal 3rd quite black, with bold black central spot; described from Terlan. — **fasciata** Dhl. are similar, but forewings of normal colouration, only a small dentate band of red is left on hindwings. — **confluens** Dhl. has the long inner marginal spot extended stretching widely over the surface of the wings. — **paucimacula** Dhl. is the extreme opposite with remnants of the dentate outermarginal spot and a dot above same and another one at base of wings. — **nubila** Caradja is probably very similar; forewings completely dark brown or with a circular yellow spot at base; hindwings extensively spotted with black. — *flavescens* Oberth. is synonymous with *crocea* Schultz.

#### 64. Genus: **Pericallia** Hbn.

*marmorata.* **P. matronula** L. (Vol. 2, p. 96, pl. 17 f, g). To the many forms described by SCHULTZ, we have to add the following: — **marmorata** Schulz with heavily enlarged spots on forewings. — **luteotincta** Schultz with orange yellowish ground colour of forewings. — **obliterata** Shelj. is an interesting aberration with yellow forewings, irregularly suffused with brownish; the orange-yellow hindwings entirely or almost devoid of spots, similarly the upperside of abdomen; 2 such specimens bred in S. Russia (Province Kostroma). — **amurensis** Shelj. is much smaller than european specimens, of paler brown almost yellowish colouration, the yellow spots larger, a fairly large spot also on the inner margin. Hindwings paler orange yellow with smaller black spots. Nikolajewsk. In contrast to the form just described, specimens from the southern Amur territory, Ussuri and eastern Mandchuria do not differ from european specimens. — **sachalinensis** form. n. (7 e) is similar to the preceding form, but larger and more slender in build; thorax similarly pale brown as the ground colour of forewings and not such a deep black as in specimens from Germany, the spots as deep an orange as the hindwings, scarcely larger than in type and always, also in the ♂, with an anal spot, spots of hindwings small and narrow, abdomen with a row of spots. Very common on Saghalin.

*mussoi.* **P. mussoi** Oberth. classified by HAMPSON in this Genus with a query. Head and thorax brown, the latter with white stripes, abdomen brown with carmine red bands dorsally, red laterally and white transverse bands ventrally. Forewings brown with yellow white triangular spot below base of cell, some small oblique



spots in centre of costa and in the cell and a triangular one below the cell; a further spot is situate behind the lower angle of cell and a cuneiform mark behind the centre between veins 1 and 2, an oblique costal streak subterminally and an irregular spot with 2 dentations between veins 5 and 2. Hindwings orange red with black spot at disco-cellular, a spot in centre of submedian nervure, an irregular apical spot and small marginal spot between veins 3 and 2. Wing expanse: 36 mm. W. China (Ta-tsien-lu).

### 65. Genus: **Axiopoena** Mén.

*A. maura* Eichw. (Vol. 2, p. 97, pl. 17 g). — **flava** O. B.-H. has yellow hindwings instead of rose. — **flava**. **karelini** Mén. (= transcaucasia Shelj.) shows purer black colouration on fore and hindwings, being almost *karelini*. blue-black on forewings, the rose of the hindwings is more brilliant, the red roundish spot in outer band is missing, in place thereof there is a small intensively red band close to the outermargin below the centre; a dark shadow on costa in the centre of the red basal patch. Suchum (Transcaucasia). — **manissadjiani** O. B.-H. *manissadjiani*. has the rose of hindwings still further extended and there is similarly in the margin a narrow band of 1 cm extent and white spots in outer margin on forewings. Malatia.

### 68. Genus: **Preparctia** Hmps.

**P. allardi** Oberth. very closely resembles *mirifica* (Vol. 2, p. 97, pl. 17 i) has however yellow hindwings *allardi*. with somewhat smaller spots and black tip to abdomen. The yellow bands on forewings are very wide being partly confluent with one another, the outer ones with the margin, so that the black is very much reduced. Wing Expanse: 68 mm. Eastern borders of Thibet.

**P. buddenbrocki** Kotzsch. (7 c). We have to thank the author for enabling us to illustrate this species. *buddenbrocki*. It is close to the former but can be distinguished immediately by the yellow abdomen which only on the first rings bears traces of black dorsal spots. It differs from *mirifica* by the sharper angles formed in the band markings. Hindwings ochreous yellow with black discal spot and a subterminal band of spots into which a dentation of the narrow marginal band projects between veins 2 and 4. W. Kansu in June and July. Captured by missionaries of the STEYLER Mission.

### 69. Genus: **Aretia** Schrk.

*A. fasciata* Esp. (Vol. 2, p. 98, pl. 17 i). — **obscurior** Th.-Mieg. is a dark form with almost extinct *obscurior*. bands in central area, so that same is almost black. — **punctifera** Th.-Mieg. is the reverse, the black of forewings *punctifera*. is reduced to minute patches. — **aurora** Caradja are bred specimens of the 2nd brood of the form *tigrina* with *aurora*. very dusky forewings and hindwings often completely suffused with red. — **virginalis** Oberth. has the white *virginalis*. bands so enlarged that the disc is almost completely white and black spots are only found at margins of wings, spots on hindwings very sparse. From Digne and Montpellier. — **parvisi** Trti. & Vrtj. from Valdieri, Maritime *parvisi*. Alps, described from 2 specimens claiming to be a race, has straighter pale yellow stripe markings than other forms; in central area the black markings anastomose to such an extent that a large black trapeziform mark is created with only a single yellow spot and a narrow stripe therein. Hindwings widely suffused with reddish extending from the margin. — **pyrenaica** Rothsch. from the Pyrenees is the form which is smaller on an average, *pyrenaica*. with hindwings sparsely marked with black, so that the predominant colour is yellow.

**A. else** Nissen is very close to *dido* Wagn. (Vol. 2, p. 98, pl. 18 d) differing however by the darker *else*. brown forewings, much larger and more whitish instead of yellow spots. Hindwings paler red and admixed with yellow like *oberthüri*; the species is about halfway between the two; *dido* is often considered to be a form of *oberthüri* and *else* would be a midway form. I do not think they are one and the same species, the appearance is too different. *else* is described from Algeria.

*A. intercalaris* Ev. (Vol. 2, p. 98, pl. 18 a). — **flava** Shelj. has the red of hindwings replaced by an *flava*. intensive yellow; From around Naryn. — **boettcheri** O. B.-H. are larger specimens with enlarged and pure *boettcheri*. white band markings on forewings. From the southern Thian Shan. — **alpherakyi** Stgr. is not synonymous *alpherakyi*. with *intercalaris* but denotes a smaller race from Alai and Transalai with reduced white markings. — **thibetica** *thibetica*. Fldr. (= *simpliciella* Strd.) (Vol. 2, p. 98, pl. 18 a; Vol. 10, p. 258) is not a distinct species but only a pale brown form from the N. W. Himalaya and in fact the type is an aberrative specimen without white markings and with quite black abdomen. — **intermedia** Rothsch. (Vol. 10, p. 258) is a transition to same, coloured *intermedia*. like *thibetica* on forewings but with normal abdomen. The actual form should be named — **suttadra** Mr. *suttadra*. (Vol. 10, p. 258 and Vol. 2, pl. 18 a as "*thibetica*"), these are specimens with increased white markings, which however do not occur on palaearctic territory. — **aurantiaca** Seitz (= ab. 1 *Hamps.*, lutea Rothsch.) are the *aurantiaca*. corresponding types with pale yellow hindwings and paler brownish forewings; this form is therefore not identical with *flava* Shelj.



- ungemachi*. **A. ungemachi** *Le Cerf* is unknown to me and I do not know whether same should be inserted here. Head black with yellow-red transverse line, palpi similarly; antennae brown and pectinated; body black on upperside, rusty red underneath, similarly scapulae and sides of tegulae. Forewings pale ochreous heavily marked with black spots, so that only lines of the yellow colour are left; a spot at base on costa, 3 unequally large spots beyond same in an oblique line, then follow 2 very large quadrate spots, the upper of which extends to below the cell; of the next two the upper one is of medium size and is extended at inner angle in an oblique line up to vein 2, the lower one large covering the anal angle and extending upwards to vein 3; above same a large subapical spot which expands downwards to vein 4 and on upper side conjoins with a straight irregular marginal band which extends to vein 2. Hindwings brilliant scarlet red, a black spot in centre of cell, beyond same from costa to upper angle of cell a straight black band conjoining with black arch at discocellular; 2 very large spots at margin, interrupted widely between veins 2 and 3. Wing expanse: 39 mm. Marocco (Azrou), a single ♂ captured in June.
- A. caja** *L.* (Vol. 2, p. 98, pl. 18 b). There is no more favoured subject for denominations than this and consequently there is an inundation of names for all manner of slight varieties. — **flavosignata** *Closs* are specimens where the white bands of forewings have a yellowish tinge; denominated from 1 specimen bred at *grebi*. Berlin. — **grebi** *Peiffer* is not quite the same, as the bands are here described as being pure dark yellow with *jeuneti*. hindwings a salmon pink; bred from Wuerttemberg parents. — **jeuneti** *Oberth.* has bands of forewings dusted with carmine red. The denominations of slight variations in markings of forewings are very prolific: — **quadri-**  
**maculata**. **maculata** *Stätterm.* is an extreme form of *sylvica*; the loops facing the base of the triple costal spot are completely separated and the hindmarginal spot is dissolved in 2 parts. — **conjuncta** *Stätterm.* is similar and at the same time the major part of the inner marginal spot merges with the loops separated from the costal *biconjuncta*. spots, forming a transverse band. — **biconjuncta** *Stätterm.* is the same but the separated loop of the costal *ypsilon*. spot is similarly united to the corresponding part of the inner marginal spot, also forming a band. — **ypsilon** *Stätterm.* is like *conjuncta* but the part of the innermarginal mark near base is separated so that a "Y" shaped *hebeoides*. transverse band is created in central area. — **hebeoides** *Stätterm.* like *ypsilon* but the separated part of the loop of the costal spot merges with the separated part of the inner marginal spot, similarly forming a transverse band. A number of gradatory forms interpose, as: — *connexa* *Englisch*, *trimacula-pallida* *Englisch*, *furcata-radiata* and *vittata* which correspond to the same forms in *flavia* and which are only mentioned here as belonging to this group. Until we get to the extreme form of *phantasma* *Niep.* with pure white forewings *leinfesti*. and unicoloured red hindwings there are an immense number of transition forms. For instance: — **leinfesti** *Rbl.* where the basal 3/4ths are almost white and at the same time the hindwings are orange yellow with *duthula*. basal spots absent whilst the 4 marginal spots merge. A step further in gradation and we have — **duthula** *Th. Mieg.* with almost completely white forewings and brickred hindwings on which there are remnants of *schultzi*. spots in the shape of brown dots. — Similar results are produced by exposure to cold: **schultzi** *Frings* has white markings of central area extinct, but enlarged in basal area and the subterminal "X" markings dissolve towards the margin, so that the outer area appears almost completely white; hindwings normal. Experiments with ether seem to have an opposite effect and cover a number of denominated forms till we reach *obscura* *radiata*. *Ckll.* Thus in — **radiata** *Gramann*, white markings of forewings reduced, with increased red on hindwings *rosae*. with a ray-like merging of the spots forming 3 cuneiform marks running to a point at base. — **rosae** *Gramann* also a result of experiment with ether, a combination of *confluens* *Rbl.* with the just described *radiata* with such heavily developed cuneiform marks that at the thick ends they merge forming a large mark running *excellens*. into three points towards base. — **excellens** *Closs* shows white markings of forewings almost extinct, only a thin dentate submarginal band, two inner marginal spots and a basal spot remaining; hindwings black with *margarethae*. an orange margin and inner margin, abdomen red with the usual black marks. — **margarethae** *Aue* has, like the following forms, brown forewings with dark black-brown markings in place of white. One cannot say that all the following forms are synonymous, because each one differs in some small characteristic from the others; thus *margarethae* has red hindwings, narrowly yellow at margin with irregularly merging spots. — **quasimono-**  
**chromica**. **chromica** *Biezanko* is deep brown on body and wings, the normal white markings reflecting through in a deeper shade of brown, hindwings are black-brown with scarcely visible black marks, abdomen remains red with *fumosa*. the usual black markings. — **fumosa** *Hörh.* similarly dusky brown with markings contrasting in slightly deeper shade, but abdomen is also dusky; hindwings similarly brown, black spots with blue reflection; antennae *zimnyi*. brownish. From Saxony. — **zimnyi** *Szulczewski* similarly shows white markings replaced by darker shade than ground colour, only subapically a few whitish patches retained. Hindwings red with yellow base and *bolga*. costa as well as 3 small spots near anal angle. — **bolga** *Th.-Mieg.* perhaps simply a synonym of *obscura* *Ckll.*, *similis*. all 4 wings unicolorous brown. — **similis** *Szulczewski* also shows a reduction in the extent of the white stripe markings, those in central area are replaced by dark brown marks. Pale forms inclining to albinism are: *eiffingeri*. — **eiffingeri** *Aue* body and forewings normal, hindwings, head and frons are yellow-brown, the black spots *gebhardti*. have yellow edges. — **gebhardti** *Höhr.* has reddish ochreous yellow forewings and dull reddish yellow hindwings. *badia*. — **badia** *Rautmann* is mousy grey on head and body, forewings grey or yellow-grey, bands grey-white, hindwings yellowish brown with 4 small grey spots with yellow edges. From a specimen bred at Magdeburg. There *albociliata*. are still the following denominations: — **albociliata** *Stätterm.* with white or in any case almost white fringes *albo-*  
*frontalis*. to forewings. — **albofrontalis** *Stätterm.* with white band on frons, which extends to the white tegulae, such



as is the case in *phaeosoma* and *auripennis*. Aberrative forms of hindwings are: — **aurantiaca** *Englisch* with orange red. — **brunnescens** *Stätterm.* with dusky brown. — **nigrescens** *Lamb.* with black hindwings. — **aurantiaca** *Klem.* is a *confluens* *Rbl.* with orange yellow hindwings; from Neu-Sandez. — **nigrociliata** *Hoffm.* has margin of hindwings edged 1 mm with black right to the anal angle. From Styria. — **muecki** *Kraml.* has only the 3 outer spots retained on hindwings. — **ocellata** *Stätterm.* has the blue-black spots of hindwings edged with yellow. — **caeca** *Stätterm.* has them filled with yellow instead of blue. — **parvimaculata** *Stätterm.* has only 3—4 small spots on hindwings, the anal one is only a dot or totally absent. — **nigropennalis** *Stätterm.* has black veins on hindwings which are outlined with yellow. — **brunneociliata** *Stätterm.* has dark brown fringes to hindwings, only being yellow in anal third. — **cingulata** *Stätterm.* is the counterpart to *rubrodorsalis* *Schultz* in which the black marks on abdomen are extended forming ringlets which merge in the brown colour of the sides of abdomen. — *wiskotti* *Stgr.* is the curious pale armenian form, of which we can give an illustration (7 f) of a specimen ex the collection of SOHN-RETHEL. — The following local forms have been denominated: — **sajana** *O. B.-H.* a dark race, at least the outermost of the 3 middle costal marginal spots is conjoined with the spot below same on inner margin forming a kind of a band; spots of hindwings small and round. S. W. of Irkutsk. — **tshiliensis** *f. n. (O. B.-H. i. l.)* (7 e) is a small form, the bands at base of inner margin are extended boldly longitudinally, hindwings orange with relatively small spots. Province Chihli. — **kamtschadalis** *f. n. (O. B.-H. i. l.)* (7 f) resembles *sajana* but has much paler colouration of ground of forewings and strikingly narrow bands and red hindwings. Kamtschatka. — **immaculosa** *Mats.* is a *phaeosoma* form in which the black spot in cell of hindwings is absent, only the 3 subterminal spots being present. Corca. — STRAND desires to introduce the unnecessary name: *ladogensis* for *confluens* *Rbl.* because of the older name of *confluens* *Rom.* which however refers to a form of *villica*.

*A. flavia* *Fuessl.* (Vol. 2, p. 99, pl. 18 b). To be added to the many forms denominated in the main Volume, we have: — **albimaculata** *Lorez* (= *mediomaculata* *Spul.*, *trimacula-pallida* *Englisch*) with large white spots in the black central area of forewings. — **vittata** *Spul.* has an uninterrupted white central band in middle area. — **furcata-radiata** *Englisch* is a similar form, but this band is of "Y" shape and the submedian nervure is also white. — **latefasciata** *Lorez* has a widened white transverse band. — **nigricans-confluens** *Romberg* denotes a pathological specimen with an asymmetrical reduction of the white markings on forewings as well as a dissimilar confluence of the black marks of hindwings. — **nox** *Romberg* is completely black on upperside, also abdomen is black. — **immaculata** *Lorez* has black spots absent on hindwings or retained merely as dots. — **continua** *Schultz* has an uninterrupted black marginal band on hindwings. — **signata** *Spul.* has 4—5 additional small marginal spots on hindwings. — **aurantiaca** *Englisch* has orange-red hindwings. — **connexa** *Englisch* has besides the central lunule on hindwings an additional black oblique streak from base to outer margin. — **golubzovi** *Sorokin* is according to KOLOSOFV synonymous with *uralensis* *Heyne*; a large form, forewings extensively black, a small white subcostal streak at base; fringes white. Hindwings with 2 black bands. A melanic form from Krasnoufinsk, Wiatka. The following further local races have been described: — **baicalensis** *O. B.-H.* similarly a completely black form, only threadlike white lines retained at base and in subterminal area. Hindwings very deep yellow, black spots very enlarged, partially confluent. From Irkutsk and Vilui. — **lederi** *O. B.-H.* is, on the other hand a small, weakly form, the black quite pale, even grey, the white bands wider than in specimens from the Alps. Hindwings whitish yellow with very small black spots, frequently only one at anal angle. Northern Mongolia: Uliassutai, Tannuola and Sajan mountains. — **jeholensis** *O. B.-H.* from the eastern Chingan mountains, Province Chihli, resembles *lederi* but is larger and abdomen appears to be a constant yellow instead of red.

*A. villica* *L.* (Vol. 2, p. 99, pl. 18 c) (7 g). We are illustrating as *caliginosa* a specimen from the State Museum of Munich, which perhaps would be better described as — **nigricans** *Oberth.* as it retains only remnants of white marks on forewings, and spots of hindwings are irregularly confluent similar to *contracta* *Schultz*. — **fereunicolor** *Oberth.* is similar to *illustris* *Schultz*, having reddish yellow forewings with traces of black markings, hindwings devoid of markings and reddish yellow. — **villicula** *Strd.* (= ab. 4 *Hmps.*) is a very aberrative specimen. Forewings reddish yellow, costa, margin, one apical spot and 3 spots below costa and one at lower angle of cell are black, hindwings with only a few black spots at margin. A very nice specimen of this description ex the collection of PHILLIPS is illustrated in *Iris* Vol. 18, pl. 2, Fig. 8 (1905). — **villicella** *Strd.* (= ab. 5 *Hmps.*) is probably synonymous with *brunnescens* *Schultz* with brown hindwings. — **wardi** *Matthew* is normally marked in the basal 2/3rds of forewings, whilst the 3 subterminal spots are enlarged and confluent so that the entire apical 3rd is yellow-white with 2 small black spots therein and a black costa. This form has often been bred in England and also captured in nature. — **confluentissima** *Oberth.* is a further extension from this form. Also from England. — **arabum** *Oberth.* held by HAMPSON to be synonymous with *koneikai*, has spots more or less confluent in an oblique direction, hindwings are orange yellow; Algiers. — **meridionalis** *Heinrich* is the form from Digne which makes a generally paler impression, the black being repressed in favour of white and of yellow on the hindwings; spots of forewings inclined to be confluent, the apical black on hindwings is reduced. The wing contour is generally somewhat sleeker. — **dryope** *Catérine* is an aberrative specimen of same. Spots of forewings confluent longitudinally, inner margin yellow with only a small black dot at apex;



*bellieroides*. tegulae yellow, abdomen without spots. Described from the Alpes Maritimes. — **bellieroides** *f. n.* is an interesting form, illustrated (7 g) from the collection of SOHN-RETHEL and alleged to have been captured at Capri, which with normal but deep yellow toned spot markings has the deep brown colour of *bellieri*, thus does not resemble *konewkai*. We are illustrating *fulminans* (7 g) to which also belongs — *syriaca* Oberth. with normal *mixta* wing colouration and spot marking, but the apex and fringes of hindwings are more extensively black. — **mixta** Schmidt based on an aberrative specimen with confluent basal and central spots (= ab. *ursula* Schultz) and a long cuneiform mark to centre of inner margin; the spots of basal half of wing are yellow, the outer ones whitish; on hindwings the basal row of spots is absent. On plate 7 g we are giving a better illustration of a somewhat aberrative form of *angelica*.

*A. rueckbeili* Püng. (Vol. 2, p. 100) is now illustrated (7 f).

*A. hebe* L. (Vol. 2, p. 100, pl. 18 d). This species is latterly placed in the Genus *Eucharia* Hb. and the older name of **festiva** Hufn. re-introduced for same. The following aberrative forms are named: — **albescens** *Schultz*: basal and central area of forewings quite white, only 2 black spots retained in marginal area; Frankfurt a. d. Oder. — **lugens** *Schultz* (= ab. 4 *Hmps.*): forewings adumbrated, the black colour extended and more or less confluent, hindwings widely black, at best a little red colouration left at base; also abdomen is suffused with black. — **melaena** *Biezanko* is very similar; the entire body is black, ground colour of forewings velvety black, band markings slightly duller and discernible in the black; hindwings black with 3 small rose coloured spots in disc. — **fischeri** *Diemer* resembles same but there are 2 further small yellow-white spots on costa of forewings; from Posen. — **moerens** Oberth. is again very similar, but the light bands of forewings are retained but only in costal area, hindwings without spots, sooty black, only a little rose colour left at base. — **tristis** Oberth. is a transition form with extended black, abdomen also is quite black, spots of hindwings increased in size and number. — **funbris** Oberth. quite similar, hindwings with still more black. — **luctuosa** Oberth. has all spots of forewings a deep ochre yellow, hindwings sooty black-brown, the black spots a still deeper shade of black and therefore apparent. — **attenuata** Oberth. has all transverse bands of forewings yellow-red, hindwings are rose coloured through which the spots appear rusty red. — **dahlkei** *Closs* is nearly the same as *melaena*, but hindwings differ somewhat, they are black with a rose streak at costa; there are 3 small yellow-white spots on costa of forewings as in *fischeri*. — ab. **christinae** *Sterzl* corresponds approximately to ab. *paradoxa* of *purpurata* with almost rosy-white basal half of wings, only the base is black, whilst marginal area is suffused with brown-grey through which the deeper black spots are reflected. — ab. **fumosa** *Sterzl* is a uniformly dusky smoky brown coloured specimen with normal deep black band and spot markings. — **catharina** *Th.-Mieg.* (= *flavescens* Oberth.) does not differ much from *wassi*, but the hindwings are purer yellow without any brownish tinge. — **festivella** *Strd.* (= ab. 5 *Hmps.*) is an asymmetric pathological specimen, forewings on one side brownish in basal half instead of black, on the other side the entire forewing is brownish; hindwings yellowish with apical half turning into brownish. — **albidina** *Sitowski* has quite white hindwings with black spots; forewings black with 5 white transverse bands edged with orange, abdomen completely black-brown. From Limanowa. — **semialba** *Maslowsey* similarly has white hindwings, but a little rose is retained at the base. — **reducta** *Closs* disc of hindwings devoid of spots, only one spot retained on costa and at anal angle. Königswusterhausen. — **albinisans** Oberth. has forewings almost completely with faint reddish yellow hue, only at cell end, below apex and at anal angle there are black spots. — **minussignata** *Th.-Mieg.* the 2nd black transverse band of forewings is reduced, the 3rd is quite absent and the 4th is only retained from costa to apex of cell. The following races are denominated: — **ragusai** *Stdr.* has no yellow edge to the white spots of forewings, the black central band is wider. Hindwings intensively red. From Palermo. — **nivea** *O. B.-H.* is the race from Asia Minor (Aintab, Malatia, Amasia, Tokat); here the bands are also pure white and enlarged at the expense of the narrower black ground colour. Hindwings dull red. — **philippsi** *O. B.-H.* from the Prov. Syr Darja (Baigacum). Bands of forewings tinged with rose, the black colour extended becoming almost confluent. Hindwings rose coloured with dull black transverse band, small basal spot and interrupted marginal band; body quite black only collar narrowly red. — **iliensis** *Wagn.* is a remarkable small race, the white transverse bands narrow, the 3rd quite absent. Hindwings heavily marked with spots. From the Ili territory and Alexander mountains. — **interposita** *O. B.-H.* is similarly very small, the light bands of forewings very narrow, wider in outer area with only very faint rose hue; hindwings very pale rose colour with narrow marginal band. Body completely black. The ♀ has quite black forewings, red hindwings with wide conjoined middle and marginal bands. Alai: Margelan. — **collaris** *Gr. Grsh.* has besides the wide red collar, the entire abdomen completely red without the black dorsal stripe, only the tip is black.

**culoti**. *A. culoti* Oberth. is placed by O. BANG-HAAS with the form of *interrogationis* of the previous species. This does not appear to be correct; *culoti* is a very small compactly built species. Head and collar light ochreous, the latter with 2 black dots; thorax black with ochreous yellow stripes anteriorly, metathorax with scarlet red markings, abdomen red at base, otherwise fawn with black lateral stripes. Forewings black with reddish yellow transverse bands similar to those of *interrogationis* but all very wide and extending straightly to inner margin so that the black is at utmost 1 mm wide. Hindwings scarlet red with black middle band and marginal spots and all are edged with yellow. Wing expanse: 46 mm. East Siberia.



7. Family: **Callimorphinae**.71. Genus: **Callimorpha** Latr.

*C. dominula* L. (Vol. 2, p. 101, pl. 18 e) — *hamelensis* Pfl. is illustrated (7 h), this is the form in which all spots of forewings are white. — *bithynica* Stgr. (7 h) is a genuine race; occasionally specimens also occur in *bithynica*. Germany with all spots of forewings ochreous yellow, such specimens should be named — *ochromaculata* Fuchs *ochromaculata*. (= *spaneyi* Strd.). The illustration in main Volume on pl. 18 e as "*bithynica*" does not refer to this form, but to a specimen inclining towards *romanovi*. — *rossica* Kol. (7 h) is freshly illustrated; the brilliant green ground colour is characteristic. Further we are illustrating *lusitanica* Stgr. (7 h) and *paucimacula* Schultz (7 i), as well as a very fine specimen coming between *conferta* Schulz and *fasciata* Spul., which is in the Munich State Museum (as "*dominula* ab.") and which was very kindly placed at our disposal. — *pompalis* Nitsche (= *subalpina* Dhl.) *pompalis*. is a fine and large race from the S. Tyrol, especially from the neighbourhood of Waidbruck. Forewings very glossy, steel-blue with normal, although often somewhat reduced, spot-marking, hindwings deep carmine red with confluent marginal spots forming a band. Wing expanse 55 mm. — *postochrea* Stdr. are specimens with *postochrea*. deep ochreous yellow hindwings from the Mte Faito. — *majellica* Dhl. (7 h) is the very characteristic racial *majellica*. form from the southern Abruzzi; small with heavy green gloss on forewings with rather small but normal spot marking, hindwings ochreous yellow with complete wide black marginal band, more or less evenly edged on inner side and showing no inclination to form ray-like extensions.

**C. philippsi** Bartel (Vol. 2, p. 101) (7 i). We are able to illustrate the, so far unique, type specimen of *philippsi*. Dr. PHILIPPS, thanks to the kindness of the owner.

*C. quadripunctaria* Poda (Vol. 2, p. 101, pl. 18 f). — *nigricans* Kemp. (= *luctuosa* Oberth.) (7 i) is now *nigricans*. illustrated. — *tristis* Sterzl are transition forms, white stripes considerably reduced, hindwings dusted over *tristis*. grey-black. — *latefasciata* Bub. has a narrower and longer inner transverse stripe on forewings; hindwings *latefasciata*. are paler red, marginal spots form a complete band. — *typhloteisa* Pfeiffer & Buholzer is a counterpart to *typhloteisa*. *nigricans*, in extreme forms all the black has disappeared, except for a longitudinal streak at base above submedian nervure and a spot at close of cell; hindwings red and devoid of spots; transition forms to this, show remnants of the dark ground colour reflected through in pale ochreous brown. From around the Pilatus. — **splendidior** Tams is a race from N. W. Persia and Armenia; forewings a brilliantly green glossy black, bands *splendidior*. wide and a bright yellowish red; hindwings a vivid scarlet red with complete marginal band.

*C. menetriesi* Ev. (Vol. 2, p. 102, pl. 18 f). Quite close to this form, *miranda* Obth. (Vol. 2, p. 72, pl. 13 f) classified under *Coscinia* should be placed.

**C. coreana** Mats. is to be placed after *histrion* Wkr. (Vol. 2, p. 102, pl. 18 g). It differs by orange-yellow *coreana*. palpi, only the base and a streak on the outer side of middle segment are black. The light yellow spots on forewings are much larger, more numerous and of slightly different shape: on costa there are 5 spots, the orange-yellow discal spot is comma shaped, the tornus spot is crescent shaped, there are 2 conjoined cuneiform spots in centre of cellule 1 b, in centre of inner margin there is a yellow spot with yellow hairs. Hindwings with 4 rows of black spots. Legs are orange with black spots. Wing expanse: 73 mm. Corea (Gensan).

71a. Genus: **Neochelonia** Draes.

The species placed in this Genus are nearest to *Callimorpha* Latr. and *Calpenia* Moore. The accessory cell of forewings is absent, veins 11 and 12 do not anastomose, vein 6, or at all events 7 to 10 stalked. Hindwings with veins 3 and 4 and 6 and 7 stalked. Hind tibiae with 2 pairs of spurs. Its classification under *Oroncus* Sz. is excluded.

Type: *N. bieti* Oberth.

**N. bieti** Oberth. (Vol. 10, p. 263 erroneously printed as "*biati*") reminds one by its shape somewhat of *H. bieti*. *jacobaeae*, which in common with HAMPSON I hold to be a genuine *Arctiid* and not a *Nyctemeriniid* — HAMPSON gives the Genus name: *Tyria* Hbn. for same. Wing contour somewhat narrower than the latter. Forewings black with greenish sheen, a yellow subapical spot of varying size and form and a yellow costal streak, which bends towards centre of outermargin and from there extends to anal angle. Hindwings orange-yellow in type with black cell spot and a black marginal band which is generally subdivided in two and which in some specimens encloses a yellow spot of the ground colour at the anal angle. Veins more or less densely black, occasionally so widely, that the entire hindwing is black. Body black with carmine red collar and anal segment and yellow lateral stripes on the glossy green abdomen. — *sulphurea* Oberth. have pale yellow hindwings. — *albescens* Oberth. *sulphurea*. *albescens*. have whitish hindwings. From Ta-tsien-lu and Omi-hsien.

**N. poultoni** Oberth. has veins 3 and 4 of hindwings without stalks. Larger than the previous species, *poultoni*. markings however similarly situate. Forewings black with faint green sheen, especially on the slightly paler veins and folds. Hindwings with irregularly placed black spots like *A. caja*. Szechuan, Kwang-hsien.



## 8. Family: Nyctemerinae.

72. Genus: **Hipocrita** Hbn.

*totonigra*. *H. jacobaeae* L. (Vol. 2, p. 103, pl. 18 h). — ab. *totonigra* Richter are extreme melanic forms, all wings quite black, on forewings a deeper tone is visible where otherwise the colour should be red, when looked at from the side. — *nigrana* Cabeau are transition forms. Here the hindwings are quite black, only at base a little dusky red is retained. — *pallens* Cabeau has grey forewings, the red is very pale. Both forms are described from Belgium.

73. Genus: **Hyalocoa** Hmps.

*atra*. *H. diaphana* Ev. (Vol. 2, p. 103, pl. 18 h). — *atra* A. B.-H. is a smaller form of only 30 mm wing expanse from Sajon, here the hyaline wings are dusted with blackish, abdomen is unicoloured black, as also is the collar, which in *diaphana* are both yellow. Forewings with a faint hyaline somewhat paler submarginal shadow and a similar patch at inner margin. — *kozhan-tschikovi* Shelj. originally classified to the subsequent Genus *Hyperborea* Gr. Gr., whilst O. BANG-HAAS considers it identical with *atra*, with which I am not in agreement. It is of larger wing expanse, viz: 36 mm in ♂; wings semi-transparent mouse-grey, faintly iridescent with indistinct whitish markings, forming an undulate submarginal band; veins darker and a dark line at margin, fringes being paler. The ♀ is somewhat smaller, sprinkled with whitish in outer half of wings, a dark undulate transverse band in the centre, parallel with outer margin and which arises from a small white spot on costa. Body grey. Wing expanse of ♀: 29 mm. Captured on the Jelinda river (Djugjuz Mountains), Primorskaja in June.

## Alphabetical List

with references to the original descriptions of the forms of palaearctic Arctiidae.

\* signifies that the form is also illustrated at the place cited.

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## 5. Family: Lymantriidae.

### 3. Genus: **Dasychira** Steph.

**D. albodentata** Brem. This species dealt with in Vol. 2, p. 112 (19 g) is only illustrated there in its form *albodentata*. *olga* Oberth. We are now illustrating a typical ♀ (8 c) according to which the differences between the forms are only very slight.

*D. fascelina* L. (Vol. 2, p. 112, pl. 19 f). From larvae from Hanover bred on heather pale specimens were obtained with clear black markings: **callunae** Peets. — **helgolandiae** Strd. would appear to be very similar. *callunae*. The ♀ is very small (38 mm). Markings on upper and undersides deeply black, clearly outstanding on pale *helgo-* ground. Heligoland and Norway. If both forms are identical, which is quite likely, *helgolandiae* has priority *landiac*. of name. — **caucasica** Shelj. is larger (♂ 45 mm) than German specimens (36—40 mm). Forewings are paler *caucasica*. on upperside and black markings only faintly indicated. On the other hand the otherwise faint white submarginal line is very distinct in this form. The rusty patches do not vary. Hindwings white with blackish discoidal spot; the space between same and base has grey hairs. There is also an inwardly diffuse submarginal line. Fringes of forewings grey, of hindwings white. N. Caucasus. — **alpina** Kitt is not paler than the other new *alpina*. forms, but body and forewings are a purer dark grey without brownish admixture of typical *fascelina*. Also the dark grey hindwing differs from that of *fascelina*. Markings of forewings are clearer than normal. From the Oetz valley. — In **nigrotecta** Dhl. forewings are quite black, hindwings grey-black with cell spot indicated. *nigrotecta*. Fringes somewhat paler. — The form **nivalis** Stgr. dealt with in Vol. 2, p. 112 but not illustrated there and *nivalis*. which is widely held to be a genuine species, is being illustrated (8 a) in this supplementary Volume. The specimen is from Isfahan in the northern Alai, captured in August.

**D. grundi** Lorkovitsch (8 c). This species has only recently been discovered among the similar *pudibunda* L. *grundi*. (Vol. 2, p. 113, pl. 19 d). Only Croatia is indicated as locality, but now that attention has been drawn to same, it may be discovered elsewhere. There is no specimen of this species in the comprehensive PÜNGELER Collection. The ♂ is much less brightly marked than *pudibunda* ♂. Wing contour is more elongated. The inner edge of the central area bends slightly outwards at inner margin, similarly the outer edge between veins 4 and 5. The latter appears to be displaced further outwards, so that the central area in relationship to the marginal area appears as wide as in *pudibunda* ♀. The reniform stigma and 2 lunae in marginal area are distinct, all the other numerous markings of *pudibunda* ♂ are absent. On underside of hindwing of *pudibunda*, the black band is double, converging upwards, whilst here it is single and very wide anteriorly. In the type the veins stand out prominently and are black. The illustration is from a cotype from Vienna, which has very kindly been placed at my disposal.

**D. conjuncta** Wil. (8 c). ♂ forewings grey, dusted more darkly at base and outer margin. The inner and *conjuncta*. outer lines are blackish. The former is angulated below costa, then obliquely inwards, the latter is heavily curved and conjoined with the inner line by a streak below vein 2. From there it curves outwards almost to the anal angle. Marginal line is black and undulate, projecting inwards on vein 2. Besides this a white dentate submarginal line is indicated. Hindwings dark brown with black central lunule and marginal line. Fringes of both wings grey with darker patches. 42 mm. Japan.

**D. aurifera** Scriba (8 a). Forewings glossy silvery grey with darker dusting. A lunule with dark edge at *aurifera*. disco-cellular. The 3 transverse lines irregular and dentate, the subbasal and inner one indistinct, the outer one clear and prominent. The undulate submarginal line most distinct in centre. Fringes white with dark patches between the veins. Hindwings golden yellow, lunule bent in middle. Fringes as on forewings. 68 mm. The ♂ has apparently not yet been described but is said to have paler ground colour on forewings and to be smaller. 50 mm. Tokio. The illustrations have been made from the types.



- [*coreana*. **D. coreana** Mats. Somewhat similar to *pseudabietis* Btlr. (Vol. 2, p. 113, pl. 19 h). Forewings grey with a slight suffusion of olive, basal 3rd brownish. The subbasal and inner lines are double and black. Above the median nervure the latter is sharply angulated and has a white outer edge at costa. A lunule with black outline on black disco-cellular. The outer line is fainter, parallel to outer margin, being only curved below median nervure and forming a point below submedian nervure. The black submarginal line is interrupted. Inside of same there is a white subterminal line touching a few brown spots between veins 2 and 4. Hindwings grey with lunule and a straight dark outer line. 40 mm. Corea.
- hirayamae*. **D. hirayamae** Mats. Similar to *horsfieldi* Saund. (Vol. 10, p. 292, pl. 38 c). Forewings dark grey, whitish at base to the indistinct inner line. The central line is double, its inner branch almost straight, the outer one heavily dentate, somewhat more widely separated from one another at inner margin. Lunule spot with black edge, sharply angulate and filled with white anteriorly and with pale edge towards base. Outer line very dentate. Between same and the somewhat interrupted submarginal line there is an indication of a further line, which has a white outward edge at inner margin. Hindwings yellow-brown. Discoidal spot and wide submarginal band diffusedly dark brown. ♂ 48 mm. Tokio.
- suzukii*. **D. suzukii** Mats. Very similar to the previous species, but more compactly built and darker grey. Only paler at base and just after the outer line. From the rather primitive illustration it seems to me to have a closer resemblance to *coreana*. Basal line at inner margin of forewings like the latter, closely approaching to the inner line. The double inner line not so heavily angulated as in *coreana*. The outer line single and heavily dentate, outwardly with white lunules and beyond same narrowly darker and the rest of wing paler. A submarginal row of spots is indicated. Hindwings yellow-brown with dark lunule and straight wide submarginal band. Veins darkened in outer 3rd of wings. ♂ 45 mm. Kyoto.
- immunda*. **D. modesta** Ky. (Vol. 2, p. 114, pl. 22 a). Among this species one frequently finds in the Ussuri territory the form **immunda** Kard. ♂ (8 c). Forewings in same are impure brownish grey with indistinct central band. Basal and marginal areas are darker. Hindwings monotonous brown. — ♂ form **effeminata** Kard. (8 c) has forewings as pale as ashy grey as in normal ♀. Scarcely a trace of dark central band. About 3 mm from outer margin there are 3 black spots. On hindwings the inner  $\frac{2}{3}$  rds are pale grey-brown, the rest is darker.
- lunulata*. **D. lunulata** Btlr. As doubts have been raised regarding the differences between *acronycta* (Vol. 2, p. 114, pl. 19 e) and the typical *lunulata*, we are giving an illustration of a ♂ (8 a) of the latter.
- effeminata*. **D. virginea** Oberth. (Vol. 2, p. 114, pl. 19 f) is now also known to occur in Japan. — The same applies to the Indian species *nigra* Hmps. (Vol. 10, p. 294, pl. 38 e) and *strigata* Moore (Vol. 10, p. 295, pl. 47 a).
- trimacula*. **D. trimacula** Scriba (8 a, b) appears to vary somewhat by the greenish grey forewings. At disco-cellular there is a large crescent shaped mark with dark edge. The outer line is semi-circular from costa to median nervure with 2 large dentations outwards. In marginal area a distinct submarginal line with sharply pointed dentations. Hindwings ochreous yellow with a large dark discoidal spot and 3 large spots as marginal band. Thorax and body are greenish brown. ♀ 55 mm. Besides we are illustrating the ♂ which has hitherto not been described. Tokio. The illustrations are from the types from the SEITZ Collection in the SENCKENBERG Museum at Frankfurt a. M.
- rossii*. **D. rossii** Curtis. This species was hitherto only known from Labrador and was therefore dealt with in Vol. 6, p. 537 and on plate 72 a. As there is a specimen in the PÜNGELER Collection labelled "Kossogol Lake, Mongolia, 1910", the species must be mentioned here. The outer line on forewings terminates more vertically at inner margin than is shown on the illustration on the left on pl. 72 a. On the right the termination should be more oblique outwardly and similarly in specimens from Labrador. — **relictus** O. B.-H. is also more faintly marked on forewings than specimens from Labrador and is thus like the mongolian specimen. The latter and also specimens from Labrador have a yellow-grey basal area which contrasts with the marginal area. In *relicta* however the basal area is grey, transparent, the margin dark grey, so that the contrast is less pronounced.
- groenlandica*. **Konokarcha daisetsurana** Mats. (Lasciocampidae) is the same.
- relictus*. **D. groenlandica** Hom. (8 c) from Greenland, which as yet is still taken to belong to the palaearctic fauna, is already dealt with in Vol. 6, p. 537 and placed in the Genus *Byrdia*. As there was no illustration, we are giving same here. In accordance with its polar origin the species is not very striking.
- tenebrosa*. **D. tenebrosa** Wkr. I have a number of specimens of this species from the British Museum. It was already dealt with in Vol. 2, p. 116, pl. 22 c. The species appears to be very variable. In one red-brown specimen from Ta-tsien-lu the central area is distinctly paler; in another specimen from the same locality the ground colour is inclined to be olive-brown, the outer line edged with white on both sides in its anterior portion. One specimen each from East Thibet and Sikkim are very dark, only the outer line is still discernible and the heavy black cuneiform marks at subterminal line. A specimen from Arizan (Formosa) is even darker still.
- semicirculosa*. **D. semicirculosa** sp. n. is close to *magnalia* Swb. (Vol. 10, p. 294, pl. 38 c) and is just as dark as same. The somewhat dentate inner line extends almost vertically. The outer line is fine and clearly marked. It extends vertically from costa to cell and to inner margin, where it is sharply and widely angulated, from lower angle of cell approximately parallel to outer margin and dentate to inner margin. It is edged with white scales on both sides.



The pale subterminal line is whitish anteriorly, behind the point of the outer line it forms a semicircle, then vertically to median nervure, there almost horizontally inwards and then again straight down to the inner margin. Hindwing paler reddish brown with discoidal spot and 2 outer dark lines. ♂ 35 mm. Ta-tsien-lu. Type in the British Museum.

#### 4. Genus: **Hypogymna** Hbn.

*H. morio* L. (Vol. 2, p. 116, pl. 19 a). According to STAUDER the form *natlyi* Aign. mentioned in Vol. 2, occurs in arid localities. Specimens from moist meadows are usually glossy black. In Wels STAUDER found 30% of the ♂♂ with falcate outer margin to forewings, in the ♀ the hindwings can be undeveloped and deformed, this form is named **falcata** Std. — The other new names given by the same author refer to colour variations such as can always be obtained by breeding en masse, but which do not occur in nature. — **eburnina** Std. ♂ *eburnina*. has an ivory coloured streak, which many specimens show in the middle cell of forewings, extended almost over the entire forewing, sometimes even it is continued on the hindwing. — In normal ♂♂ the fringes of forewings are blackish brown, in **illustreciliata** Std. they are buff to golden. — When the fringes also of hindwing are like this and costa and inner margin are yellow, similar to *Org. aurolimbata*, the form is named **omninolimbata** Std. — A colour variation that can occur in all dimorphous species, viz: a ♂ in the colouration of the ♀ is named **femini-colorata** Sdt. It is completely yellow brown like the ♀ and is naturally very rare. — The reverse form, viz: the ♀ with the almost black normal ♂ colouration is named **defuncta** Std. and is also very rare. — An extreme form of *illustreciliata*, which however is only known in the ♀ and in which all the wings are glossy golden yellow is named **aureomicans** Std. These seem almost too many denominations for such an insignificant species.

#### 5. Genus: **Orgyia** O.

*O. gonostigma* F. (Vol. 2, p. 117, pl. 19 a). **flavescens** Masl. denominates the rare ♀ with yellowish white in place of the normal dark brown hairs. It is only obtained by breeding and may therefore be a pathological form.

*O. antiqua* L. (Vol. 2, p. 117, pl. 19 a). The form **grisea** Denso (8 d) has been observed to occur for a time around Dresden. The antennae of the ♂ are somewhat larger and with longer pectinations than customary in *antiqua*. Also the grey colouration produces a similarity with the north american (*Hemerocampa*) *leucostigma* (Vol. 6, p. 537, pl. 72 a) which also has the faintly developed spot at anal angle of forewings. But markings are identical with those of *antiqua*, only the brown patches are replaced by paler or darker grey. Also on underside all the brown is replaced by grey. — We are illustrating (8 c) a specimen of *zimmermanni* Graes., from E. Thibet in the collection of OßERTHÜR. This species was dealt with in Vol. 2. Our illustration shows fringes of forewings with pale spots, which should not be so according to the description. The pale spot at anal angle is missing. It may be considered a transition form. Two pairings from captured ♂ with the ♀ of *thyellina* did not produce the same results. In **anthyellina** John the ♂ is much more like *thyellina*, but the bluish submarginal spots are absent as well as the bluish sheen to forewings. A similar hybrid was subsequently named *wintersteini* Wagnig. The ♂ of this experiment is halfway between the parent forms. From this description one can suppose that the form differs from *anthyellina*, but all other particulars are missing. Both authors state in regard to the ♀ that it is larger than the parent forms. — **leucantiqua** Klemann is a hybrid of the american *leucostigma* ♂ with *antiqua* ♀. The ♂ is of the same size as the parent forms, the ground colour is paler or darker brown and the area between the bands is paler towards costa, sometimes even being whitish. The outer margin is often very dark, the usual white spot there very distinct, but smaller than in *antiqua*. The ♀ has a dark central dorsal line.

**O. immaculata** sp. n. (8 d). Probably closely allied to *antiqua*. Hindwings somewhat darker than forewings, which are only so pale in the specimen illustrated, the other 2 are darker and therefore the lines are somewhat less pronounced. In the latter the inner and outer lines are about as curved as in *antiqua* and the outer one has a third parallel line a small way off. The small dark reniform stigma with pale centre. In a very dark specimen it has a pale halo. A white anal spot is absent. ♂ 26—28 mm. Chefoo. Type in the Berlin Museum.

*O. trigotephras* Bsd. (Vol. 2, p. 117, 19 b). A hybrid of the race *corsica* ♂ with *trigotephras* ♀ produced specimens that had a greater resemblance to *trigotephras* and were somewhat larger than same. The dark brown ground colour is a little paler, due to inherited characteristics from *corsica*. The transverse bands are somewhat more distinct, like in *corsica*. One can say that the hybrid **gadollae** Wgn. is a larger pale, more clearly marked *trigotephras*. The ♀ shows no special characteristics. — **dilutior** Bub. is a paler form of *corsica* Bsd. or *ramburi* Mab., which the author deems to be different. It is like the *ericae* var. *intermedia* Friv. (Vol. 2, p. 118). The inner marginal spot on forewings is distinct and an obsolescent reniform stigma with dark outline is apparent, costa almost devoid of markings, size normal. It occurs chiefly at lower altitudes up to 700 m, at greater



- calabra*. heights the specimens are darker (= *corsica*). From Corsica. — The race of *calabra* *Std.* is described from the Aspromonte region at an altitude of 800—1100 m. It is closely allied to *etrusca* *Vrty.* (Vol. 2, pl. 22 b) but is smaller and more monotonous in colour. Hindwings much darker than in *etrusca* and *sicula* *Stgr.* Generally fore and hindwings are uniform dark brown on upper and undersides. On forewings the customary light spot near anal angle is scarcely discernible. The ♀ sparsely haired with silky grey and with brown head. The specimens from Calabria mentioned in Vol. 2, p. 118 are probably from lower altitudes and not identical with *calabra*. According to STRAND and TURATI they are the same as *sicula* *Stgr.* and this is probably right. —
- holli*. *holli* *Oberth.* (8 d) is a striking insect according to the original illustration. The lunule that is generally more or less distinct on forewings is replaced by a pale intersected ring, to which a white spot is attached anteriorly. The anal spot is clear and the transverse lines very distinct. Hindwings somewhat more reddish than forewings.
- seb-douensis*. El Biar (Algeria). — *sebdouensis* *Oberth.* (8 d) according to the illustrations varies more. In some specimens forewings are unicoloured, only the inner and outer lines being dark and prominent. The discoidal lunule and anal spot are absent. The latter can however be present and then the outer line beyond the cell is not so excurved but more or less parallel with the inner one. Sebdu.
- nupera*. *O. nupera* *Trti.* (8 b). This new species is in size and colour halfway between *ericæ* *Germ.* and *rupestris* *Rmb.* All wings grey-brown. Forewings finely dusted with white especially in centre of costa and before apex. The spot near the anal angle is yellowish, an inner and outer line are indicated. The latter is double, excurved behind the cell and at inner margin. A brown streak at cell end. Fringes of both wings the same colour. The specimens illustrated were very kindly placed at my disposal by Count TURATI. ♂ 22—25 mm. ♀ wingless, silky white. Gran Sasso. Larvae similar to those of *corsica*, feeding on low plants.
- areerii*. *O. dubia* *Tausch.* (Vol. 2, p. 119, pl. 19 e). There are 2 new subforms to the group of *dubia*: *arcerii* *Rag.* As large as *splendida* *Rmb.* but otherwise not differing from *dubia*, except that 2 black costal marks are said to be missing. No particulars are given of the black discoidal spot and yellow submarginal line. On hindwings the marginal band is narrower and the discoidal spot often separated from it. Trapani. This locality is the chief characteristic of the race. — *orana* *Powell* (8 d) has a nice ochreous yellow ground colour, somewhat darker than in *turcica* *Led.* and *isolatella* *Strd.* (Vol. 2, pl. 19 e). On forewings the black discoidal spot is always isolated, at inner margin the 2 transverse lines can remain separated. The yellow wavy line between the 2 black marginal areas is always continuous, i. e. not diffuse or interrupted in centre. On account of its smallness it is placed with *dubia*: *splendida* is generally larger and according to POWELL it is a separate species. — The following subforms are placed with the group of *splendida*: *deserticola* *Powell* (8 d) with costa as pale as in normal *dubia*, *aurea*. but for a desert insect it is relatively large and therefore classified to *splendida*. Algeria. — *aurea* *Oberth.* (8 d) is of the same ground colour as *orana* and is placed in this group on account of its size. The black discoidal spot on forewings is widely isolated. Transverse bands as in *orana*. The pale margin is characteristic. The pale zigzag line extends along the veins to outer margin, so that occasionally only widely separated small black spots are left there. The zigzag line itself varies in width. Central Atlas. — In Spain one finds specimens that are scarcely yellow on forewings. At base only small yellowish specks, central band is narrow and the yellow patches near outer margin are reduced: *mancha* *Rbb.* — *medionigra* *Rbb.* has still less yellow. On forewings only discal area is yellow, at base and outer margin the yellow patches are dusky obscured. At base of hindwings *mancha*. *medionigra*. in front of the outer margin there is a further dark line and the entire hindwing is dusky. — *prieta* *Rbb.* is the most extreme form. Forewings have scarcely any yellow, only the central band reflects faintly through. Hindwings dusted with blackish. Only the outer margin of both wings is distinctly yellow.
- thyellina* *Btlr.* (Vol. 2, p. 120, pl. 22 b and 19 e). In a breeding experiment ♀♀ among the 2nd brood were obtained with wings as well developed as those of the 1st generation. Some had however only obsolescent indications of the customary markings at outer margin. The remainder of forewing is pale yellow, hindwings almost white. Such specimens are named *flavescens* *Wohnig.* — In the 3rd generation on the other hand some of the ♂♂ varied. Markings of forewings are obsolete, the blue spots before the white lunules at outer margin *flavescens*. are absent, all brown markings are more or less grey, hence the name *grisea* *Wohnig.*
- panlacroixi* *Oberth.* The author of this species complains about the illustration in Vol. 2, pl. 19 b. But when compared with OBERTHÜR's second, more modern and better illustration, there is little that can be improved and in such a poorly marked species this is nothing remarkable.
- parallela*. *O. parallela* *sp. n.* (8 e). Body and hindwings brown-black somewhat like the illustration of *ericæ* *Germ.* in Vol. 2, pl. 19 b. Fringes of hindwings and the entire forewing somewhat paler than in the illustration. Both lines approximately parallel, the inner one curved in the cell and then running straight obliquely inwards, the outer one as in *panlacroixi* *Oberth.* (Vol. 2, pl. 19 b). There is no shadowy line in marginal area. Costa is slightly pale grey in centre, the white anal spot is present. On underside hindwing is only slightly darker than forewing. ♂ 32 mm. Ta-tsien-lu. Type in the British Museum.



6. Genus: **Dasorgyia** Stgr.

In Vol. 2, p. 120 it was stated that the species were unknown to the author and no reliable description had been published. From the illustrations on pl. 22 b one can see that there is not the least similarity with *Dasychira*. On the other hand *Org. dubia* is fairly similar and remotely like it is also *Lachana ladakenssi* Moore (pl. 19 a) from Ladak and Kashmir. With the latter the slender long-haired body and the short palpi correspond. The antennae on the other hand are very long and with much shorter pectinations than in *Dasychira*. There appears to be only one pair of spurs at extremity of the weak and long-haired hind tibiae. On forewings veins 2 and 3 are widely separate, 4 + 5 with short stalks, 6 from somewhat below angle of cell, 7 and 8 + 9 somewhat separate from the apex of the accessory cell, 10 from  $\frac{2}{3}$  of its costal wall. On hindwings vein 2 arises very far back, 3 and 4 from the same point, 5 somewhat above same, 6 + 7 with short stalks, 8 at  $\frac{1}{3}$  of length of cell conjoined with same by a bar.

7. Genus: **Aroa** Wkr.

**A. postfusca** sp. n. (8 d). Forewings somewhat similar to *substrigosa* Wkr. dealt with in Vol. 2, p. 121, *postfusca*. pl. 19 h, but slightly darker. Hindwings black-brown over their entire surface, not only at margin as in *pyrrhochroma* Wkr. (Vol. 2, pl. 19 i), however excepting the fringes, which are approximately as forewings. Under-side of the same colour with dark shades only in apical area and at margin of forewings. Antennae and abdomen black-brown, thorax as forewings. ♂ 32 mm. Yunnansen, 2150 m. Type in the British Museum.

8. Genus: **Cifuna** Wkr.

*C. locuples* Wkr. In Vol. 2 the form illustrated was the one that is chiefly distributed in India and which only reaches palaearctic territory in Central China; we are now illustrating the more northerly form **confusa** Brem. (8 b) according to a ♂ from Manchuria and a ♀ from the Amur.

*confusa.*10. Genus: **Arctornis** Germ.

*A. l-nigrum* Müll. (Vol. 2, p. 123, pl. 20 a). In **costa-nigra** Lamb. costa and outermargin of forewings especially at apex are dusted with black. This is said to be "a very nice aberration" occurring in both sexes. — The 2nd generation in the Tyrol is named **pusillata** Dhl., it is somewhat smaller. There are no other differences and the chiefly remarkable feature, viz: that there is a 2nd generation to this otherwise single-brooded insect, is not discernible from the name. — In **evanescens** Schultz the "L" is entirely absent.

*costa-nigra.**pusillata.**evanescens.*

*A. alba* Brem. (Vol. 2, p. 123, pl. 22 c). A rare form of this species has an ochreous brown streak at discocellular nervure of forewings, which however is not very pronounced. According to the original description however this is the typical form. Generally there is a black spot there and this has given occasion to create the name **nigripunctata** Warn. (Vol. 2, pl. 22 e as "alba").

*nigripunctata.*11. Genus: **Stilpnotia** Ww. & Humphr.

*S. flavosulphurea* Stgr. — In Vol. 2 (pl. 22 d) there was only an illustration of the form *cretacea* Stgr. We are now illustrating the typical form from the Alai (8 k).

**S. chichibensis** Mats. Forewings silky white with rose sheen in certain light. A cell spot is absent, costa brownish at apex, fringes white. Antennae white with brown pectinations. Head and base of antennae yellow. Otherwise completely white. 32 mm. Honsho.

*chichibensis.*

**S. suigensis** Mats. Similar to the previous species, but palpi and vertex orange yellow. Fore and middle tarsi with orange rings. Fore tibiae with the same colour on inside. The spurs of tibiae however without the black tips as in *chichibensis*. 30—32 mm. Corea.

*suigensis.*

*S. salicis* L. (Vol. 2, p. 123, pl. 20 a). **neumannii** Banderm. has been repeatedly captured near Halle and it corresponds to *E. chrysorrhoea* ab. *nigrosignata* Banderm. On forewings there is a whole row of black spots (about 7 in number) of 1 mm width near the outer margin. On hindwings there is only single spot near the apex.

*neumannii.*

**S. doii** Mats. Forewings pale lemon yellow with silky gloss. Costa and outer margin slightly darker. Hindwings white, silky and devoid of markings. ♀ 48 mm. Hokkaido.

*doii.*

**S. surtur** O. B.-H. is somewhat similar to *sartus* Ersch. (Vol. 2, p. 124, pl. 21 d) but differs by the uniform dark colour on upper and undersides, similar to *Ocn. detrita* (Vol. 2, pl. 21 c). Forewings somewhat wider, antennae more boldly pectinated than in *sartus*. ♀ 39 mm. Juldus.

*surtur.*



14. Genus: **Pantana** Wkr.

*P. pluto* Leech. Of this species that was dealt with in Vol. 2, p. 125 we are now giving an illustration (8 d). This specimen is from Siao-lu. A somewhat smaller (26 mm instead of 33 mm) and rather paler ♂ from Tien-tsuen probably also belongs here.

18. Genus: **Lymantria** Hbn.

*L. dispar* L. (Vol. 2, p. 127, pl. 20 d). Normal specimens from Andalusia look very different from those from Germany, but RIBBE has not been able to decide from the descriptions available whether they should be designated as *bordigalensis* Mab. or *disparina* Müller. I consider the latter to be the more probable and in any case we are illustrating a ♂ (8 e). Among these there are single specimens **fraguarius** Rbb. (8 e) in the following form: In the ♂ the inner line of forewings has a paler grey inner edge and the outer 1/3rd of wing is paler grey with faint darker lines. The central area is darker with sharply outlined lines. Hindwings not so dark. Generally the ♂ resembles the ♀ by its pale ground colour. The ♀ is white. A black central band on forewings which occasionally covers the entire central area. The black discoidal spot therein has a white areola. Besides this an inner and outer line are generally only indicated at costa. The specimens are much smaller than those from Germany. The wool at tip of abdomen of ♀ is yellowish, not black-brown as in typical *dispar*. — **fasciata** Lamb. has 3 pale grey bands on forewings which are clearly outlined by the normal black lines. Of these 3 bands the 1st is near to base, the 2nd in centre and the 3rd and largest at margin. It is subdivided there by the normal black line. "A very remarkable aberration". — **brunnea** P. Schulze. Forewings of ♀ dark brown with paler brown patches. Hindwings a nice brown. Fringes, especially of hindwings, are not paler than ground colour. Underside is cinnamon brown. — **albescens** Mats. is found among *japonica* Motsch. (Vol. 2, pl. 20), the japanese race. Forewings of ♂ grey white, dark brown at apex and outer margin. Inner and outer lines only distinctly marked at costa. Hindwings white, dark brown at costa and apex. Submarginal line of the same colour is interrupted near inner margin. This is probably a transition form to the continental forms *praeterea* and *examinata* (8 f). — Among the hybrids of *dispar* and *japonica* one finds specimens in which the forewing of ♂ is sooty black, even the subterminal line is scarcely discernible. Also hindwings are pure black, and antennae and body are the same. The ♀ thereto is paler. Normal markings are indicated on forewings. Hindwings are black to the middle. The black marginal spots have grey-white edges and the dark marginal band that is usually present, is absent. Body impure grey, anal wool is coppery brown: **eremita** Banderm. (8 e). — A form that hardly belongs to *eremita*, but a normal ♂ of a hybrid *dispar* × *japonica* race produced with a *dispar* ♀, a form of which the ♂ was purer yellow than the hybrid ♂. Also the ♀ is remarkable by its yellow tone. Generally the hindwing is like *dispar*. It is named **flava** Banderm. (8 f). The reciprocal crossing produced *eremita*. — **alba** Std. is the race from Istria. It is smaller in ♀ sex and purer white. Band markings on both wings are much reduced or absent. In extreme forms the discoidal spot and marginal dots can be absent. It appears to be only an extreme form of the andalusian *fraguarius*. There is no description of the ♂. — **asiatica** Wnuk. (8 e, f) is the asiatic race and of course larger than the european, especially the ♀. The ♂ is paler grey-brown, forewings with scant black-brown markings. In the ♀ the ground colour is yellowish, markings of forewings much reduced, quite absent on hindwings. On forewings only a few spots in cell, on the upper veins and occasionally on the marginal veins. On hindwings marginal spots may be absent. Southern central and eastern Siberia. We are illustrating here a pair ex the PÜNGELER Collection, which are not large, but nevertheless perhaps belong to *asiatica*. The larvae fed on *Pinus larix*. Also specimens from Mo-sy-mien in the British Museum correspond well with our illustration of *asiatica*. — In single ♂ of *asiatica* the marginal band on hindwings is absent, these are named **obsoleta** Wnuk. — A still more extreme form is **unicolor** ♂ Wnuk. in which also on forewings the black-brown markings are missing. — **ochracea** ♂ Wnuk. has ochreous brown ground colour and can occur in the *obsoleta* and *unicolor* forms. Fortunately the ♀ is not favoured with these names. To what degree *asiatica* and its subforms differ from the following, it is difficult to ascertain until more material is available. In view of the general variability, the differences will not be material. — **praeterea** Kard. (8 f) is in point of size between the european and japanese. The ♂ has pale brown forewings, base and marginal area darker. Inner and outer lines delicate but distinct. A dark spot in cell, at end of same an angular streak, a spot at base. Hindwings dun. The ♀ is more yellow than in Europe, but paler than in Japan. Markings are very scant or absent. Fringes of forewings with black spots, hindwings almost devoid of spots. ♂ 45—48 mm, ♀ 70—77 mm. Ussuri. — Among this race there are occasionally pale ♂: **examinata** Kard. (8 f), without transverse line and with a dot and comma mark in cell, base only faintly adumbrated. Therefore a form like the ♀. It is however not excluded that these specimens are worn and that this has brought about the faintness of the markings.

*L. monacha* L. (Vol. 2, p. 128, pl. 20 g). In **transiens** Lamb. the forewings of ♂ are black with a central row of 7—8 white dots. Hindwings suffused with black. Head is white, tegulae red, patagia black with white edge. Abdomen white with black rings. The ♀ has also base of forewings white and at margin



a band of white streaks and is thus slightly less dark than the ♂. Perhaps this is the first sign of melanic forms developing in Belgium's industrial areas. — **fasciata** Hannem. has a wide dark central band on *fasciata*. forewings, in which is situate a white ring with black central spot. — A few names have been given from Russia. — **gracilis** Krul. ♀ has a completely white upper forewing with wide black margin. This form is *gracilis*. rare and the ♂ thereto is unknown. East Russia. — **flaviventer** Krul. has, as the name indicates, the abdomen *flaviventer*. with yellow underside instead of rose. — **kusnezowi** Koloss. ♀ has wings of yellowish white colouration. Trans- *kusnezowi*. verse lines are not present or perhaps they are only faded, as the specimen seems to be a worn one. Urals. — **brunnea** Stipan. denotes a ♀ that is grey-ochreous brown wings and body with diffuse markings some- *brunnea*. what like *eremita*.

*L. aboleta* Stgr. As the specimen illustrated in Vol. 2, pl. 21 a was poorly marked, we are giving here (8 b as *oboleta*) an illustration of a well marked pair.

*L. atlantica* Rmb. (Vol. 2, p. 129, pl. 20 g). **maura** Oberth. is a small melanic form. On forewings in- *maura*. ner and outer lines scarcely contrast with the dark ground. Hindwings of ♂ uniformly dark, slightly paler than forewings, the abdomen which is usually red is dusky. Sebdlou (Algeria).

**L. mus** Oberth. (8 g) is like *atlantica* in the arrangement of its lines, but much smaller with grey-yellow *mus*. ground colour. From outer line there is a streak to lunule at disco-cellular nervure. In the lunule a black streak. Hindwings somewhat paler, an outer band is indicated. El-Utja (Algeria).

**L. kruegeri** Trti. (8 f) is similar to *atlantica* and *lapidicola* H.-Schäff. but somewhat more compactly *kruegeri*. built. Pectinations of antennae of ♂ are longer than in *atlantica* and shorter than in *lapidicola*. Forewings rosy brownish with 3 transverse lines. The inner one is closer to base in *kruegeri* than in *atlantica*; the middle one is wider and more diffuse. The outer one is more oblique inwards at inner margin in *atlantica*. The small black radial basal streak of *atlantica*, is absent here. Hindwings somewhat rosy brownish with wide dark marginal band similar to *lapidicola*. The ♀ has hindwings uniformly dark and is also somewhat darker on forewings, markings more diffuse than in ♂. Abdomen is rose coloured on upperside, somewhat darker at tip without dark rings. ♂ 32—37 mm, ♀ 40 mm. Gennargentu (Sardinia). Perhaps *kruegeri* is only a form of *lapidicola* (Vol. 2, pl. 23 e).

**L. militaris** Oberth. ♀ somewhat larger than *atlantica*. Forewings buff without transverse lines. A black *militaris*. radial streak extends from base under the cell; above it there is a black spot. At disco-cellular there is a "V" shaped black angular streak with a ray extending right into the middle cell, so that a "Y" is formed. Behind same there is a heavily dentate black double submarginal line and black marginal streaks. Hindwings coloured like forewings without discoidal spot or band. Colomb-Bechar (Algeria).

*L. oberthüri* Luc. (Vol. 2, p. 130). The ♂ of the form **belvalettei** Dum. from the Sahara differs from *belvalettei*. typical ♂ from Nefta by its greater size (33 instead of 30 mm). Ground colour of forewings is reddish ochreous, not grey-white. Surface of wings is bestrewn with white above the inner margin and marked by a fine black network. There are black scales above and below the lower wall of cell and similarly in the outer interstices of the veins. The reddish fringes are spotted with black. On hindwings the dark marginal band is more extensive and diffuse. The ♀ varies considerably, both from its ♂ as also from the typical ♀. It is smaller (28—30 mm instead of 40 mm). Forewing is narrower, ground colour ochreous with indications of black transverse lines and besides there is a black streak below the cell. The clarity of the markings varies in the single specimens. Between the ochre-red veins there are many black and a few white scales. Hindwings ochre-brown with indications of dark marginal band. — The colour of the larvae that grow to 35 to 45 mm length, varies from pale grey to ochreous. It has white and brown longitudinal lines with 8 tufts of hair on each segment. It feeds on *Calligonum comosum* and hibernates.

**L. sakaguchii** Mats. Grey-white with black-brown lines on forewings. Near base there are 2 black dots. *sakaguchii*. The inner line is situate almost in centre of wing, it is incurved in cell and at submedian fold and excurved on median nervure. Outer line double, heavily dentate with a bold curve inwards above vein 5. Fringes checked with black. Hindwings similarly coloured, widely black-brown on costa to vein 6. ♂ 30—60 (?) mm. Okinawa, may still be found on palaearctic territory.

**L. nigriplagiata** sp. n. (8 f, g). Perhaps related to *moesta* Swh. (Vol. 2, p. 131). Thorax grey-white. *nigri-* *plagiata*. Forewings buff. The inner line only apparent below the cell, widely white and very oblique. Behind same below the base of vein 2 a black spot. Outer line near margin, double, heavily dentate and with white lunules in the dentations, forming a white spot below vein 2. Abdomen and hindwings grey-brown, paler in inner area. The ♀ is a very pale grey-brown. The black main spot and the pale lunules very diffuse. A second ♂ is darker brown, the inner line of forewings is absent. 32—40 mm. Siao-lu, Tien-tsuen. Type in the British Museum.

*L. concolor* Wkr. The form *superans* Wkr. was already discussed in Vol. 2, p. 131. It has increased black markings. I have received from the British Museum a ♀ each from Ta-tsien-lu and Siao-lu that bear ♂ markings i. e. hindwings have a marginal band and abdomen is red in the anterior half and yellow in post-



erior. The forewings with yellow ground colour and even more heavily marked with black than the ♂ *superans* illustrated in Vol. 10, pl. 40 c with the exception of the hindwings which are milky white, with a dark marginal band.

*L. asoetria* Hbn. Of this species which was dealt with in Vol. 10, p. 325, pl. 41 b, I have 2 ♂♂ before me from Tze-ku in the British-Museum. Ground colour of forewings is pure white, hindwings yellow-grey with wide dark marginal band. As this specimen varies, we are illustrating same here (8 g). I do not consider it necessary to give a name.

*apicebrunnea.* **L. apicebrunnea** *sp. n.* (8 g). ♂ both wings pure white. The inner line with a heavy spot on costa; it is excurved on upper wall of cell and on median nervure and strongly incurved in cell and on submedian fold, then very obliquely outwards to inner margin. Cell spot and angulated spot missing in this specimen. Outer line double, the outer branch very heavily dentate. Submarginal line broad and heavily dentate. Behind same from apex to vein 3 violet brown. Fringes with coarse black spots. Hindwings brownish from costa to vein 6. Fringes posteriorly with fine black spots. Body ochreous brown. ♂ 50 mm. Ta-tsien-lu. Type in the British Museum. — I have a specimen that looks very similar but is a deeper brown and seems to be close to *baibarana* Mats, but markings are somewhat rubbed. I am therefore desisting from a description. From Tze-ku.

### 19. Genus: **Ocneria** Hbn.

*stoetzneri.* *O. terebinthi* Err. (Vol. 2, p. 131, pl. 21 b). **stoetzneri** Draes. is smaller than type. Wings are darker grey and more thinly scaled. Lines fainter, in ♂ very diffuse. Below base of vein 2 there is a dark streak, behind same and above vein 5 a dark shade. There are no red patches on palpi and head. Peking. — (On pl. 21 b of Vol. 2 erroneously given as *therebynthi* instead of *terebinthi*.)

*nisseni.* *O. poenitens* Stgr. (Vol. 2, p. 132, pl. 21 c). This species was described as a form of *signatoria* Chr., but may be held to be a species. No doubt **nisseni** Roths. (8 k) belongs to same. The brown ground colour is more reddish than in *poenitens* and all markings are clearer. In the double submarginal line a few pale scales are interspersed. Also abdomen and hindwings are rather more reddish. Khenchela, Ain-Sefra (Algeria). — *algorica* Oberth. seems identical with the illustration of *poenitens* (Vol. 2, pl. 21 c) of which the author disapproved but which corresponds to specimens in the PÜNGELER Collection. If one does not consider it of importance that in *algorica* apparently the outer edge of the submarginal line is more clearly marked than the inner one (in *nisseni* both are equally heavy), then *algorica* and *poenitens* are evidently identical, whilst *nisseni* differs by its clearer markings.

*brunnea.* *O. rubea* F. (Vol. 2, p. 132, pl. 21 c). The form **brunnea** Rocci is a monotonous dark reddish brown instead of the normal reddish grey. As there is only a single ♂ specimen it is difficult to say whether same is only an aberration or whether it represents the normal race at Genua. — **obscura** Bub. from the same district (Alassio) was described later, but need not differ on that account. Markings normal and ground colour of both wings dark reddish brown-grey. The light spot at end of cell on forewings contrasts distinctly from the dark ground colour. — The race **hillmanni** Dhl. from the S. Tyrol is grey-black (♂), red patches barely indicated, the dark bands diffuse, pale middle spot obsolescent. Nothing is said about the ♀.

*uniformis.* **O. uniformis** Roths. (8 g) is somewhat similar to *flavipalpata* Stgr. Body and forewings cinnamon brown. Except for a small ruddy spot at lower angle of cell, there are no other markings. Hindwings cinnamon red. The only specimen before me has brownish white abdomen and hindwings. ♀ 38 mm. S. Algeria.

*flavipalpata.* **O. flavipalpata** Stgr. (Vol. 2, p. 132, pl. 21 b). We now have a description of the larvae of this species. They feed on the desert plant *Acacia tortilis* and are red-brown, the feet vermilion. On each segment there is a white and black lateral tuft of hair. On dorsum on 4th and 5th segments there is a white cushion of hairs; on the 6th and 7th segments similarly a yellow cushion. On the last 2 segments blue markings with 2 red spots. On the last segment there is a grey-blue tuft of hair from which long greeny white hairs project, extending backwards. Similar hairs on the head. The locality, Libyan desert, is new.

### 20. Genus: **Ocnerogyia** Stgr.

As the neuration of this Genus has not yet been described I am giving same now. In forewings vein formation is like *Lymantria*, but vein 7 arises somewhat later from the common stalk of 7 + 8 + 9, vein 10 arises free from the cell and is somewhat bent at its base. In hindwings vein 3 arises nearer base of wing, so that it lies midway between 2 and 4, 8 approaches the cell somewhat later. Middle and hind tibiae with terminal spurs. Antennae of ♀ with short pectinations.

*amanda.* **O. amanda** Stgr. (8 g). We are now illustrating the ♂ of this species which was dealt with in Vol. 2, p. 133. It also suffices for the underside but there is still an ochreous streak on forewings from base below



the cell, almost to vein 2. The ♀ differs somewhat from the ♂. Abdomen is pale grey-brown, somewhat yellowish at base. Hindwings also are pale grey-brown, the inner area somewhat more reddish. On underside of forewings, the streak below the cell is missing. — This species is rare in collections (the ♀ was described in 1920), but it is a pest to fig trees in Mesopotamia. Larvae grey-green with long hairs anteriorly, which project and hang right over the head. There are no bristles such as in *Orgyia*, *Dasychira*, but hairs in arrangement like on *Arctiidae* larvae. It is full-fed in about 24 days being about 8—11 days in the pupal stage, so that throughout the summer, even in the greatest heat, (which usually brings about a slowing up, though not in this case) one can find all stages.

**O. nora** Stgr. (8 g). We are now also illustrating this species which was placed with a query in Vol. 2, *nora*. p. 132 in the Genus *Ocneria*.

**O. tölgi** (8 h) Rbl. also belongs here and is perhaps only a large *nora* form. Owing to its rarity the *tölgi*. type very kindly placed at our disposal from Vienna is being illustrated. The ground colour is monotonous and a shade darker than *nora*. There is no difference in the shape of the inner and outer lines, but there is no central band and the submarginal shade is absent. A black angular mark on disco-cellular. Hindwings only as reddish brown as *nora* on the costa, otherwise much darker. On underside of forewings of *nora* the colour is yellow-brown with regular wide blackish costa whilst in *tölgi* the dark colouration penetrates as far as the lower wall of cell. Underside of hindwing is also much darker. ♂ 27 mm. Amanus mountains.

Note: *samarita* Stgr. (Vol. 2, pl. 21 e) should be classified here. This is however much less likely in the case of *ledereri* Mill. (Vol. 2, pl. 22 h) and *amabilis* Chr. (Vol. 2, pl. 21 d).

## 21. Genus: **Albarracina** Stgr.

**A. warionis** Oberth. (8 i). The ♀ is similar to *korbi* Stgr., a species that was dealt with in Vol. 2, p. 133, *warionis*. and it may be held to be a sub-race to the *warionis* which was previously described. *warionis* ♀ differs from *korbi* according to the original illustration by the diffuse brown stripe from apex of forewings to the centre of inner margin, which however may also be absent. Beyond same there is a row of black dots, which on the original illustration extends to inner margin whilst according to the description it is incurved on the lower wall of cell and near the base turns up toward costa. The enclosed space is more yellowish grey than the grey shade of the rest of forewing. Hindwings grey-brown with diffuse dark central band. Described from Oran and identical with *korbi-deundulata* Strd. A further synonym is *korbi-banghaasi* Rotsch. We are now illustrating the ♂ from a specimen ex the collection of OBERTHÜR. The hindwing can be white or brownish and the black spots on forewing can be larger or smaller. According to ROTHSCILD the *warionis* ♀♀ from Oran are more brown than grey as the ♀♀ from Morocco and both are again different to those from Syria and Palestine (= *syriaca* Stndf.). A single ♀ from Morocco which is larger and darker grey is named **schindlerae** Oberth. According to the *schindlerae*. material before me the differences between *warionis* (from Oued-Djida) and *korbi* (from Albarracin) are very small. The best one can say is that in *korbi* (8 k) the black submarginal spots on forewings are larger with clearer white lunules bordering same. In one specimen which BARTEL had received the locality is given as "Spain" for *korbi*, whilst it most closely resembles *warionis*. I have specimens of *syriaca* both from Syria and Palestine, which are practically alike. The marking is very diffuse, only the oblique band extending from apex is more prominent than in *warionis*, in my *korbi* it is scarcely indicated. — *bau* (8 k) can easily be differentiated by the more upright deep black apical band and the black streak (not dot) below vein 2 near the margin.

**A. korbi** Stgr. (8 k). This form is dealt with in Vol. 2, p. 133 but the illustration on pl. 21 d does *korbi*. not refer to this species; the moth illustrated does not belong here at all, whilst the description in the text is quite correct and agrees with our present illustrations of specimens from Albarracin.

**A. alluaudi** Oberth. (8 i) is somewhat larger than *warionis*. Body and wings dark mouse-grey, not pale *alluaudi*. grey. Thorax a leaden grey like the forewings. Markings similar to *warionis*, but very much less distinct. Fringes long pale and dark grey spotted. Close inside of same an undulate row of delicate black lunules. Veins glossy. Hindwings unicoloured grey with pale fringes. Marakesh.

## 24. Genus: **Porthesia** Steph.

**P. riukuana** Mats. Thorax and forewings yellow bestrewn with a few reddish orange scales. In the *riukuana*. central cell also a few carmine red scales. Abdomen and hindwings pale yellow with faint violet sheen in certain light. ♂ 19 mm. Okinawa; mentioned here as a boundary insect, which probably extends into palaearctic territory.

## 25. Genus: **Euproctis** Hbn.

**E. chrysorrhoea** Hbn. (Vol. 2, p. 135, pl. 21 e). The form **plumbociliata** Heinr. has lead-grey fringes *plumbociliata*. as the name indicates. — In Algeria and Tunis most of the ♂ have a few black dots on forewings similar



- to *punctifera* Teich and *punctella* Strd., none however are so heavily spotted as *nigrosignata* Bandermer. The ♀ has golden yellow hairs on abdomen instead of the brown hairs common to those of central Europe and for this we have the name **xanthorrhoea** Oberth. (8 h). It is also remarkable that in the coastal region of Algeria and close to Hyères the larvae feed exclusively on *Arbutus unedo*. In the interior of Algeria and further away from Hyères it feeds on all kinds of trees and is correspondingly harmful. According to specimens in the PÜNGELER collection *xanthorrhoea* occurs in Sardinia, but forewings rarely have black dots.
- boulifa*. **E. boulifa** Dum. has thorax and forewings a saffron-yellow with 2 lines of white scales. The inner one commences at lower wall of cell, the outer one is complete. Fringes a silky yellow. Hindwings yellow-red, paler at base. The ♀ monotonous pale buff. On forewings costa and inner margin are pale saffron-yellow. Abdomen with reddish brown hairs, anal tuft black-brown. 20—30 mm. Tunis.
- aurata*. **E. aurata** Wil. (8 h). Forewings pale yellow with orange-red band in similar arrangement to that of *piperita* (Vol. 2, pl. 21 e) but much more diffuse. Hindwings yellowish white. ♂ 30 mm. Shikoku (Japan).
- curvata*. **E. curvata** Wil. (8 h). Somewhat similar to *vitellina* Koll. (Vol. 2, p. 137, pl. 23 a). Thorax yellowish, abdomen yellow-brown. Forewings lemon-yellow with an outer row of red-brown spots which is bent at lower angle of cell. Besides there are 1—2 spots at base. Hindwings more whitish, with yellowish hairs towards the inner margin. 32—48 mm. Japan.
- sakaguchii*. **E. sakaguchii** Mats. Forewings with black central band, which is interrupted in the space above the subcostal nervure. With pale edges on both sides and intersected by pale veins. The colour of basal and marginal areas is not mentioned, but is presumably yellow. Above each of veins 5 and 7 there is a black spot. Hindwings somewhat paler. Vein 4 is displaced towards vein 3 and is therefore further from vein 5. ♀ 44 mm. Okinawa; mentioned here as a boundary insect.
- piperita*. **E. piperita** Oberth. (10 a). We are giving a new illustration, of a form ex the PÜNGELER collection that varies considerably from that dealt with in Vol. 2, p. 136 and illustrated on pl. 21 e. We should mention here that the basal spot can also be smaller and be separated from the main spot by a narrow line of ground colour. In a ♀ from Chang-ku (in the British Museum) the main band extends in centre to the outer margin, in this specimen the hindwing is a slightly bolder yellow than in the specimen illustrated.
- susanna*. **E. susanna** Stgr. (8 h and Vol. 2, p. 138, pl. 21 i) also occurs in Egypt. The larvae feed there on *Ochradenus baccatus*. It is black on upperside, yellow on underside with black dusting laterally. At the level of the stigmata there is an orange-yellow lateral stripe. Each segment has 4 pairs of warts, of which the central pair is the larger, they are brown with short golden brown hairs intermixed with a few longer white hairs. The second pair is brown with long white hairs. The last two pairs are orange yellow with short white hairs. The 3 anterior segments with only white hairs. — As the specimen illustrated in Vol. 2 represented a small ♂ from Arabia, we are now giving an illustration of a larger ♀ from Egypt.
- flavotriangulata*. **E. atomaria** Wkr. (Vol. 2, p. 138, pl. 21 h). As *atomaria* is subject to great variation, I presume that **flavotriangulata** form. nov. (8 h) is only a form of same. The yellow ground colour forms a large triangular mark on costa of forewings and the large brown spot extends in its main bulge at vein 6 in a small projection outwards. Generally there are 2 brown apical spots, but here there is only one, which can also be merged with the large main spot. There is a yellow streak also on centre of inner margin. Hindwing is black-brown to centre or nearly to margin. Abdomen black with yellow tip. ♂ 25—28 mm. ♀ 32 mm. Ta-tsien-lu, Chang-ku. Type in the British Museum.
- decussata*. **E. decussata** Mr. has already been dealt with in the Indo-Australian part and illustrated in Vol. 10, pl. 44 e. According to a specimen from Ta-tsien-lu in the British Museum, the species also belongs to the palaearctic fauna.
- magniplaga*. **E. magniplaga** ♂ sp. n. Somewhat similar to *niphonis-squamosa* Btlr. (Vol. 2, p. 136, pl. 21 e). The smoky brown band of forewings is much like the illustration of the ♀ (*niphonis*) on pl. 21 f, only at its base there is still a semi-circular patch of the ground colour. The latter is orange-yellow. Hindwings cream and in one of the 2 specimens available there is a dusky brown spot of abt 4 mm diameter above the inner angle. Thorax and abdomen faintly brown. ♂ 42 mm. Tze-ku. Type in the British Museum.
- parviplagiosa*. **E. parviplagiosa** sp. n. (8 i). Somewhat similar to *grisea* Semp. (Vol. 10, p. 347, pl. 45 e) but it has traces of a dark central band in centre of inner margin. At disco-cellular there is a diffuse pale spot, which is also visible on underside. ♂ 27 mm. Tien-tsuen. Type in the British Museum.
- karapini*. **E. karapini** Strd. (8 i) is somewhat similar to *latifascia* Wkr. (Vol. 2, pl. 21 f). Forewing pale cream colour with indications of 2 transverse bands each of 1 mm width, which however are much nearer the margin than in *latifascia*. Inner margin is a somewhat deeper colour. Hindwings and fringes pale white. Thorax whitish, abdomen and anal wool black-brown. ♀ 33 mm. Karapin. Japan.



**E. ochrilineata** *sp. n.* (8 i). Shaft of antennae and thorax are ochreous brown, pectinations darker. *ochrilineata*. Forewings dark purple brown, narrowly ochreous at costa with 2 similar transverse lines which are both distended and diffuse at costa; the inner one is excurved at lower wall of cell and in 3 specimens out of 4 with a fine point outwards in the submedian fold. The outer one is similarly excurved, so that the main bend is not concentrated behind the cell. Abdomen and hindwings slightly paler than forewings. Fringes of both wings almost as pale as the bands on forewing. Underside devoid of markings, scarcely paler than upperside. ♂ 32—36 mm. Tze-ku. Type in the British Museum.

**E. marginata** *Mr.* This species is indigenous to Indian territory around Darjeeling etc. and therefore dealt with in Vol. 10, p. 338, pl. 43 c. — A ♀ from Tze-ku, **diffusefasciata** *form. nov.* (8 h) varies by having *diffuse-fasciata*. a very small streak-like spot at disco-cellular of forewings. Also the yellow margin is narrower, the 7 black marginal spots are present. Hindwings which are otherwise devoid of markings have a wide diffuse purplish brown outer band. ♀ 56 mm. Tze-ku. Type in the British Museum.

**E. divisa** *Wkr.* This white species which is dealt with in Vol. 10, p. 342 pl. 45 i, also occurs in West China and Siao-lu and thus reaches palaearctic territory.

**E. nigrifulva** *sp. n.* (8 i). Very similar to *fulvinigra* *Hmps.* dealt with in Vol. 10, p. 340, pl. 44 c, but *nigrifulva*. without the inner and outer line of forewings, which certainly are also not discernible on the illustration. The legs of ♂ are orange-yellow, those of ♀ orange-red. In the ♂ thorax and forewings orange-yellow, somewhat darker in the centre. Hindwings and abdomen grey-brown, fringes as on forewings. Underside of both wings grey-brown, only margins and fringes being yellow. The ♀ similarly but the orange-yellow patches of the ♂ are orange-red. 30 mm. Tze-ku. Type in the British Museum.

## 9. Genus: **Laelia** *Steph.*

**L. coenosa** *Hbn.* (Vol. 2, p. 122, pl. 19 i). **impunctata** *Mats.* is an extreme form of *sangaica-paucipuncta impunctata*. *Strd.* already dealt with in Vol. 2. The ♂ has no dark marginal dots on forewings. The ♀ is grey-white along the entire costa, with a few black-brown scales at apex. The author enumerates the species among the *Noto-dontides*.

## Alphabetical List

with references to the original descriptions of the forms of palaearctic *Lymantriidae* enumerated in Supplementary Volume 2.

\* signifies that the form is also figured in the place cited.

*alba* Lym. *Std.* Iris 28, p. 16.  
*albescens* Lym. *Mats.* Journ. Coll. Agr. Hokk. 19, p. 25.  
*alluaudi* Alb. *Oberth.* Ét. Lép. Comp. 19, p. 220.  
*alpina* Das. *Kitt* Verh. Zool.-Bot. Ges. Wien 74/75, p. (69).  
*anthyllina* Org. *John* Ent. Ztschr. 36, p. 34.  
*apicebrunnea* Lym. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 102. \*  
*arcerii* Org. *Ragusa* Bull. Soc. Ent. It. 55, p. 19.  
*asiatica* Lym. *Wnuk.* Rev. Russe Ent. 20, p. 79.  
*asoetria* Lym. *Hbn.* Sammlg. Exot. Schmett. 2.  
*aurata* Eup. *Wil.* Trans. Ent. Soc. Lond. 1911, p. 272. \*  
*aurea* Org. *Oberth.* Ét. Lép. Comp. 19, p. 201.  
*aureomicans* Hyp. *Std.* Iris 35, p. 182.  
*aurifera* Das. *Scriba* Ent. Rundsch. 36, p. 42. \*  
  
*belvalettei* Lym. *Dumont* Bull. Soc. Ent. Fr. 1928, p. 225.  
*boulifa* Eup. *Dumont* Bull. Soc. Ent. Fr. 1922, p. 244.  
*brunnea* Lym. disp. *P. Schulze* Int. Ent. Ztschr. 4, p. 26.  
*brunnea* Lym. mon. *Stipan* Ent. Ztschr. 37, p. 40.  
*brunnea* Ocn. *Rocci* Mem. Soc. Ent. It. 2, p. 9.  
  
*calabra* Org. *Std.* Ztschr. wiss. Ins.-Biol. 12, p. 110.  
*callunae* Das. *Peets* Jahresb. Nat. Ges. Hannover 55, p. 214 (1908).  
*caucasica* Das. *Schelj.* N. Beitr. syst. Ins. 1, p. 131.  
*chichibensis* Stilp. *Mats.* Journ. Coll. Agr. Hokkaido 19, p. 26.  
*confusa* Cif. *Brem.* Lep. Ost-Sibirien, p. 42. \*  
*conjuncta* Das. *Wil.* Trans. Ent. Soc. Lond. 1911, p. 270.  
*coreana* Das. *Mats.* Journ. Coll. Agr. Hokkaido 19, p. 36. \*  
*costa-nigra* Arct. *Lamb.* Rev. mens. Namur 8, p. 43.  
*curvata* Eupr. *Wil.* Trans. Ent. Soc. Lond. 1911, p. 271. \*

*defuncta* Hyp. *Std.* Iris 35, p. 182.  
*deserticola* Org. *Powell* Oberth. Ét. Lép. Comp. 12, p. 273. \*  
*diffusefasciata* Eupr. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 105. \*  
*dilutior* Org. *Bub.* Ztschr. Oestr. Ent. Ver. 11, p. 35.  
*divisa* Eupr. *Wkr.* List Lep. Het. Br. Mus. 4, p. 836.  
*doi* Stilp. *Mats.* Journ. Coll. Agr. Hokk. 19, p. 38.

*eburnina* Hyp. *Std.* Iris 35, p. 182.  
*effeminata* Das. *Kard.* Ent. Mitt. 17, p. 416. \*  
*eremita* Lym. *Banderm.* Int. Ent. Ztschr. 18, p. 30.  
*evanescens* Arct. *Schultz* Ent. Ztschr. 24, p. 35.  
*examinata* Lym. *Kard.* Ent. Mit. 17, p. 417.

*falcata* Hyp. *Std.* Iris 35, p. 182.  
*fasciata* Lym. disp. *Lamb.* Rev. mens. Namur 7, p. 51.  
*fasciata* Lym. mon. *Hannem.* Int. Ent. Ztschr. 10, p. 37.  
*femicolorata* Hyp. *Std.* Iris 35, p. 182.  
*flava* Lym. *Banderm.* Ent. Ztschr. 37, p. 49.  
*flavescens* Org. gon. *Masl.* Polsk Pisma 2, p. 133. \*  
*flavescens* Org. thyell. *Wohnig* Int. Ent. Ztschr. 21, p. 38.  
*flavipalpata* Ocn. *Stgr.* Iris 8, p. 296. \*  
*flaviventer* Lym. *Krul.* Rev. Russe Ent. 9, p. 303.  
*flavotriangulata* Eupr. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 104. \*  
*fraguarius* Lym. *Rbb.* Iris 23, p. 221.

*gadollae* Org. *Wgr.* Int. Ent. Ztschr. 15, p. 17. \*  
*grisea* Org. ant. *Denso* Iris 26, p. 132.  
*grisea* Org. thyell. *Wohnig* Int. Ent. Ztschr. 21, p. 39.  
*gracilis* Lym. *Krul.* Rev. Russe Ent. 11, p. 445.  
*groenlandica* Das. *Homeyer* II. Dtsch. Nordpolfahrt 2, p. 469.



- grundi* Das. *Lorkovitch* Verh. Zool.-Bot. Ges. Wien 80, p. 5.  
*helgolandiae* Das. *Strd.* Zool. Zentr.-Blatt 1906, p. 798.  
*hillmanni* Ocn. *Dhl.* Ent. Ztschr. 39, p. 108.  
*hirayamae* Das. *Mats.* Journ. Coll. Agr. Hokkaido 19, p. 35. \*  
*holli* Org. *Oberth.* Ét. Lép. Comp. 12, p. 278. \*  
*illustreciliata* Hyp. *Std.* Iris 35, p. 182.  
*immaculata* Org. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 97. \*  
*immunda* Das. *Kard.* Ent. Mitt. 17, p. 416. \*  
*impunctata* Lael. *Mats.* Ins. Matsumur. 4, p. 136.  
*karapiua* Eupr. *Strd.* Ent. Mitt. 3, p. 335.  
*kruegeri* Lym. *Trti.* Atti Soc. Zool. It. 51, p. 285. \*  
*kusnezovi* Lym. *Koloss.* Ent. Ztschr. 41, p. 481.  
*lunulata* Das. *Bflr.* Ann. Mag. Nat. Hist. (4) 20, p. 403.  
*magniplaga* Eupr. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 104.  
*mancha* Org. *Rbb.* Iris 23, p. 219.  
*maura* Lym. *Oberth.* Ét. Lép. Comp. 11, f. 4724. \*  
*medionigra* Org. *Rbb.* Iris 23, p. 219.  
*militaris* Lym. *Oberth.* Bull. Soc. Ent. Fr. 1914, p. 386.  
*mus* Lym. *Oberth.* Ét. Lép. Comp. 11, p. 22. \*  
*neumanni* Stilp. *Banderm.* Entom. Anz. 9, p. 340. \*  
*nigra* Das. *Hmps.* Journ. Bomb. Nat. Hist. Soc. 11, p. 442.  
*nigrifulva* Eupr. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 105. \*  
*nigriplagiata* Lym. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 101. \*  
*nigripunctata* Arct. *Warn.* Iris 38, p. 154.  
*nigrotecta* Das. *Dhl.* Mitt. Münch. Ent. Ges. 19, p. 103.  
*nisseni* Ocn. *Rothsch.* Novit. Zool. 19, p. 125.  
*nivalis* Das. *Stgr.* Stett. Ent. Ztg. 1887, p. 97.  
*nupera* Org. *Trti.* Natural. Sicil. 1919, p. 248.  
*obscura* Ocn. *Bub.* Ztschr. Oestr. Ent. Ver. 12, p. 65.  
*obsoleta* Lym. *Wnuk.* Rev. Russe Ent. 20, p. 79.  
*ochracea* Lym. *Wnuk.* Rev. Russe Ent. 20, p. 80.  
*ochrilineata* Eupr. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 105. \*  
*omniulimbata* Hyp. *Std.* Iris 35, p. 182.  
*orana* Org. *Powell* *Oberth.* Ét. Lép. Comp. 12, p. 272. \*  
*parallela* Org. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 98. \*  
*parviplagiata* Eupr. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 104.  
*plumbociliata* Eupr. *Heinr.* D. Ent. Ztschr. 1916, p. 510.  
*postfusca* Ar. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 99. \*  
*praeterea* Lym. *Kard.* Ent. Mitt. 17, p. 416. \*  
*prieta* Org. *Rbb.* Iris 23, p. 219.  
*pussillata* Arct. *Dhl.* Ent. Ztschr. 39, p. 107.  
*relictus* Das. *O. B.-H.* Horae Macrol. 1, p. 77. \*  
*riukiwana* Port. *Mats.* Journ. Coll. Agr. Hokk. 19, p. 39.  
*rossii* Das. *Curt.* Ross II. voyg. N. W.-Paß. App. 70.  
*sakaguchii* Eupr. *Mals.* Journ. Coll. Agr. Hokk. 19, p. 40. \*  
*sakaguchii* Lym. *Mats.* Journ. Coll. Agr. Hokk. 19, p. 26.  
*sebdouensis* Org. *Oberth.* Ét. Lép. Comp. 12, p. 278.  
*semicirculosa* Das. *Gaede* Seitz, *Macrolep.* Suppl. 2, p. 96.  
*stoetzneri* Ocn. *Draes.* Iris 40, p. 53.  
*strigata* Das. *Mr.* Lep. Atkins., p. 58.  
*surtur* Stilp. *B.-Haas* Iris 26, p. 107.  
*suigensis* Stilp. *Mats.* Journ. Coll. Agr. Hokk. 19, p. 27.  
*suzukii* Das. *Mats.* Journ. Coll. Agr. Hokk. 19, p. 35. \*  
*toelgi* Ocn. *Rbl.* Sitz.-Ber. Ak. Wiss. Wien 126, p. 264.  
*transiens* Lym. *Lamb.* Revue Mens. Namur 9, p. 10.  
*trimacula* Das. *Seriba* Entomol. Rundsch. 38, p. 29.  
*unicolor* Lym. *Wnuk.* Rev. Russe Ent. 20, p. 80.  
*uniformis* Ocn. *Rothsch.* Novit. Zoolog. 20, p. 118.  
*warionis* Alb. *Oberth.* Ét. d'Ent. 6, p. 75. \*  
*wintersteini* Org. *Wohnig* Int. Ent. Ztschr. 21, p. 38.  
*xanthorrhoea* Eupr. *Oberth.* Ét. Lép. Comp. 12, p. 282.



## 6. Family: *Thaumetopoeidae*.

### Genus: *Thaumetopoea* Hbn.

**T. bonjeani** Oberth. (9 a). In colouration the ♀ is very similar to *solitaria* (Vol. 2, pl. 23 c) but is much *bonjeani*. more faintly marked on forewings. The inner line is slightly angulated at median nervure; at disco-cellular there is a diffuse streak. The outer line is faintly double, slightly less indistinct at costa, the outer edge slightly undulate. Hindwings white, somewhat darkened at base, no anal spot. Azrou (Algeria). — The larvae live gregariously on *Cedrus atlantica*, their hairs not being poisonous. As the *solitaria* larvae live singly, as the name indicates, *bonjeani* cannot be identical with same in spite of the great similarity.

**T. wilkinsoni** Tams (9 a) is somewhat like *solitaria* Frr. in the arrangement of the lines. Forewings *wilkinsoni*. of ♂ grey with narrow black transverse lines. Basal line projecting in a point inwards at lower wall of cell, then vertically to inner margin. The inner line is somewhat distended at inner margin and inclining outwards, at costa it is considerably distended and diffuse. Disco-cellular with black angle. The outer line fine and dentate, forming an angle at lower median nervure, then turning inwards and incurved below submedian nervure. Hindwings white, margin narrowly darker, a dark brown spot below submedian nervure. ♀ similar but browner, the lines less distinct. 33—45 mm. Cyprus.

*T. pityocampa* Schiff. (Vol. 2, p. 144, pl. 21 k). Among typical specimens in the Tessin, one sometimes finds the very dark form **obscura** Vorbr. (9 a), in which also the hindwings are blackish. — In the South Tyrol *obscura*. the species is very variable, both in form and in the development of the lines. Two forms from there have been denominated: **convergens** Dhl. both lines of forewing converge at inner margin, forming a dark spot. *convergens*. — In the ♀ the transverse lines are normally already fainter than in ♂, **renegata** Dhl. denotes specimens where *renegata*. they are quite absent. — From an illustration of *insignipennis* Strd. (9 a) by REISSER it is evident that in same the inner line of forewings is distended at costa and inner margin, just as in *wilkinsoni* Tams, also the outer line does not differ much from same. On hindwings however the black spot is missing. A new locality for it is the Sierra d'Alfacar. — Besides this pale form a very dark form occurs at the same spot: **bicolor** ♂ *bicolor*. Reisser (9 a). The 3 transverse lines are still just distinguishable, similarly the pale surround to reniform stigma and the pale undulate line. Transitions also occur in Corsica. They differ from *nigra* Bang-Haas by the white hindwings with black anal spot. The examination of the genitalia by ZERNY has established the dissimilitude of *wilkinsoni* and *insignipennis*.

*T. processionea* L. (Vol. 2, p. 143, pl. 21 k). A ♂ with somewhat paler ground colour and diffuse markings, having the appearance of a ♀ is named **seiffersi** Closs. *seiffersi*.

*T. herculanea* Rmb. (Vol. 2, p. 144, pl. 23 c). The races described as follows belong to the race *colossa* Bang-Haas (Vol. 2, pl. 23 d) in consequence of their considerable size. **phosphatiphila** Dumont is just slightly *phosphatiphila*. darker than the latter. Forewings pure white with ochreous brown lines and black veins. The inner line, extending from upper wall of cell is bent. The outer line (apparently not a double line as in other forms) slightly curved at subcostal nervures, rising somewhat upwards at upper median nervure and obliquely to inner margin. Beyond same a narrow white band, slightly distended at its extremities. Outer margin dark. Hindwings white. The ♀ is similar but somewhat darker. 35—42 mm. Tunis. — **carneades** Trti. (9 a) has silky white forewings *carneades*. with double inner and outer lines; the inner one is filled with a few slightly less dark scales. The central spot is also distinct and the fringes distinctly darkly spotted. Hindwings pure white, devoid of markings. The body is less dark than in *colossa*. ♂ 35 mm. Benghasi. — **lustrata** Trti. from Derna is a sub-form to same. Ground *lustrata*. colour of wings is pure white. The dark brown marking is purer and less diffuse. Also of this form only the ♂ is known. Perhaps same is synonymous with *phosphatiphila*.



### Alphabetical List

with references to the original descriptions of the forms of palaearctic *Thaumetopoeidae* enumerated in Supplementary Volume 2.

\* signifies that the form is also figured in the place cited.

**bicolor** Th. *ReiBer* Ztschr. Oest. Ent. Ver. 13, p. 17. \*

**bonjeani** Th. *Powell* Oberth. Ét. Lép. Comp. 16, p. 188. \*

**carneades** Th. *Trti.* Atti Soc. Ital. Sci. Nat. 63, p. 49. \*

**convergens** Th. *Dhl.* Entomol. Ztschr. 39 (1925), p. 6.

**lustrata** Th. *Trti.* Atti Soc. Ital. Sci. Nat. 65, p. 28.

**obscura** Th. *Vorbr.* B'flies of Switzerland 1, p. 205.

**phosphatiphila** Th. *Dum.* Bull. Soc. Ent. Fr. 1922, p. 245.

**renegata** Th. *Dhl.* Entomol. Zeitschr. 39 (1925), p. 6.

**seiffersi** Th. *Closs* Int. Ent. Ztschr. 10 (1917), p. 147.

**wilkinsoni** Th. *Tams* Bull. Ent. Rec. 15 (1925), p. 293. \*

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## 7. Family: Lasiocampidae.

### 1. Genus: *Chondrostega* Led.

A relatively large number of new species of this interesting group are described. Whether they will all be retained in the future, or whether they will be merged, as in the Genus *Somabrachys*, cannot yet be said.

**Ch. powelli** Oberth. (9 b, 10 a). Compared by the author as regards the colour with *pastrana* Led. (♂ *powelli*. 10 a, ♀ Vol. 2, p. 149, pl. 24 a). Base and outer margin darker, so that occasionally the ground colour of the forewings is only retained as an outer band. On hindwings an outer band can be indicated on upperside, which can be almost as heavily excurved in the centre as on underside of *vandalicia* Mill. (Vol. 2, p. 149, pl. 24 a). The underside of the 2 specimens figured by OBERTHÜR appears to be so different, that one could almost believe they were 2 species. The species seems to be very variable. In one specimen an outer band of dark spots, which is interrupted anteriorly, is apparent on underside of hindwings. In another specimen there are 3 spots nearer the base, one at cell-end, one below same and another at costa. Finally there is a specimen in the PÜNGELER collection with a continuous dark central line, which is heavily incurved at costa. ♂ 34—38 mm. Algeria. The ♀ has long and thin antennae, whilst in *constantina* they are shorter and thicker.

**Ch. tingitana** Powell (9 b) was first known in the ♀♀. Head and thorax with yellow-brown hairs which *tingitana*. are less dense than in *constantina* (10 a) and *powelli* (9 b). Also the dark brown hairs on abdomen are less dense. Antennae are not so long as in *powelli*, but differing also from those of *constantina* and *vandalicia* (Vol. 2, p. 149, pl. 24 a) by their fineness and sharper points, the pectinations being less pointed. The process (tooth) on thorax after the 1st pair of legs is little developed. The lateral parts of the projection on frons are somewhat more rounded off than in *constantina*. Tangiers. Later on OBERTHÜR has illustrated the ♂ without giving any particular description. On upperside it resembles a red-brown *powelli*. Forewings are uniformly dark from base to outer line, then somewhat paler and glossy. Hindwings are paler and shades of a central band are discernible. On underside the outer band of forewings is slightly more prominent. On hindwings it is much more distinct and of the same shape as shown in our illustration of *powelli*.

**Ch. maghrebica** Joannis. Commencing again here with the ♀, we find the following differences: the *maghre-*  
*bica*. projection on the frons has sharper ridges at the sides. The hairs on head and thorax are longer and yellower than in *constantina* and *powelli*. Hairs of abdomen are also somewhat longer and the brown colouration is less reddish, it is preferably yellow anteriorly and yellow-brown posteriorly. In the ♂ head and thorax are black-brown, abdomen is yellow-grey with brown belts. Forewings black-brown, the outer band whitish, fairly wide, parallel with the outer margin and only slightly distant from same. Fringes spotted. Hindwings grey-brown with a dark shade from centre of inner margin to the cell. Outer margin narrowly brownish. Underside of forewings buff-brown with pale veins. The light outer band further removed from margin with narrow black-brown edge inwardly. Here and on hindwings it is incurved below costa, then excurved and continuing parallel to the margin. On hindwings veins are also light and there is a pale streak in the cell. The line on hindwing is similar in formation to that of *vandalicia* (Vol. 2, p. 149, pl. 24 a) but the line there is dark and not light as stated in Vol. 2, p. 149 and the area to base is sometimes as brown as the line itself. ♂ 27—34 mm. Marakesh.

**Ch. zanoni** Trti. from Cyrenaica seems to be very similar to *aurivillii* Pnglr. (9 b) from Jerusalem *zanoni*. (Vol. 2, p. 150). As *aurivillii* has not yet been illustrated, we are giving an illustration from the type. *zanoni* varies on upperside of forewings by paler base, the outer paler band appears to run straighter to costa. Fringes in both species are checked. The brown ground colour of hindwings is just as dark as that of forewings, so that the pale base, light median band and margin contrast sharply. Fringes are as the ground colour, i. e. dark, but this is not discernible from the original illustration. In *aurivillii* (9 b) they are as light as the margin.



In both species the pale median band on underside of hindwings is narrow and clear, almost forming a semi-circle. In *aurivillii* it has an inner edge of dark brown. In *zanoni* fringes of forewings are not checked on the underside. ♂ 30 mm.

*osthelderi*. **Ch. osthelderi** Pnglr. (9 b). Antennae extremely heavily pectinated. Wings dark grey-brown at base, separated from the slightly paler outer area by an indistinct darker band. Hindwings of same shade as this marginal area. A dark band is indicated somewhat before the centre. On underside of forewings the dark central band is only distinct anteriorly. It is more clearly marked on hindwings and forms a semicircle as in our *powelli*. ♂ 20 mm (Type) to 26 mm. Konia, Akshehir.

*götschmanni*. **Ch. götschmanni** Stertz (9 b) in the imago is very like *pastrana* Led. (10 a and Vol. 2, p. 149, pl. 24 a), but the larvae are different. The antennae in *götschmanni* have not such enormously long pectinations, but the ground colour of upperside and the incurved costa are just as in *pastrana*. Occasionally traces of a dark outer band can be observed at costa of forewings. Same is better discernible on underside of both wings; this however is faint enough in the only specimen I have. According to PÜNGELER the eyes are only weakly haired. The ♀ is a paler brown than any of the other species. ♂ 25 mm. Jerusalem.

*intacta*. **Ch. intacta** Pnglr. i. l. (9 c) appears a more sandy yellow than *pastrana* and *götschmanni*. As in *pastrana* there is no band on upper or undersides. On closer examination however the differences are considerable. According to PÜNGELER the eyes of *pastrana* are hairy, those of *intacta* naked. Besides the antennae are somewhat more shortly pectinated than in *götschmanni* and barely half as long as in *pastrana*. Costa of forewings is not incurved. The red-brown ♀ is outwardly not different from *pastrana*. ♂ 26 mm. Valley of the Jordan.

*pauli*. **Ch. pauli** Pnglr. i. l. (9 c). Antennae as in *intacta*, as also size and formation of wings. According to PÜNGELER the eyes are hairy. Basal area of forewings is somewhat darker to the area where an outer band might occur. On underside a wide diffuse brown band is discernible, which is formed about as in *götschmanni*. ♂ 26 mm. ♀ pale brown with white anal tuft, exactly like a ♀ of *palaestrana* Stgr. Jerusalem.

*Ch. pastrana* and *palaestrana* which in Vol. 2, p. 150 are grouped together are, separated as distinct species by PÜNGELER and STERTZ.

## 2. Genus: **Malacosoma** Hbn.

*cinnamomea*. *M. neustria* L. (Vol. 2, p. 150, pl. 24 b). — **cinnamomea** Trti. & Vrtj. denominates cinnamon brown ♂♂, sometimes having a darker central band, which occur among typical yellow ♂♂ of the Italian Maritime Alps. A similar pair from Herzegowina is found in the PÜNGELER collection. — **bicolor** Sibille are ♂♂ having base of forewings a straw-yellow and the outer similarly coloured line being somewhat wider and diffuse. Such specimens occur everywhere. — In **interrupta** Le Charles ♀ the central band of forewings is interrupted, which is a very rare occurrence. — A form corresponding to *castrensis-pallida* and *franconica-pallida* also occurs here (1 ♂ from Amur in the PÜNGELER collection), but so far it is not denominated. — A few hybrids have been reared, viz: *neustria* ♂ × *franconica* ♀ = **caradjae** Stdjss. (9 d), but only in the ♂ sex. Colouration of wings is like *neustria* ♂, but the scaling is somewhat transparent, the shape of the two lines is more like those of *franconica*. On underside too, the pale band resembles that species. — Also a copulation of *neustria* ♂ × *castrensis* var. *veneta* ♀ (= **schaufussi** Stdjss.) (9 d) was successfully carried out by Prof. STANDEFUSS. It resulted in only ♀♀. On forewings the inner edge of central band is heavily bent at costa as in *veneta*, extending then straightly and not regularly curved. Both margins are heavier than in *veneta* (9 d) but weaker than in *neustrensis*. — The hybrid **neustrensis** Klemann from *neustria* ♂ × *castrensis* ♀ is also only known in the ♀ sex. It may be presumed that same does not differ much from the previous description.

*fasciata*. *M. castrensis* L. (Vol. 2, p. 151, pl. 24 c). — **fasciata** ♂ Closs has a dark central band on forewings and may therefore be considered a variation of the same form that is named *veneta* Stdjss. as a race; it therefore seems desirable to also illustrate *veneta* here (9 d). — **costipuncta** ♀ Closs has the dark central band reduced to a small spot on costa. As one can see from the original illustration this form is a stunted cripple and not deserving of a name. — **designata** ♂ Aigner is an extreme albino and paler than the illustration of *franconica-pallida* in Vol. 2, p. 151, pl. 24 d. Not only is the forewing still paler than in the pale form *kirghisica* Stgr. but it is devoid of markings. Hindwings and abdomen are also yellowish white. — The race **halophila** Std. from Muggia (Trieste) resembles *veneta* Stdjss. (9 d) but is still larger. In the ♂ the yellow colouration of upperside of forewings is darker and the central band is rather more vertical to the inner margin. Behind same is an outer band of brown spots, the outer margin, in contrast to *veneta*, is almost always dark yellow and not brown, whilst the thorax also in *veneta* (for instance in the specimen illustrated) is dark yellow. The ♀ appears to differ from *veneta* ♀ only by the darker basal area of forewings. — **thomalae** form. nov. is a still paler form than *kirghisica* Stgr. described already in Vol. 2, p. 151. The submarginal dark band of the latter is quite



absent on forewings; except for the 2 dark transverse lines, the entire forewing is pale yellow in the type, almost whitish in a second specimen; fringes are not checked. On hindwings the straight pale band is somewhat more distinct than in *kirghisica*. Type 1 ♂ Thian-shan and 1 ♂ from Issyk-kul.

*M. franconica* Esp. (Vol. 2, p. 151, pl. 24 d). In Vol. 2 *lutea* Oberth. is indicated as a ♀ form, we can now illustrate the corresponding ♂ (9 d). OBERTHÜR believes he has ascertained that the *lutea* ♂ in west Algeria is paler than in east Algeria and he separates the latter as *orientalis* Oberth. According to ROTHSCILD this is not a fact, pale and dark specimens — or rather pale specimens with dark transverse bands and dark ones with pale transverse bands occur in one and the same locality. Therefore these are not 2 races of *franconica*. In consequence he separates the dark *franconica* form, **brunneo-olivacea** (9 c) from the pale *lutea* ♂, which he *brunneo-olivacea*. classifies to *alpicola* Stgr. According to Dr. JORDAN our illustration duplicates the illustration of OBERTHÜR. The ♂ differs from *franconica* by the deeper creamy yellow transverse lines. The ♀ is either buff-brown, olive brown or suffused with chocolate-brown, never the chestnut-brown of typical *franconica*. — A pairing of *franconica* ♂ × *castrensis* ♀ has produced the hybrid **penzigi** Tutt in a single ♀. The outline of the median band *penzigi*. on forewings is indicated, which is never the case in typical *franconica* ♀, whilst in *castrensis* ♀ it is always clearly marked. Ground colour is halfway between the two. Otherwise with the similarity between the ♀♀ of the two parent forms, there is no difference to be seen.

*M. alpicola* Stgr. (Vol. 2, p. 152, pl. 24 e). — **calabrica** Std. from Aspromonte is much larger than the *calabrica*. type. Colouration of ♂ is very dark black-brown with steep clearly marked outer band. There is a pale shading on hindwing but no band. The ♀ is also much darker than type and without bands. I consider the form identical with *intermedia* Mill. (9 c) from South France and this name would then have right of priority. We are illustrating a ♂. — **mixta** Rothsch. from the Central Atlas (Azrou) is only known in the ♀. It is as large as *panor- mixta*. *mitana* Trti. (Vol. 2, pl. 23 f) but grey-brown and without bands. 42 mm.

**M. mauginii** Trti. is said to have somewhat shorter and more pointed wings than *neustria*. Forewings *mauginii*. yellow, somewhat more densely dusted with grey at outer margin and in front of same slight indications of a pale outer line. Pale *neustria* have a dark line there. Fringes same as in *neustria*. Hindwings somewhat darker, of approximately the same shade as the outer margin of forewings. Underside is fulvous as the upper-side of dark *neustria*, but the dark band is uniformly curved and not undulate as in *neustria*; with a pale edge outwardly and veins pale as in *neustria*. ♂ 25 mm. Bengasi.

### 3. Genus: **Trichiura** Steph.

**T. tamanukii** Mats. According to the author it "somewhat" resembles *T. crataegi*. In my opinion it *tamanukii*. is more like *Poec. populi* (Vol. 2, p. 153, pl. 24 f.). Forewings dark brown with grey-white inner and outer lines. The inner one is nearly straight and almost vertical. The outer one dentate and parallel to the outer margin, similar to *populi*. The dark ground colour extends slightly beyond same as in *populi-alpina*, the rest of the margin is paler. Hindwings of same colour as forewings, but certainly slightly paler. The outer line pale with dark edge inwardly, approximately parallel to the outer margin. The pale head and collar, as well as the fringes as in *populi*. ♂ 38 mm. Saghalin.

*T. crataegi* L. (Vol. 2, p. 152, pl. 24 e). We are now illustrating **castiliana** Splr. (9 d), which was already *castiliana*. discussed in Vol. 2, p. 152 and which has a pale base and submarginal band. The specimen illustrated originates from Barcelona. In a ♂ from Amasia the base is just as pale but the marginal area is almost as dark as the central band.

### Genus: **Crinocraspeda** Hmps.

This Genus is described in Vol. 10, p. 403. Now a species has been discovered in Japan:

**Cr. miyakei** Wil. It is similar to *excisa* Wil. described in Vol. 10, p. 404 and pl. 32 a. The margin of *miyakei*. both wings is undulate, hindwings are bent inwards on costa near base and at apex. Forewings grey-brown, somewhat more reddish brown behind the centre. Outer line black, obliquely inwards, angulated at costa and there with white outward edge. Inside of same cloudy dark brown and veins black. Behind same to the pale irregular submarginal line the veins are brown. Marginal line dark brown and undulate. Hindwings grey-brown, red-brown in centre, a black spot on costa before the centre. ♂ 44 mm. Tokyo. As the species is described from a badly damaged specimen, it may be identical with *Seitzia plumigera* (vide p. 118, pl. 9 h) which is dealt with later on.

### 4. Genus: **Poecillocampa** Steph.

*P. populi* L. (Vol. 2, p. 153, pl. 24 f.). — In **olivacea** Warn. all wings and body are suffused with a *olivacea*. nice olive green. Described from 1 ♂ from the Lower Elbe. — **bajuvarica** Stich. from Regensburg is a very *bajuvarica*.



dark race, similar to *lydiae* Krul. dealt with in Vol. 2, p. 153, but the collar is still light coloured and fringes checked. The inner pale line on forewings is absent and the outer one is faint and not dentate. — Of *albo-marginata calberlae* Heyne (9 c) already discussed in Vol. 2, p. 153, we are now giving an illustration. — *calberlae* Rag. (i. l. ?) (9 c) differs from *canensis* (Vol. 2, p. 153) by the undulate shape of the outer line which is approximately parallel to the characteristic pale submarginal line. The light marginal area is much more sharply defined against the dark central area. Giögenti. From the PÜNGELER collection.

*tenera*. **P. tenera** O. B.-H. (9 c) is approximately the same in colouration as *populi*. The lines of forewings are faint. The inner one slightly bent, the outer one fairly straight, bending round at its end and bolder there. On hindwings the faintly developed outer band is as in *populi*. Fringes of both wings are checked. Sutshansk.

### Genus: **Somadasys** gen. nov.

I am utilising this name for a number of species which are described by MATSUMURA as *Eriogaster* and of which also PÜNGELER had classified a specimen under the latter name. Whether *Odon. brevivenis*, dealt with in Vol. 2, p. 170, pl. 27 f belongs here, I cannot say, but I consider it likely. Palpi and antennae as in *Eriogaster*. Body of ♂ more elongate, forewings more pointed. Veins 3 and 4 arising almost from a spot, 8 + 7 + 6 stalked, of which 8 branches off from before the middle of the stalk of 6 + 7. 9 + 10 with very long stalk, 11 being near 12 throughout its course. On hindwings 4 + 5 stalked, 7 + 8 stalked arising from accessory cell, which at base has a bold spur projecting towards costa.

The 4 species described by MATSUMURA are so similar that they are perhaps subforms of a single species.

*daisensis*. **S. daisensis** Mats. is similar to *Odon. brevivenis* Btlr. (Vol. 2, pl. 27 f). Ground colour buff-brown. The silvery spot on forewings is larger, round, extended somewhat anteriorly. The outwardly dentate inner line almost touches it. The outer and submarginal lines are straight, almost parallel to the outer margin, the former nearer to the silvery spot than in *brevivenis*. Hindwings buff, devoid of markings. ♀ with dark yellow forewings. Hindwings pale chestnut brown. 40—46 mm. Honsho.

*kibunensis*. **S. kibunensis** Mats. (9 e) is similar to the previous species but the ground colour of forewings of ♂ is chestnut-brown, being somewhat paler at the base. The inner line is somewhat more rounded off. The outer line is about parallel with the outer margin, slightly depressed above vein 5. The submarginal line is also parallel and excurved below the costa. Both lines are widely separated throughout their entire length. Hindwings somewhat paler than forewings with 2 very indistinct dark bands, which are absent in the original illustration. ♂ 36 mm. Honsho. In the specimen illustrated from Ta-tsien-lu, which is in the British Museum, the silvery spot is very small. I presume that same is identical with *kibunensis*.

*yatsugadakensis*. **S. yatsugadakensis** Mats. (9 e). Also similar to *daisensis*. Forewings grey-yellow, golden yellow at base and inner margin. The silvery spot large, disco-cellular nervure black-brown. The lines are not described. The outer one somewhat more incurved towards the inner margin. The submarginal line slightly bent in above vein 5, thereby approaching the outer line at costa. Hindwings pale yellow-red with 2 indistinct dark bands. For illustrative purposes a specimen ex the PÜNGELER collection from Shoji has been chosen which is designated *argenteomaculatus* Btlr. I do not know an original description for this denomination. A second specimen from Nikko is somewhat more reddish, but the silvery spot is also large. The outer line appears to be somewhat more oblique, so that at costa it is still nearer to the submarginal line than is shown on the illustration and at inner margin it is nearer the inner line. On hindwings no dark band is visible on upperside.

*takamukui*. **S. takamukui** Mats. Ground colour as in *yatsugadakensis* but the inner line is more strongly angulated and extends to the small silvery spot. Hindwings without dark band. ♂ 38 mm. Kyushyu. From the rather imperfect illustration of MATSUMURA, I should consider this a colour variation of *daisensis*.

### 5. Genus: **Eriogaster** Germ.

*aavasaksae*. *E. lanestris* L. (Vol. 2, p. 154, pl. 24 h). — The Lapland form *aavasaksae* Teich is greyer than type, the outer line indistinct, formed apparently of spots. The outer margin of both wings grey-white, fringes with white spots, in ♀ also the hindwings similarly. On forewings the costa, especially at apex is white. — We are illustrating *arbusculae* Frr. (9 f). It is now deemed to be a separate species. The band of forewings in same ends vertically at inner margin whilst in *lanestris* it is more inclined to be obliquely inwards there. — A ♂ in which the outer margin of forewings is brown like in the ♀ and not grey, is named *rufomarginata* Closs. — In contrast ♀♀ with a more distinct grey marginal area are named *variegata* Lenz. In same the grey colour penetrates into the central area.

*catacoides*. **E. catacoides** Strd. Colouration and markings as in *catax* L., but somewhat darker. In *catax* ♂ the forewing has 2 very diffuse dark transverse lines whilst here they are fine and fairly sharply marked. Central area and marginal area equally wide. The outer line is somewhat undulate and incurved at costa. The white central spot is more faintly edged with black. ♂ 32 mm. Japan (?), Formosa.



*E. catax* L. (Vol. 2, p. 154, pl. 24 g). From a larva discovered near Vienna a ♂ moth resulted differing considerably from typical specimens by the absence of the reddish colouration. Forewings ochre golden yellow with no dark edge to the white discal spot. Hindwings paler almost whitish yellow: *auriflua* Schaw. *auriflua*.

*E. rueckbeili* Graes. (9 d). We are now illustrating this species, which was dealt with in Vol. 2, p. 155.

## 6. Genus: **Lasiocampa** Schrk.

*L. quercus* L. (Vol. 2, p. 156, pl. 25 a—c). The following forms of the race *alpina* Frey are denominated: **semifasciata** Wgr. ♂: the yellow band on hindwings is completely absent, on forewings it is present but diffuse. The margin on underside of both wings is not golden yellow, but has only sparse yellow scales. — **caecopuncta** Rbl. is without white discal spot on forewings of ♂, in ♀ there is a brown spot in normal or almost normal size. The edge of the marginal area appears to be fainter. Further breeding produced an increasing number of *caecopuncta* amongst normal *alpina* until the latter became completely extinct. — **hastifera** Std. ♀ is a normally dark *alpina* ♀ only all the veins are completely yellow commencing at base and not only in the marginal area. — **spadicea** Wgr. ♀ is very dark but not so dark as *quercus* ♂, it has a slight rose coloured sheen somewhat like a dark *Mal. franconica* ♀. — **doriai** Rocci & Trti. is described as a race from 3 ♂♂ from the Isle of Giglio (Tuscany). Ground colour is less intensively reddish and resembles that of *trifolii*. The yellow transverse line of forewings is delicate similar to that of *spartii* (Vol. 2, pl. 25 b). The margin of hindwings is much less pale than in *sicula* Stgr. (pl. 25 c). — Besides we are illustrating *olivacea* Tutt (9 e) mentioned in Vol. 2, p. 157. — **wagneri** Tutt is the hybrid of *quercus* ♂ × *trifolii* ♀. It is denominated because as STANDFUSS remarks a ♀ was bred from this hybrid. No description appears to exist. — **augustilinea** Valle ♀ from Finland is as dark as *callunae* ♀, but all bands are as narrow as in the southern forms *spartii* and *sicula* (Vol. 2, pl. 25 b and c).

*L. trifolii* Esp. (Vol. 2, p. 158, pl. 25 c, d). Occasionally one finds ♂♂ in the South Tyrol in which the pale outer line on forewings is sharply defined and there is a further faint line near the base. This has a pointed projection in the middle such as is faintly indicated for *medicaginis* ♂ in Vol. 2, pl. 25 d. Such a pale line also occurs in *cocles* Hbn., the other southern races have a dark line with a more or less clear pale edge at the base. These are named **bilinea** Hartig; **basilinea** Lenz from Bavaria will probably be practically identical. — **mitfordi** Oberth. is very pale fulvous, the orange-yellow marginal area being separated by a dark line. In basal area and on hindwings a faint dark line. The outer line of forewings in the ♀ is situate somewhat nearer the base than customary. The inner area is somewhat paler than in the ♂, the outer area of the same colouration as in ♂, hindwings scarcely darker than the marginal area. — **ochracea** ♂ Hartig probably differs very little. The forewings are said to be reddish yellow-brown, the white discal spot larger, the outer line narrow. Underside monotonous ochreous red without the outer line on both wings which occurs in *mitfordi*. TUTT deems specimens with a basal line on forewings as typical *trifolii* and denominates (normal) specimens in which same is absent as *unilinea-typica* and specimens in which both lines are indistinct and pale radial longitudinal streaks occur: *suffusa-typica*. — In the Journal Iris 1, p. 156 an aberration or race is cited as *romana* Stdjss. which does not appear to have been described. — A sub-race of *cocles* Hbn. from Sardinia is named **sardoa** Trti. (9 f). Whilst in *cocles* the ground colour appears to be fairly variable, it is always dark fulvous in *sardoa* ♂ similar to *medicaginis* Bkh. and has a clear pale band on both wings and is not paler in marginal area. The ♀ can be as dark as the normal ♂, generally however it is somewhat paler. Similar specimens occur in Corsica (Viz-zavona). — **daddi** Heinr. described from a single ♂ from Digne and therefore not definitely a race, is similar to *sardoa*. It has a clear pale line on hindwings, but differs by the paler margin of both wings. — **semifasciata** Failla occurs occasionally among *cocles* in Sicily. The pale outer line on hindwings is absent in same and the specimens are smaller. It is probably a starvation form which resembles a small typical *trifolii*. — **devittata** Trti. are specimens from the Apennines of Modena in which only occasionally the lines of both wings are absent. The ground colour corresponds to that of *medicaginis* so that such specimens are not quite identical with *iberica* Gn. — **samnitica** Dhl. from the Majella is probably a transition to same. Colouration of ground is a very uniform pale grey, the outer margin somewhat lighter and the outer line less prominent. This line is also indistinct on hindwings. ♂ 35—39 mm. The ♀ is a monotonous yellow-grey, the pale band is wide and quite indistinct.

*L. serrula* Gn. (Vol. 2, p. 159). As the illustration in Vol. 2, pl. 25 f is not very natural we are giving a fresh illustration here (9 e). — The race **aegyptiaca** Oberth. (9 c) differs by the greyer forewings than the typical *serrula* and it approaches to *palaestinensis* Stgr. (Vol. 2, pl. 26 a). In the only pair which I have before me the pale outer line on forewings of ♂ is very distinct, fainter in the ♀. Hindwings in both sexes fulvous, a faint pale line is present which is somewhat more distinct in the ♂ and fainter in the ♀. — An aberrative ♀ among *palaestinensis* is denominated as **seileri** Stertz (9 g). It was also mentioned in Vol. 2 but we are now illustrating same. In it a dark band is also indicated on the hindwings, the marginal area of both wings is somewhat paler than basal area.

**L. bomilcar** Oberth. (10 d) is only known to me from a copy of the illustration. It differs on the forewings in the ♂ from *serrula* as there is no narrow pale line beyond the dark outer line, however there is a pale



area of 1—2 mm width. On underside of forewings there is a dark patch from the outer line towards the base and especially above the inner margin. Hindwings are almost as dark on underside as on upperside. According to ROTHSCILD *bomilcar* = *serrula-undulata* Stgr. which was not illustrated in Vol. 2. Lambèse. In regard to *bomilcar* ♀ and *hamilcar* see remarks under *dauidis*.

*aucta*. *L. eversmanni* Eversm. (Vol. 2, p. 159, pl. 25 f.). — The form **aucta** Krul. (9 f) is newly described. It was illustrated long ago in a butterfly book of HOFFMANN \*). Whilst *bomilcar* only differs very slightly from *serrula* and is separated as a species, *aucta* varies to such an extent that it might even be taken as a form of *trifolii*. The ♂ is pale reddish brown on forewings to the outer line, yellow brown on inner margin and in marginal area. Hindwings somewhat paler than forewings. The ♀ is paler on forewings with diffuse dark outer line. Hindwings are almost darker than forewings. Sarepta. — The typical form also occurs in Sarepta. Generally the specimens in the hindwing resemble the illustration in Vol. 2, pl. 25 f, except for the dark band which is normally absent. The species is distributed as far as Corea. The only good specimen from there before me has a dark band at base of forewings similar to southern *trifolii* forms, for instance *ratamae* H.-Schäff., and the hindwing is somewhat darker reddish brown than is illustrated on pl. 25 f. and without a band. The other specimen I have is too worn and rubbed.

*hamilcar*. *L. davidis* Stgr. (Vol. 2, p. 160, pl. 26 a as *palaestinensis*). — **hamilcar** Oberth. ♂ from Lambèse so closely resembles *davidis* that we are dealing with same here. The ♂ differs from *davidis* ♂ on forewings by a somewhat more yellow tone of the ground colour. In the illustration (Vol. 2, pl. 26 a) of *davidis* the middle band of hindwings is shown as being too wide and short and the margin too widely dark in comparison to the single specimen at my disposal. In *hamilcar* (10 d) the band of hindwings is as narrow as that on the forewings and there are only small dark spots at the margin. The band of both wings on underside of *hamilcar* is somewhat diffuse inwardly. The ♀ which is designated as *bomilcar* ♀ by OBERTHÜR appears to me more probably to belong to *hamilcar*. In ground colour it corresponds almost to the *davidis* ♀, Vol. 2, pl. 26 a, but the darker outer line is more distinct on both wings, beyond same there is a space of 2—3 mm which is widely pale *schulzi*. and the space towards the base is faintly darkened. — **schulzi** ♀ Stertz (9 g) is a somewhat more yellowish form of *davidis* ♀. Except for this yellowish tone the illustration of *davidis* ♀ pl. 26 a (3rd fig.) would agree with same, but the line of forewings is slightly fainter, whilst typical *davidis* have still a less faint band, same as is illustrated in *eversmanni* ♂, on pl. 25 f. We are now illustrating this form mentioned in Vol. 2, p. 447. — According to ROTHSCILD *davidis* is the extreme pale form of *serrula-palaestinensis* and *hamilcar* the pale form *akbesiana*. of *serrula-undulata* (= *bomilcar* Oberth.). — **akbesiana** Oberth. from Akbès has a very glossy ivory white ground colour and a sharply prominent white discal spot on forewings. There are no other differences as compared to *davidis*.

*L. josua* Stgr. (Vol. 2, p. 160). As in Vol. 2, pl. 26 a another species was illustrated under this name, we are giving a correct illustration here (9 f). — OBERTHÜR did not appear to be quite clear about *vaucheri* Blach., which was already dealt with in Vol. 2, because he later on deemed the specimens illustrated in Lép. Comp. 11, Fig. 4721 and 4722 to be a *trifolii* form. It is true that *vaucheri* ♂ Oberth. shows a less sharp pale band on both wings than the illustration of *vaucheri* Blach. and in *vaucheri* Oberth. In ♀ the pale band on hindwings is absent. However in the collection of PÜNGELER there are 2 *vaucheri* ♀♀, clearly from the same brood, of which the one has a pale band on dark ground on forewings whilst in the other the relationship is reversed viz: the band is the darker. — *deleta* Rothsch. is the same as *trifolii-mauretanica* Stgr. — Probably it will be ascertained later that *serrula* to *josua* are all only *trifolii* forms. The small differences in the larvae prove nothing. In *Somabrachys* formerly there were an innumerable number of species described with slightly different larvae and then one day they were all confined to 3 species.

The species of the following groups differ from those of the former ones by the absence of the discal spot on forewings and the outer line on both wings. (Subgenus *Lambessa* Stgr.)

*decolorata*. **L. decolorata** Klug (9 g). According to ROTHSCILD *datini* Mab. which was dealt with in Vol. 2, p. 160 as a separate species, belongs here. — For the description of *decolorata* I formerly only had the ♀ before me. STERTZ describes the ♂: ground colour of both wings monotonous buff-grey, somewhat olive-grey, slightly *virago*. paler at base. It agrees completely in the colour with the illustration of *staudingeri* in Vol. 2, pl. 26 b. — **virago** Rothsch. (9 g). The ♂ is grey on both wings, paler than *decolorata*. The ♀ has somewhat darker brownish fore- *sordidior*. wings than hindwings. Biskra. — **sordidior** Rothsch. (9 h) from the high plateau in Central Algeria is brownish grey. Body and inner margin of hindwings ochreous. The ♀ is cinnamon-brown. Such colour variations are of little value as everyone sees or describes the colour slightly differently. For instance the ♂ which is sent to me as *sordidior* from the Tring Museum is much paler than the specimen which STERTZ has designated *decolorata* ♂, whilst various *sordidior* in the PÜNGELER collection are scarcely paler in comparison. We are illustrating a specimen of these under the name *decolorata* (9 g). ROTHSCILD does not give a description of the colour of typical *decolorata*.

*püngeleri*. **L. püngeleri** Stertz (= *albescens* Rothsch.) (9 f, g) is certainly a different species from *decolorata* as the antennae of the ♂ are shorter and the abdomen of the ♀ longer. Besides this the species is so variable in

\*) 1. Edition (1887) Pl. 20, Fig. 8.



colour that there is every opportunity for new denominations. The type (♂) is stated to be orange-yellowish, which more or less agrees with the specimen kindly sent to me by the Tring Museum as *albescens*. It varies from creamy white to brownish yellow and such dark specimens have a shadow-like median band. Hindwings dusky brown with paler base and fringes. The ♀ is creamy white, the outer half of hindwings somewhat suffused with grey-brown. Palestine.

*L. staudingeri* Baker (Vol. 2, p. 160, pl. 26 b). Besides the typical more or less yellow-grey form from Batna, Kenchela, there is a race in the Province of Oran (Aflou, Sebdou) in which the ♂ is inclined to cinnamon-brown. This is named: **castaneolavatus** Rothsch.

*castaneo-*  
*lavatus.*  
*sinis-*  
*calchii.*

**L. siniscalchii** Trti. is similar in wing contour to *püngeleri* (9 f, g). Forewing of ♂ is pale rusty red and hindwings slightly paler. Base of both wings and entire body yellowish white. The species can therefore not be identical with *püngeleri*, as same has dark hindwings and it also cannot be a *decolorata* form, as the thorax is paler than forewings. In the ♀ body and forewings have a brownish tinge, hindwings slightly paler. 40—50 mm. Cyrenaica.

**L. vitellius** Oberth. This species is only illustrated by OBERTHÜR and not described. Forewings of ♂ *vitellius*. orange-yellow. Discal spot and marginal area browner. The edge of same runs parallel to outer margin and is situate much further inwards than is general in *Lasiocampa* species. This division of colouration is less distinctly marked on hindwings. On underside also an outer line is present on both wings and the space beyond same is darker. In other species when basal and marginal areas differ in colour, the margin is paler. Here the reserve is the case and possibly *vitellius* should not be classified here. East Thibet. It was already illustrated in Vol. 2, pl. 56 k, but in consequence of its uncertain classification it was overlooked in the text. In a specimen ex the collection of STÖTZNER the dark marginal area is wider than in our illustration and the basal area of forewings is darker.

## 7. Genus: **Macrothylacia** Rmb.

*M. rubi* L. (Vol. 2, p. 160, pl. 26 c). ♀ f. **pallida** Osth. This name has been given to ♀♀ of such pale *pallida*. ground colour that the light bands merge in same. To judge from the original illustration they do nothing of the sort, so that the name simply applies to pale specimens. ♀♀ in which the submarginal line is absent and having the space behind the outer line to margin uniformly pale, have still to be denominated. It should be mentioned here that a *pallida* ♂ Tutt was already mentioned in Vol. 2, p. 161. Besides we have a *pallida* ♀ Th.-Mieg. in Vol. 2, p. 448 without however a description. It was a stunted pale specimen devoid of any markings and of 55 mm expanse. — ♀ f. **transfuga** Krul. denotes ♀♀ with bright rusty colour of the ♂ and this is nat- *transfuga*. urally very rare. — *alfacaria* Rbb. is a transition from *korbi* to *bistrigata*. Sierra de Alfacar. It was discussed in Vol. 2, p. 448. — The form *korbi* Grünbg. is dealt with in Vol. 2, p. 160; a sub-form to same is **bistrigata** Bub. *bistrigata*. (9 h). In both sexes it has transverse lines on forewings. The inner one however is distinctly excurved in the middle, the outer one has its main curve further from costa. According to SCHAWERDA this form is synonymous with the following *digramma-curvifascia*. From the pair in my collection this does not appear to me to be so, as the ground colour is paler than in *curvifascia* and fringes of hindwings are not so pale. The shape of the lines appears to vary in *digramma* and this cannot therefore be used for a differentiation.

*K. digramma* Meade-Waldo is held by ROTHSCILD to be a distinct species. The inner line is as in *bistrigata*, the outer one is excurved at costa, as it is at inner margin, in *rubi* it is only excurved at inner margin. The ♂ quite corresponds to the ♀ which at first only was known, but this is not the reason for specifically separating same from the dimorphous form *rubi*, but the different course of the lines. It is quite possible that *korbi* is also a distinct species. — In Portugal there are two differing races in which the lines of forewings are heavier and fringes of hindwings quite pale: **curvifascia** Rothsch. with a dark chocolate-brown ♀ with slightly paler *curvifascia*. hindwings. The outer line is not undulate, but uniformly excurved. The ♂ has thorax and base of forewings suffused with yellowish. Hindwings darker than in the ♀. Cintra. — **parallelifascia** Rothsch. (9 h). The ♀ is even *parallelifascia*. darker than in the previous form. Both lines are straight and parallel; the outer one is not as broad as in *curvifascia*, but broader than in *digramma*. The ♂ is quite similar to the ♀, thorax and base of wings are not paler. Province Algarve.

## 8. Genus: **Metanastria** Hbn.

*M. subpurpuria* Btlr. (Vol. 2, p. 161, pl. 26 c). — **flavopurpurea** O. B.-H. (10 d) from Transbaikalia *flavopur-* has both yellow bands of forewings wider than in *dieckmanni* Graes. from Ussuri. Also inner margin appears *purca*. to be somewhat more yellowish.

**M. takamukuana** Mats. is probably only a form of the preceding. Ground colour reddish brown, only *takamu-* slightly darker in median area. The inner line very diffuse, like in *subpurpurea* from inner margin to the spot *kuana*. in the cell, above same extinct, without yellow marginal spot. The outer line of the same shape as in *subpur-*



*purea*, but continuous. At base of inner margin a few yellow scales. On underside of forewings the outer line is more vertical to the inner margin, so that it ends further outwards. ♂ 60 mm. Honsho.

### 9. Genus: **Diplura** Rmb. (recte *Dipluriella* Strd. vide Vol. 2, p. 448).

*homochroa*. *D. loti* O. (Vol. 2, p. 162, pl. 26 d). — Of this very variable species the form **homochroa** Zerny has been established from a few ♀♀ taken at Algeciras. These specimens are unicoloured dark dusky brown, the light central lunule being quite absent. A ♀ ex the PÜNGELER collection from Lisbon is equally dark, the outer line is almost obscured, but the central lunule is retained as a dot. — *vernetensis* Oberth. from Vernet-les-Bains differs in the ♂ from the typical form from Andalusia by the white dusting along the inner edge of the white line on forewings, so that same appears almost to be double. That also *algerienses* Baker is only a form of *loti*, is quite likely owing to the great variability. In Vol. 2, pl. 26 d a sharp white inner line is indicated in *algerienses* ♂, whilst in the ♂ in the PÜNGELER collection, it is quite absent. On the other hand the abdomen and hindwings are blackish. In Vol. 2 in regard to the ♀ it is stated "discal spot sharply defined, band indistinct." In my *simulatrix*. specimen the band is still just discernible, discal spot is absent. — **simulatrix** Chrét. (*sefeira* i. l.) (9 g) resembles the above mentioned illustration of *algerienses* by the presence of the inner line in the ♂, but it is purer brown and the outer line is still more dentate than in *algerienses*. The ♀ resembles the typical ♀ by its pale brown colouration, nevertheless the outer line appears to be slightly bolder.

### 11. Genus: **Chilena** Wkr.

- oberthüri*. **Ch. oberthüri** Luc. Ground colour of ♂ milky white. From apex of forewing a yellow-grey line extends, which at first is undulate and at vein 4 is decidedly angulated outwards. Of this nothing is visible on the original illustration, as there it runs quite straight to  $\frac{3}{4}$  of inner margin. Inside of it a parallel line runs from approximately vein 6. The area from there to base is more darkly dusted. Hindwings with long white hairs and darkly dusted at outer margin. The ♀ is faintly brownish white with 2 pale brown lines, commencing before and behind the apex and extending to centre of inner margin. 32—48 mm. Tunis.
- hilgerti*. **Ch. hilgerti** Roths. (10 b). Body and wings milky white without any markings. Forewings with a slight yellow sheen in their anterior part. In one of the 2 known ♀ kindly sent me by the Tring Museum, one can discern an apical line, if one tries, such as occurs more distinctly in the following form. ♀ 40 mm. At Salah *virgo*. (S. Algeria). — **virgo** Oberth. from El Outaya (Tunis) has the apical line more distinct and it appears to be larger (50 mm). Scarcely deserving special denomination.
- bouillonae*. **Ch. bouillonae** Dumont. Forewings of ♂ white with slight rosy lustre, ochreous yellow scales at costa. A somewhat diffuse dusky brown line extends from apex to centre of inner margin, not touching at its extremities. It varies in distinctness and sometimes is accompanied by a parallel line outwardly. Hindwings pure white, veins yellowish. Both wings with ochreous yellow marginal line which is also present on undersides. The entire body white, only the scapulae are rose. The ♀ is more impure white, the rose colour also extends slightly along the veins of wings. 35—40 mm. Morocco.
- sordida*. **Ch. sordida** Ersch. was dealt with already in Vol. 2, p. 163, pl. 26 e. According to this illustration the ♂ has turned out too dark in comparison with the specimens in the PÜNGELER collection. Besides the light apical line does not exist and in fact the ♂ is very similar to the illustration of the ♀. However such specimens *cinerascens*. as the illustrated ♂ may of course exist. — **cinerascens** Oberth. from Transcaspia is much darker, often it is somewhat dusted with grey in the outer half. Except for the pale line the illustration of the ♂ on pl. 26 e corresponds fairly well with this form. Transcaspia.
- lucasi*. **Ch. lucasi** Oberth. has brown ground colour. The bold white apical line is displaced outwardly in centre of wing. A white oblique streak at disco-cellular. Hindwings somewhat more reddish. ♂ 38 mm. Figuig (West Algeria).
- malacosomoides*. **Ch. malacosomoides** Roths. Forewings cinnamon-grey. The inner line double, dentate, the middle one similarly and somewhat brownish on its outer edge; both conjoined on submedian nervure by transverse lines. The outer line is heavily bent, brown and delicate. Hindwings cinnamon-grey. ♂ 32 mm. Hagggar (Sahara).
- geyri*. **Ch. geyri** Roths. Forewings pale grey, densely bestrewn with cinnamon-brown, with white cell spot and an outer band of dark brown spots. Hindwings yellowish mouse-grey peppered with cinnamon-brown. The specimens appear to vary, according to the amount of dark dusting in basal area of forewings. ♂ 42—48 mm. Hagggar. Perhaps belonging to the Genus *Ergolea*, as the outer line consists of spots.



Genus: **Ergolea** Dumont.

Antennae pectinated in ♂ and ♀, shorter in ♀. Eyes small, hairy. Frons with three-cornered plate of which the point that projects forwards is serrate. On the clypeus there are 5 tufts of hairs that hang over in front. Palpi short. Legs thickly haired. Fore-tibiae with 2 claws of which the inner one is the longer. On forewings veins 6 + 7 have short stalks, 9 + 10 are stalked to almost half their length. On hindwings veins 4 and 5 arise from lower angle of cell, 7 + 8 on a long stalk.

**E. reneae** Dum. Body silvery grey admixed with yellow-red. Forewings separated from apex to the middle of inner margin by a row of brown dots. Inner area fuscous, dusted with brown. Outer area white, also dusted with brown with rusty red veins. At upper cell end a pale rose spot. Hindwings coloured like the marginal area of forewings. Basal half up to the anal angle with long light grey hairs. The ♀ duller, markings more diffuse. 35—41 mm. El Golea (Algeria). — **lavaudeni** Dum. is a larger form (43—56 mm). Ground colour in ♂ and ♀ is dusky smoky brown, only at base of hindwings of ♂ a little of the rose colour is left. The dividing line of forewings is darker in the ♂, but also in ♀ it is more distinct than in *reneae*. Colour of body varies from yellow-grey to blackish. — The larva grows to 40 mm length, it is red with black spots and white hairs. From the 4th segment these decrease in size towards the end. On dorsum rhomboidal spots which are divided transversally by a crimson red rectangle, except on the 1st 3 segments. Adjoining same a lateral line of black spots, decreasing in size posteriorly. It feeds on *Caligonum comosum* and hides in the day time in the earth.

Genus: **Syrastrenopsis** Grünbg.

Antennae pectinated in ♂ and ♀ to their extremities. Palpi almost as well developed as in *Cosmotriche* Hbn. Body as in *Epicnaptera* Rmb. In forewings veins 6 + 7 are stalked, arising from angle of cell, 8 near by, 9 + 10 on long stalk. In hindwings veins 4 and 5 arise from one spot, 8 forms a short accessory cell with vein 7.

**S. moltrechti** Grünbg. (10 a). Ground colour of ♂ red-brown. On forewings there are 2 pronounced dark transverse lines, both lined on inner side with violet-grey; behind same on centre of marginal area a fainter line, also with paler edge inwards. Hindwings slightly paler at base. The ♀ somewhat paler, the light margins wider, also outer margin is paler. On hindwings the pale base extends to median area. 32—45 mm. Ussuri.

11. Genus: **Cosmotriche** Hbn.

*C. potatoia* L. (Vol. 2, p. 164, pl. 26 f). As this species had been generously favoured with denominations in Vol. 2, only a few have been added. — In **suffusa** Closs (♀) all wings and body are suffused with brownish. Perhaps the same as ab. *extrema* Tutt. — **obscura** Closs (♀) is brown-grey with pale yellow basal spot on forewings and dark grey hindwings, all markings very distinct. Similar to *diminuta* Tutt, in which however the hindwing is red-brown. — **pallida** Splr. denotes pale aberrations with markings more or less grey. As the shade of colouration varies considerably, it is not apparent whether these are pale yellow, light brown or other coloured specimens. — *decolor* Th.-Mieg. just mentioned in Vol. 2, p. 448, is a pale grey-brown ♂.

**C. diversifasciata** sp. n. (10 b). Somewhat similar to *fossa* Swk. dealt with in Vol. 10, p. 408, pl. 32 e and in the somewhat angular shape of the hindwing similar to *lidderdalii* Drc. (ibid. pl. 32 d). Forewings reddish brown with indistinct dentate inner line. The cell spot rusty red, a small distinct white accessory spot above same and nearer costa. From near the apex to the centre of inner margin an almost straight, very clear black-brown line with paler scales on its inner side. Paler patches before same on costa and below the outer margin at apex, as well as at anal angle. The dentate submarginal line as in the other species. A diffuse straight dark band before the middle, situate further inwards than the light band of *fossa*. On underside the cell spot of forewings is slightly reflected through, the bands of both wings diffuse and on paler ground than on upper-side. ♀ 55—58 mm. Ta-t sien-lu and S. China. Type in the Berlin Museum.

12. Genus: **Selenephora** Rmb. (*Selenephora* Stgr.-Rbl.)

*S. lunigera* Esp. (Vol. 2, p. 165, pl. 27 a). — The form **malchani** O. B.-H. (9 h) is grey-black in discal area of forewings. Margins are clearcut, white, dentate. The dentate subterminal line is somewhat more distinct than in typical forms. Hindwings dark dusky brown. S. E. Transbaikalia. — **mongolica** Gr.-Grsh. has grey-white ground colour to forewings, which are fairly uniformly dusted over with black-brown. Discal area and inner margin are darker. Also hindwings are darker than in *lunigera*. Mongolia. — **seitzi** O. B.-H. is similar to *malchani*. Marginal lunules of discal band of forewings more distinctly white. The chief difference lies in the continuous wide brown submarginal line. Hindwings are slightly darker. Ussuri territory. — **monbeigi** form, nov. is about of the same colouration as *malchani*, but the edges of the discal band are not white but as in



*lunigera*. The inner edge of this band projects sharply in the cell in the direction of the cell end. The outer edge of the middle band is incised below the costa and then projects in a point; this is more generally the case in the ♀ and the point is less pronounced in the ♂. At inner margin the band is much wider than usual in the ♀ on account of the absence of any incurving below median nervure. Submarginal spots as in *malchani*. Abdomen and hindwings as in typical *lunigera*. Type: 1 ♂ from Tze-ku in the British Museum.

### Genus: **Kononia** Mats.

According to the author similar to *Trichiura*. Neuration of forewings is not described. In hindwings veins 7 and 8 form a long fusiform cell, with a spur at base towards the costa. Outer margin of forewings somewhat undulate.

*pinivora*. **K. pinivora** Mats. Forewings grey with brown markings. Subbasal line somewhat diffuse. Discal area brown with distinct outline. The inner edge obliquely outwards with a dentation inwards below the origin of vein 2. The outer edge obliquely outward below costa, bent at a right angle at vein 6 and direct in a slightly undulate line to inner margin. The spot at disco-cellular is white. Submarginal line is wide, diffuse and somewhat undulate. Hindwings brown with diffuse pale band having a dark edge inwardly. 40—47 mm. Hokkaido. The larva feeds on *Pinus pumila*. This point establishes the correct classification of the species.

### Genus: **Seitzia** Scriba.

Neuration and wing contour of forewings similar to *Selenephora*. Veins 6 + 7 with short, 9 + 10 long stalks, vein 8 from anterior angle of cell. Hindwings more like *Epicnaptera* with 2 incisions on costa. Antennae of ♂ with very long pectinations.

*plumigera*. **S. plumigera** Scriba (9 h). Forewings reddish brown. The inner line dark, delicate, incurved and sharply dentate. The outer line dark brown with white dots on veins, excurved below the cell and bent rectangularly at vein 9. Submarginal line undulate, with white edge in the type, bent inwards between veins 4 and 6. The margin beyond same whitish from inner margin to vein 5. Hindwings reddish brown. On hindwings there may or may not be a vertical pale band. Ground colour varies in shade. A very pale red-brown specimen of this common species is named *Takaneta japonensis* Marumo. The discal band of the type projects in the centre outwardly and beyond same there is a broad white spot. In the ♂ illustrated there is a dark spot on costa and beyond same a little white. ♂ 42 mm. Shiobara and Nikko.

## 14. Genus: **Epicnaptera** Rmb.

*lutescens*. *E. tremulifolia* Hbn. (Vol. 2, p. 167, pl. 27 b). — The names *lutescens* Closs and *fulvescens* Klem. denote more yellowish specimens. — Pale yellow-brown specimens are named *flavescens* Lenz. Similar specimens with pronounced bands are named *fasciata* Lenz, with obsolete or absent bands *obsoleta* Lenz and with heavy grey margin *grisescens* Lenz. — The latter form is a transition to *grisea* Hoffm.: “♀ almost grey, especially on abdomen and at margins of wings.” — *püngeleri* Schaw. is a 2nd generation in Bosnia. The ♂ is very faintly marked having a pale red-brown ground colour. The outer margin of forewings is reddish grey to almost milky white and on hindwings the median band and anal angle are of the same colour. — Among these specimens there was 1 ♂ of almost red ground colour on forewings with punctiform median and almost obsolescent outer band, hindwings and body red-brown: *rubicunda* Schaw. — *püngeleri* is somewhat like *suberifolia*. Similar specimens from Hungary have hitherto been erroneously (Vol. 2, p. 167) designated *ambigua* Stgr. The genuine *ambigua* (10 e) is now being illustrated. — Both the possible hybrids have been reared with *ilicifolia* L. *tremulifolia* ♂ × *ilicifolia* ♀ = *veris* Lenz of which only the ♀ is known. Forewing only varies from that of *tremulifolia* by the darker grey apical area. Hindwing is very dark and the narrow pale band, inherited from *ilicifolia*, is well pronounced. Underside in colouration and marking more like *ilicifolia*. — The reverse cross is named *aestatis* Prack. The ♂ resembles *ilicifolia* in colouration, but in marking it is more like *tremulifolia*. Body is yellow-red. The light discal spot of forewings is absent, the whitish grey patches are darker than usually in *ilicifolia*. On hindwings the whitish median band is diffuse and thereby it resembles that of *tremulifolia*. Also on underside the moth resembles *ilicifolia* in colouration whilst the markings are those of *tremulifolia*.

*rubescens*. *E. suberifolia* Dup. (Vol. 2, p. 167, pl. 27 c). The normal form is yellow-grey. — *rubescens* Rbb. denotes a reddish form, which resembles *tremulifolia* in colouration. The shade of colour of our illustration of *suberifolia* on pl. 27 c is midway between the two forms.

*albo-fasciata*. **E. albofasciata** O. B.-H. (10 a) approximately agrees in point of ground colour with *tremulifolia*, in marking with *ambigua* (10 e). In front of the outer row of dots there is a narrow fairly sharply defined light band, behind same only the area at anal angle is slightly paler. On hindwings the red-brown margin contrasts rather more definitely with the pale median band and inwards of same there is a narrow dark transverse line which is clearer than in specimens of *tremulifolia* from Hungary or *ambigua* from Asia. ♂ 33 mm. Ili, Kuldja.



Of the two species already discussed in Vol. 2, p. 167: *glasunovi* Gr.-Grsh. and *alice* John we are now giving illustrations. *alice* on pl. 49 b does not give the true shade of colour and just in the colour there is the essential difference between *alice* (10 b) and *glasunovi* (10 b). The ♀ of *alice* is more red-brown and larger than the ♂.

### 15. Genus: **Gastropacha** O.

*G. quercifolia* L. (Vol. 2, p. 168, pl. 27 d, e). — A hybrid *johni* Frings from a crossbreed of *quercifolia* *johni*. ♂ × *populifolia* ♀ was bred, which is a midway form between the parent forms. The ground colour is a mixture of the brownish *quercifolia* and the reddish *populifolia* colours. There are scarcely any traces of an inherited bluish sheen of *quercifolia* ♂. There is also little darkening on costa of forewings whilst however the dark longitudinal line on thorax is present such as always occurs in *populifolia*. The transverse lines of forewings are occasionally more like *populifolia* and again like *quercifolia*. On hindwings the median band is distinct and narrow as in *populifolia*, whilst in *quercifolia* it is wider and more diffuse. The two dark shadow like bands extend only to the centre of wing.

*G. populifolia* Esp. (Vol. 2, p. 169, pl. 27 c, d). From the neighbourhood of Berlin one occasionally gets reddish orange-yellow specimens which are much paler than normal and with very faint markings. They are named **lutea** Closs.

*lutea*.

**G. coreana** Mats. Somewhat resembles *quercifolia*, but it is not stated in what particular it differs from *coreana*. *populifolia*, so that this description does not help us much. The slight dentations of margin are more like *populifolia*. Ground colour of both wings is violet brown, slightly grey at margin. The inner and outer lines of forewings single, as in *quercifolia*. The much interrupted submarginal line is more like that of *populifolia*. Hindwings broadly golden yellow at base and costa with a narrow clearly outlined median line and a wider diffuse band beyond same. On underside of forewings an angulated dark brown median band and on hindwings an arched central band and a straight outer one. 70—90 mm. Corea.

### 17. Genus: **Odonestis** Germ.

*O. pruni* L. (Vol. 2, p. 170, pl. 27 f). — **vulpecula** Dhl. are extremely poorly marked specimens of this *vulpecula*. otherwise little variable species. The inner line is quite absent, the outer one very delicate. — **ambitiosa** Dhl. *ambitiosa*. denotes the opposite, with normally heavy lines, the space between the outer one to the submarginal line is adumbrated with blue-grey scales. Similarly the margin to a light stripe behind the submarginal line. In this form also the hindwings have a distinct dark median band besides the outer one usually present. — In the south Ussuri territory and in Corea the race **rufescens** Kard. (10 c) is distinctly darker red. The inner line is angulated below the costa and is straighter, this characteristic however does not always occur.

*rufescens*.

### 18. Genus: **Dendrolimus** Germ.

On account of the great similarity and variability of the separate species it seems appropriate to reproduce a table drawn up by MATSUMURA.

- |  |                       |
|--|-----------------------|
| 1. ♀ The 2 lowermost spots of submarginal row, oblique, not parallel to outer margin . . . . .                             | 2.                    |
| — These 2 spots are situate vertically and almost parallel to outer margin . . . . .                                       | 3.                    |
| 2. All lines on forewings close together . . . . .   | <i>punctatus</i> .    |
| — All lines on forewings widely separated . . . . .  | <i>segregatus</i> .   |
| 3. Apical pectinations of antennae almost as long as thickness of shaft of antennae . . . . .                              | <i>pini</i> .         |
| — These pectinations are longer than the thickness of shaft of antennae . . . . .  | 4.                    |
| 4. The pectinations are deep black . . . . .   | <i>albolineatus</i> . |
| — The pectinations are brown to yellow-brown . . . . .   | 5.                    |
| 5. The outer line double. The distance between outer and inner lines always further than to the submarginal line . . . . . | <i>sibiricus</i> .    |
| — Outer line not double. The 3 lines named about equidistant . . . . .   | 6.                    |
| 6. Outer margin of forewings somewhat undulate. Expanse 90—100 mm. . . . .   | <i>superans</i> .     |
| — Outer margin straight. Expanse 60—90 mm . . . . .  | <i>jezoensis</i> .    |

Such a table can only be a general indication. It is impossible to fit all sub-forms into it, for instance *superans* is said to have a single outer line. MATSUMURA however illustrates a *superans-dolosa* with a double line.

*D. pini* L. (Vol. 2, p. 171, pl. 28 a). The profusion and variability of this species has brought an inundation of names. The 1st 12 forms dealt with here have been denominated by KRAMLINGER and KÖHLER and we are making use here of their designations for the wing areas. Basal area expands from base to the inner line. Inner band lies between middle line and inner line, middle band from middle line to outer line, outer band



beyond same to the margin. — **flavofasciatus** has middle band golden yellow, according to the original illustration it is grey heavily bestrewn with yellow-brown scales. — **albofasciatus** has whitish inner band and base, the “dark” middle band is light brown. — **nigrofasciatus** has a blackish inner band, base and outer band are also relatively dark, but appear lighter owing to white dusting. — **fischeri** has marginal band deep dark brown with narrow but heavy white inner edge and further to the base, slightly less dark than margin. — **bilineatus** has a double middle line, so that in accordance with the precedent created by TUTT, one can create a number of double names, with the addition of *bilineatus*, as this variety can occur in all forms of colour. — **duplo-lineatus** has inner line double, this is less common. Inversely it is often absent in the ♀, but no name has yet been given for this. — **fuscus** is completely blackish brown with striking white discal spot, the outer line is indicated by pale scales, all others have disappeared. — I have 2 ♂♂ from Berlin with completely black forewings and extinct white discal spot: therefore an extreme form of *fuscus*. Another ♂ is pale red-brown, similarly devoid of markings, but with white discal spot of normal size and possibly not identical with *unicolor-brunnea* Rbl. Both forms are not yet named. — **brunneus** is the opposite extreme of *unicolor-brunnea* Rbl.; in same there is not only a monotonous red-brown ground colour, but all transverse lines are sharply marked in dark brown. — **janthinus** has violet-brown dark ground colour on both wings. Forewings, with the exception of the marginal area, bestrewn with yellow scales; on the original illustration they appear somewhat rose. — **pseudomontanus** has coarsely scaled white forewings. The lines may be present or absent; if the outer one is very heavy, one has *externofasciata* Grünbg. already described in Vol. 2, also *albofasciatus* will scarcely be different, *grisescens* Rbl. is only slightly more yellow-grey. — **subtilis-squamatus** denotes small specimens of all marking and colour varieties, the scales of which in consequence of their small size, appear soft and velvet-like. — **pernederi** when completely developed, shows a merging of the inner and middle lines by bars on the submedian fold, behind the cell and on costa. A merging of the lines at the last named spot is more common. — In **impunctatus** the pale discal spot on forewings is quite absent. Transitions to this and the previous form are frequent. — CLOSS has named the following forms: *diluta*. In this the transverse lines of forewing are absent, except for the outer one. This is merely a transition to *externofasciata* Grünbg. — *cana* and *albescens* Closs are approximately the same as *grisescens* Rbl.; *intermedia* is about the same as *flavofasciatus*. *pallida* scarcely varies from *unicolor-grisescens* Grünbg. — In **conflua** “both” the red-brown areas are confluent. — **mülleri** is dark grey-black with transverse lines retained. — **albostrigata** is pale reddish grey with sharply dark lines. In the outermost band (marginal band?) and at edge of basal area with heavy white markings. — *trilineata* is no doubt the same as *bilineatus*. — *fusca* Meves seems to be identical with *fuscus* Kraml.; one cannot assert this definitely, because the author mentions nothing about the marginal area. — **formosa** Meves has basal and middle areas ashy grey. Inside of the black subterminal line there are large white or grey-white sagittate marks. — In **isabella** ♀ Meves all wings are bay coloured, somewhat darker at base, occasionally dusted with grey at margin. The two transverse lines slightly darker, the white discal spot present. — **castanea** Peklo & Sterzl has red-brown forewings. The inner and middle lines are missing, the outer one may be present as in *externofasciata*. The basal half is sometimes suffused with dark grey, the dark grey margin contrasts sharply. The discal spot may be absent. — **iberica** Schaw. the form from S. Spain is mouse-grey, only between the middle and outer lines it is pale brownish grey. All transverse lines are faintly developed, the white spot only small. Single specimens also resemble *unicolor-brunnea* Rbl. Unfortunately of this and the following race only the ♂♂ are known. — **corsaria** Schaw. is the new race from Corsica, the larvae feed on *Pinus laricio*. The ♂♂ have a wing expanse of 65–77 mm and are therefore very large. Ground colour of forewings is pale bluish white-grey, only the area between the middle and outer transverse bands being pale grey-brown. The middle band has sharper dentations. The projection of the band below the centre of the wing forms a very strongly projecting dentation. The outer band is punctiform and deep black. All specimens, so far only ♂♂, resemble one another closely. Finally we mention 3 forms denominated by KRAUSSE: **ecksteini** is similar to *unicolor-brunnea* Rbl. and quite red brown, it differs from same however by much deeper markings in a dark red-brown tone. — The common form in which the basal area, middle area and bands are red-brown whilst the marginal area is grey, is named **wolffi**. — If in the latter form the costa of the forewings is widely grey to the extent of 2–3 mm it is named **strandii**.

*D. sibiricus* Tschetv. (Vol. 2, p. 172) (10 c). We are now illustrating a specimen from the Urals of this species.

*D. albolineatus* Mats. The species was originally described as a form of *sibiricus*, later it was ascertained that it is a distinct species and so similar to *jezoensis* Mats. (vide below), that one can only certainly differentiate same by the genitalia and the larvae. Therefore we refer here to the classification table on p. 119. — All the forms of this species mentioned here are named by MATSUMURA. — **fuscolatifascia** ♀ has the space between the inner and outer line on forewings coloured black-brown. Between the outer and the submarginal lines the brown spots are absent. — **nigribasalis** ♂ is black-brown from base to the inner line, however with a few grey-white scales. From the inner to the outer line everything is grey-white. Marginal area not described



**albida** ♂ has base of wings whitish with dark brown discal spot. Heavily dusted with black-brown between inner and outer lines, so that the name appears misleading. — **brunneo-pallida** ♂ has yellowish brown forewings and dark lines. The submarginal line is not interrupted as usual. — **frequens** ♂♀ have pale grey-brown ground colour with black transverse lines. The cell spot is situate in the inner line. Marginal area black-brown with a brown band in the centre between the outer and the submarginal lines. — **tomaiensis** ♂ has whitish grey forewings with 3 black-brown bands about equidistant from one another. Underside brownish grey with wide dark band on both wings. — **kiminensis** ♂ has white forewings with admixture of olive. Central spot is situate inside of the inner line, which is angulated at lower wall of cell. Outer line is undulate, narrow posteriorly. — **nigrescens** ♂♀ have dark brown forewings. Transverse lines are darker but not wider than usual. Behind the outer line paler brown, palest at inner margin and before the submarginal line. — **kurilensis** ♂♀, forewings dark brown. The inner line black with wide white edge inwardly and obsolescent discal spot therein. Outer line black, heavily dentate with narrow white edge outwardly. Dark submarginal line indistinct with white edge inwardly below apex and below centre. — **centropallida** ♂, forewings yellowish brown with black transverse lines and black inner margin at base. The inner line very wide covering the cell spot. Outer line double, not dentate, the outer of the two lines fainter. Submarginal line is said to be interrupted, but this is not the case in the illustration. It has a white inner edge. Space between inner and outer lines is palest. — **submarginata** ♂, forewings dark brown with black lines. The inner and outer lines as in *pini-pernederi*, the outer one slightly edged with white outwardly, submarginal line with white inwardly. Area in front of same yellow-brown. — **albata** ♂♀, forewings grey with black transverse lines. The outer line with white edge outwardly, more widely so at costa. Submarginal line black and wide with white inner edge. — **ichinosawana** ♂♀, forewings black-brown with black lines. White inner edges to the inner and submarginal lines, whilst the outer line is edged with white outwardly. Discal spot is prominent. Dark brown between the outer and submarginal lines. — **centro-zonalis** ♂, forewings yellow-brown, lines black-brown. The inner line is situate further outwardly than usual and together with the outer line forms the edging to a somewhat darker narrow central band, which has pale edges. Central spot is isolated as it is closer to base. The submarginal line is interrupted, somewhat wider at inner margin. — All these emanate from Saghalin and the Kurile Islands. Should such a sub-division ever be made for specimens from the Urals and inner Asia science may be favoured with many new denominations.

*D. superans* Btlr. (Vol. 2, p. 172, pl. 28 b). All the new forms are described by MATSUMURA: — **concolorata** ♀ has yellowish brown forewings with silky gloss and without transverse lines. Central spot is indistinct. — **scribae** ♂ has reddish brown forewings with wide grey-brown median band which is edged by the diffuse dark brown inner and outer lines. On MATSUMURA's illustration the outer one is very sharply outlined. Beyond same the colour is rusty red and the submarginal line is very diffuse. Cell spot is grey-white.

**D. jezoensis** Mats. Ground colour varies considerably, from grey to buff, reddish brown and dark brown. As compared to the similar *superans* the differences are as follows: on forewings the inner line commences vertically to costa, at lower wall of cell it runs obliquely inwards, bending over the submedian fold and extending vertically to inner margin. Vein 9 terminates in the costa, not at apex. The species is common in Hokkaido, but rare in Honsho (Japan). 66—84 mm. — All the following forms have been named by MATSUMURA. **brunneata** ♂♀ are pale buff; inner and outer lines, as well as margin are reddish brown; submarginal line is black with paler yellow edge inwardly. — **nigrofasciata** ♂♀ are very similar, but all lines are black and cell spot is indistinct. — **tenuilinea** ♂ differs from the former form by very narrow inner and outer lines. Cell spot yellowish brown and indistinct. — **obsoleta** ♂ has dark brownish yellow forewings with somewhat darker lines. Cell spot as in *tenuilinea*. — **pallescent** ♂ similar to *brunneata*. Forewings yellowish, transverse lines pale brown, the inner and submarginal lines with white edges inwardly, outer line with same outwardly. — **nohirae** ♂, forewings pale buff, cell spot silvery white, all transverse lines black with undulate line between outer and submarginal lines. Hindwings with indication of 2 dark brown bands. — **isschikii** is similar, but forewings are dull brown, outer line wide, submarginal line not very distinct. On underside both wings have a dark central band. — **olivacea** ♂♀ have grey forewings with faint suffusion of olive brown. Both lines darker. The space between the outer and submarginal lines buff, submarginal line with wide white edge outwardly. An additional buff spot in centre of the normal cell spot. — **infusata** ♂ has dark brown forewings with indistinct transverse lines. In centre a wide grey-brown band with silky gloss. Submarginal line somewhat darker. Accessory cell spot and 3 spots behind the outer line reddish brown. — **aino** ♂ differs from *infusata* by the distinct transverse lines. Space between outer and submarginal lines is reddish brown. The grey-brown median band is absent. — **albofascia** ♂ resembles *aino*, but the central band is white. — **fusilineata** ♂ has grey forewings. A long fusiform dark brown streak in cell having a white spot in centre. Below same a black-brown streak parallel to median nervure. Outer line indistinct towards inner margin, edged outwardly with white. Marginal area widely dark brown. — According to MATSUMURA the forms *dolosa*, *zonata* and *fentoni* dealt with in Vol. 2, p. 173 under *segregatus*, should be placed with *superans*, as *spectabilis* (*segregatus*) is never so large as these forms. *cinerea* and *bijuscia* are correctly classified.



*D. segregatus* Btlr. (Vol. 2, p. 172, pl. 28 b). Also here a large number of forms has been newly described by MATSUMURA. He considers *segregatus* to be only a sub-form of the species *spectabilis* Btlr., which in Vol. 2, p. 172 was dealt with as a form of *superans*. Colour of forewings varies from grey-white to dark brown, transverse lines can be quite absent. The only certain characteristic is that the 2 lowest submarginal spots are always situate obliquely. Antennae of ♀ have distinctly shorter peetinations than *superans* and *jezoensis*. — **fuscofascia** Mats. has buff forewings, transverse lines very indistinct, submarginal line wide, black-brown with delicate white edge outwardly. Margin widely grey. Cell spot small, grey. Hindwings paler. — **lateritia** ♂♀, forewings yellow-red. Inner and outer lines white, intermediate ground colour darker. Submarginal line dark brown with white edge inwardly. Cell spot white and small. Margin widely grey-brown. — **nigrolineata** ♀, forewings grey-white, all lines black. Not brown between the outer and submarginal lines. — **tenuifascia** ♂, forewings brown with gold glossy sheen. Cell spot small, transverse lines absent. With wide violet-brown central band, which is constricted above the inner margin. Hindwings more reddish than forewings. — In **latifascia** ♂ the violet-brown central band is wider, submarginal line black-brown, indistinct, consisting of spots, with golden sheen anteriorly to outer line. — **hyacinthina** ♂, forewings hyacinth red without transverse lines, in certain light discal area is darker. Underside without bands. — **albomarginata** ♀ is similar to *bifascia* Grünbg. but margin more widely grey-white (abt. 1/3rd of length of wing), submarginal line indistinct. From same to outer line pale brown. Outer line sharply dentate. — **griseomarginalis** ♀ is also similar to *bifascia*. Margin widely whitish grey with violet tone. Inner line obsolete, anteriorly to same a small cell spot. Submarginal line with delicate white edge. — **tokyonis** ♂, forewings reddish brown. Inner and outer lines dark brown. The submarginal dark row of spots with white edges outwardly. Between same and outer line the colour is paler than ground colour. — **hiroshimana** ♂, forewings buff, inner and outer lines whitish, intermediate space being pale brown. Submarginal row of spots black-brown. From same to outer margin, dark brown as hindwings. — **kononis** ♂, forewings with black-brown patch on costa at base, then reddish brown to inner line. Inner and outer lines white, the intermediate space being dark grey, edged inwardly by an arched, outwardly by a dentate black-brown line. The submarginal row of spots extinct, of same shade as margin (how, is not said). From same to outer line reddish brown. — **shakojiana** ♂, similar to *tricolor* (vide below) varying by the absence of the white outer line. — **scribae** ♀ according to its author, is closely related to *nigrolineata*, but the ground colour is dark brown instead of grey-white, inner and outer lines are white instead of black, only the submarginal row of spots is black with white edges inwardly. — **ryuzana** ♀, forewings dark brown with grey-white scales. A wide black-brown spot outwardly of cell spot, which expands towards costa. According to the illustration a narrow dark band extends obliquely inwards from centre of costa, it just embraces the cell spot with its inner edge and touches the base of wing whilst its outer edge ends 1/3rd of the length of the wing outwardly. Then follows a black spot with white edge at about the centre of inner margin. Submarginal row of spots black with white edges inwardly. — **ferruginea** ♀, forewings rusty red. Outer line white, undulate, extinct towards costa. From same to submarginal line paler. The latter black with white edge inwardly. Marginal area widely black-brown with white scales. — **fallax** ♂, all lines extinct, ground colour dark brown, reddish brown inwardly of the dark submarginal spots to the outer line. — **coreana** ♂, is similar to *kononis* but the central area is dark brown, the submarginal row of spots is black-brown with white outer edge. — **tricolor** ♂, dark brown. The outer line whitish, submarginal row of spots black. The intermediate space and the basal 1/3rd are reddish brown.

*D. sagittifera* sp. n. (10 c). The general impression is like *segregatus*. Thorax of ♂ grey. Forewings dark brown. Cell spot distinct, white. Both lines black and dentate with grey white edges on averted sides. The inner one at the level of the cell spot, being further transposed from same than in *segregatus*, the outer one more incurved below median nervure and approximating to the inner line in contrast to *segregatus*, where it is rather inclined to bend outwards. The central area between the lines is grey. The black submarginal line heavily dentate, angulated outwards at vein 4 and inwards above and below vein 3, forming a "W" and almost touching the outer line. Abdomen and hindwings red-brown. Thorax of ♀ also red-brown, only the patagia are grey. Markings much more diffuse, especially the inner line is scarcely discernible. ♂ 72, ♀ 90 mm. Ta-tsien-lu. Type in the British Museum. — A smaller ♂ (58 mm) from Tze-ku shows base and central area of wings uniformly grey-brown. The dentations of the heavy submarginal line almost touch the outer line, also below vein 3, marginal area is more grey. A ♀, also from Tze-ku, captured in a different year, is unicoloured dark grey-brown, small (66 mm). The outer line is only distinct at inner margin, submarginal line is finer and more distinct than in typical ♂.

*D. punctata* (10 d) Wkr. This species was already dealt with in Vol. 2, p. 173, pl. 28 d. A pair from Ta-tsen-lu in the British Museum and which I mention here, has the inner line of forewings as illustrated on pl. 28 d, but same is double and the white cell spot is between the two lines. The shape of the dark outline and the very slightly undulate submarginal line are as in our illustration but the central and marginal areas are paler, basal area and the area beyond the outer line are darker. A diffuse dark band is discernible in the paler hindwings of ♂ and ♀, basal area is paler. As the distribution of colours does vary from that shown on pl. 28 d, we are giving a further illustration here. A fresh denomination appears unnecessary.



**D. angulata** *sp. n.* (10 e) is similar to the previous species in its brown to dark rusty brown ground colour. *angulata*. The inner line is also double. The inner more indistinct branch is angulated to cell spot, the outer one similarly boldly angulated outwards at the same spot but incurved lower down below veins 2 and 3. The outer dark line is more distinct than is illustrated in *punctata*, in regular curvature, parallel to the outer margin. The very indistinct black submarginal spots are situated further outwards and at inner margin do not approach the outer line. Hindwings red-brown suffused with rose. ♂ 55 mm. Tze-ku. Type in the British Museum. An equally large ♂, also from Tze-ku, has forewings and thorax rather heavily suffused with reddish, the outer line is more distinctly incurved at costa, the inner line and cell spot are scarcely discernible.

In addition 2 species from Indian territory may be described here:

**D. burmensis** *sp. n.* Thorax and forewings of ♂ uniformly dark red-brown. Cell spot white, delicate but *burmensis*. clear. An inner line is not visible. The outer line is pale yellow, slightly dentate, obliquely outwards from costa, being sharply bent at vein 7, then parallel to outer margin and below median nervure vertically to inner margin. The rather indistinct submarginal line is blackish, the space beyond same being very dark, anteriorly however it is pale red-brown. It is curved inwards between veins 4 and 5 and is densely dusted with whitish outwardly just over the inner margin. The pale buff centre of inner margin is striking. Hindwings almost black. ♂ 60 mm. Upper Burma (8000' altitude). A (♀ 90 mm) from the Karen Hills is classified here on account of the pale patch on inner margin and in spite of the considerable disparity in the size. Ground colour is black-brown, the delicate cell spot and the shape of the outer line, as in the ♂. The black submarginal line is more distinct with an increase in the white dusting at inner margin. Hindwings rather less dark than in ♂, a band of white scales from apex to anal angle, which expands and becomes more distinct at its extremities.

**D. biundulata** *sp. n.* (10 e). Thorax and forewings of ♂ dark reddish brown, an inner line and cell spot *biundulata*. are not discernible. Outer line very delicate, white, slightly undulate and slightly incurved at vein 5 and at submedian fold, approximately parallel to the outer margin, only curving inwards rather more at costa. The grey-white submarginal line merges with the marginal area which is of the same shade, 2 dentations extend inwards above and below vein 4, but they do not extend to the outer line. Above and below widely excurved. Abdomen and hindwings suffused with rose, as in *angulata*. ♂ 52 mm. Wei si (Yunnan). The ♀ from Tien tsuen that probably belongs hereto is only slightly larger (56 mm). Ground colour uniformly dark brown. There is a small white cell spot and behind same an indistinct grey-white inner line formed similarly to that of *angulata*. The outer line as in the ♂, submarginal line somewhat more dentate. On the inner side the edges of the two convexities are brownish yellow with a few white scales. Abdomen and hindwings paler reddish brown. The antennae of the ♀ more heavily pectinated.

**D. alfierii** *Andr. & Seitz* (10 d). This species is very like *bufo* *Led.* (Vol. 2, p. 173, pl. 28 f). Ground *alfierii*. colour is sandy yellow-grey with small pale central spot. Except for a few dark dots near the anal angle, forewings are devoid of markings. The 2 pale bands on forewings which are just discernible in *bufo* are absent here, similarly the dark dusting in centre of wings. Also the greater part of the black submarginal spots is absent. ♂ 40 mm. Heluan. Larvae are also very similar to those of *bufo*.

## 19. Genus: **Pachypasa** *Wkr.*

*P. lineosa* *Vill.* (Vol. 2, p. 174, pl. 28 f) also named *limosa*. — **powelli** *Oberth.* (10 e) has very brownish *powelli*. forewings, also the pale radial streak is not so whitish as in typical form. Hindwing is pale red-brown. Aflou, Guelt-es-Stel (Algeria). — **intermedia** *Rothsch.* (10 e) is a transition form. Forewings are not so silvery grey *intermedia*. as typical, but grey-brown, radial streak is normal. Hindwings much paler brown than in *powelli*, but not grey-brown as the type. From around the town of Algiers.

## 21. Genus: **Paralebeda** *Auriv.*

*P. plagifera* *Wlk.* The main indian form is illustrated in Vol. 2, pl. 30 d. — We are now illustrating the palaearctic form: **femorata** *Mén.* (10 f) which was described in Vol. 2, p. 175. *femorata*.

## 22. Genus: **Taragama** *Moore.*

*T. repanda* *Hbn.* (Vol. 2, p. 175, pl. 29 a). — **roseoclara** ♀ *Schaw.* denotes a pale rose-brown specimen *roseoclara*. among typical forms from Cadiz. A delicate roseate hue covers the forewings, also the patagia are rose whilst the rest of the thorax is grey. Abdomen and base of hindwings pale yellowish, similarly the traces of the transverse lines. The specimen is probably similar to *aegyptiaca* *O. B.-Haas.* — Whilst the algerian form corresponds to those typical of S. Spain, very dusky ♂♂ occur at Tangiers and other coastal localities. The large patch on



forewings is black-brown and not red-brown. In the only specimen before me the outer white line is delicate but distinct. It extends straight to the costa, whilst in *repanda* and *aegyptiaca* it is incurved immediately at the *tenebrosa*. costa: *tenebrosa* Rothsch. (10 e).

*fainae*.

**T. fainae** Geras. In the wing contour the species more closely resembles the *Lemonia* species, as however I have no specimen before me, it is no use prognosticating. Body is pale grey. Forewings brownish, anteriorly grey, central area darker and edged by 2 white lines. The inner one commencing at  $\frac{3}{5}$ ths of costa extending slightly outwards to median nervure, along same to origin of vein 2, then vertically to the centre of inner margin. The outer line commences at  $\frac{4}{5}$ ths of costa, thence vertically towards inner margin to vein 3, then horizontally inwards and vertically to  $\frac{2}{3}$ rds of inner margin. Hindwings similarly coloured to forewings, with extinct pale outer band; base and inner margin impure white. ♂ 40 mm. Chiva.

### 23. Genus: **Bhima** Moore

*B. eximia* Oberth. (Vol. 2, p. 177, pl. 29 d). The description in Vol. 2 was not quite comprehensible in consequence of the poor original illustration from OBERTHÜR. Inner and outer lines of forewings are double, they are yellowish white and rather indistinct. The undulate submarginal line has 3 dentations pointing inwards. — *latimarginata* subsp. nov. (10 b) from Ta-t sien-hu has slight dark shading at inner margin of hindwings, the outer margin is widely blackish with black projections along the veins. Type in the British Museum.

### Alphabetical List

with references to the original descriptions of the forms of *Lasiocampidae* enumerated.

\* signifies that the form is also illustrated in the place cited.

aavasaksae Er. *Teich* Stett. Ent. Ztg. 42, p. 187.  
aegyptiaca Las. Oberth. Ét. Lép. Comp. 12, p. 327.  
aestatis Epic. *Prack* Entom. Zeitschr. 35, p. 61.  
aino Dendr. *Mals.* Thous. Ins. Add. 4, p. 916. \*  
akbesiana Las. Oberth. Ét. Lép. Comp. 12, p. 339.  
albata Dendr. *Mals.* Journ. Coll. Agr. Hokk. 18, p. 10. \*  
albida Dendr. *Mals.* Thous. Insect. Add. 4, p. 919. \*  
albofascia Dendr. *Mals.* Thous. Insect. Add. 4, p. 916. \*  
albofasciatus Dendr. *Kramlg. & Köhl.* Monogr. p. 6. \*  
albofasciata Epic. O. *B.-Haas* Horae Macr. 1, p. 78. \*  
albolineatus Dendr. *Mals.* Thous. Ins. Add. 4, p. 918. \*  
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albostrigata Dendr. *Closs* Int. Ent. Zeitschr. 14, p. 108.  
alfieri Las. *And. & Seitz* Senckenbergiana, 7, p. 56.  
ambitiosa Odon. *Dhl.* Entom. Zeitschr. 39, p. 116.  
angulata Dendr. *Gaede* in *Seitz*, Macrolep. Suppl. 2, p. 123.  
aucta Las. *Krnl.* Societ. Entom. 21, p. 50.  
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bajovarica Poec. *Stieh.* Ztschr. wiss. Ins.-Biol. 14, p. 198. \*  
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bilinea Las. *Hartig* Ent. Rundsch. 41, p. 45.  
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bouillonae Chil. *Dumont* Bull. Soc. Ent. Fr. 1930, p. 249.  
brunneata Dendr. *Mals.* Thous. Ins. Add. 4, p. 913. \*  
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brunneo-pallida Dendr. *Mals.* Thous. Ins. Add. 4, p. 920. \*  
brunneus Dendr. *Kramlg. & Köhl.* Monogr., p. 7.  
burmensis Dendr. *Gaede* *Seitz*, Macrolep. Suppl. 2, p. 123.  
caecopunctata Las. *Rbl.* Verh. Zool.-Bot. Ges. 64, p. (177).  
calabrica Mal. *Sld.* Iris 35, p. 31.  
calberlae Poec. (*Ragusa* i. l.) *Gaede* *Seitz*, Macrolep. Suppl. 2, p. 112.  
caradjae Mal. *Stdjss.* Stett. Ent. Ztg. 45, p. 195.  
castanea Dendr. *Peklo & Sterzl*, Zeitschr. Naturb. u. Samm. 2, p. 2. \*  
castaneolavatus Las. *Rothsch.* Novit. Zool. 21, p. 314.  
catacoides Er. *Strd.* Suppl. Ent. 4, p. 11.  
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centrozonalis Dendr. *Mals.* Journ. Coll. Agric. 18, p. 10. \*

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coreana Gastr. *Mals.* Journ. Coll. Agric. Hokk. 19, p. 22. \*  
coreana Dendr. *Mals.* Journ. Coll. Agric. Hokk. 18, p. 19. \*  
corsaria Dendr. *Schaw.* Iris 40, p. 149.  
costipuncta Mal. *Closs* Suppl. Ent. 6, p. 19.  
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flavofasciatus Dendr. *Kramlg. & Köhl.* Monogr., p. 7.  
flavopurpurea Met. O. *B.-Haas* Horae Macr. 1, p. 77.  
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fuscifascia Dendr. *Mals.* Thous. Ins. Add. 4, p. 921. \*  
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halophila Mal. *Std.* Iris 29, p. 28.  
hamilear Las. Oberth. Ét. Lép. Comp. 11, f. 4719. \*  
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*impunctatus* Dendr. *Kramtg. & Köhl.* Monogr., p. 7. \*  
*infusca* Dendr. *Mats.* Thous. Ins. Add. 4, p. 916. \*  
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*intermedia* Pach. *Rothsch.* Novit. Zool. 24, p. 370.  
*interrupta* Mal. *Le Chartes* Amat. Pap. 3, p. 64. \*  
*isabella* Dendr. *Meves* Ent. Tidskr. 35, p. 40.  
*issikii* Dendr. *Mats.* Thous. Ins. Add. 4, p. 915 \*  
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*lavaudeni* Ergol. *Dumont* Bull. Soc. Ent. Fr. 1928, p. 228.  
*lucasi* Chil. *Oberth.* Ét. Lép. Comp. 16, p. 341.  
*lutea* Gastr. *Closs* Int. Ent. Zeitschr. 11, p. 166.  
*lutescens* Epic. *Closs* Int. Ent. Zeitschr. 8, p. 199.  
*maghrebica* Chondr. *Joannis* Encycl. Ent. B. Lep. 3, p. 12.  
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*mülleri* Dendr. *Closs* Int. Ent. Zeitschr. 14, p. 107.  
*nenstrensis* Mal. *Klemann* Int. Ent. Zeitschr. 20, p. 415.  
*nigrescens* Dendr. *Mats.* Journ. Coll. Agric. Hokk. 18, p. 9.  
*nigribasalis* Dendr. *Mats.* Thous. Ins. Add. 4, p. 919 \*  
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*nigrolineata* Dendr. *Mats.* Thous. Ins. Add. 4, p. 922. \*  
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*oberthüri* Chil. *Lucas* Bull. Soc. Ent. Fr. 1909, p. 71.  
*obscura* Cosm. *Closs* Int. Ent. Zeitschr. 14, p. 122.  
*obsoleta* Dendr. *Mats.* Thous. Ins. Add. 4, p. 914 \*  
*ochracea* Las. *Hartig* Ent. Rundschau 41, p. 45.  
*olivacea* Dendr. *Mats.* Thous. Ins. Add. 4, p. 915. \*  
*olivacea* Poec. *Warn.* Int. Ent. Zeitschr. 11, p. 220.  
*osthelderi* Chond. *Pnglr.* Mitt. Münch. Ent. Ges. 15, p. 96.  
*palleseus* Dendr. *Mats.* Thous. Ins. Add. 4, p. 914. \*  
*pallida* Cosm. *potat.* *Sptr.* Schmett. Eur. 1, p. 121.  
*pallida* Macr. *rubi* *Osth.* Schmett. S.-Bayern 2, p. 208.  
*parallelifascia* Macr. *Rothsch.* Novit. Zool. 24, p. 453.  
*pauli* Chondr. (*Pnglr.* i. l.) *Gaede* Seitz *Macrolep.*, Suppl. 2, p. 110.  
*penzigi* Mal. *Tutt.* Brit. Lep. 5, p. 28.  
*pernederi* Dendr. *Kramtg. & Köhl.* Monogr. p. 8. \*  
*pinivora* Kon. *Mats.* Ins. Mats. 1, p. 112 \*  
*plumigera* Seitzia, *Seriba* Ent. Rundsch. 36, p. 42. \*  
*powelli* Chondr. *Oberth.* Ét. Lép. Comp. 6, f. 1162.  
*powelli* Pach. *Oberth.* Ét. Lép. Comp. 12, p. 343.  
*pseudomontanus* Dendr. *Kramtg. & Köhl.* Monogr., p. 7. \*  
*püngeleri* Las. *Stertz* Iris 29, p. 125  
*püngeleri* Epic. *Schaw.* Verh. Zool.-Bot. Ges. 64, p. (357).  
*reneae* Erg. *Dumont* Bull. Soc. Ent. Fr. 1922, p. 219.  
*roseoclara* Tar. *Schaw.* Ztschr. Oestr. Ent. Ver. 13, p. 103.  
*rubescens* Epic. *Rbb.* Iris 23, p. 226.  
*rubicunda* Epic. *Schaw.* Verh. Zool.-Bot. Ges. 64, p. (357).  
*rufescens* Odon. *Kard.* Ent. Mitt. Dahlem 17, p. 417.  
*rufomarginata* Er. *Closs* Int. Ent. Z. 11, p. 87.  
*ryuzana* Dendr. *Mats.* Journ. Coll. Agric. 18, p. 18. \*  
*sagittifera* Dendr. *Gaede* Seitz *Macrolep.*, Suppl. 2, p. 122.  
*sannitica* Las. *Dhl.* Mitt. Münch. Ent. Ges. 19, p. 103.  
*sardoa* Las. *Trti.* Atti Soc. It. Sc. Nat. 51, p. 289.  
*schaufussi* Mal. *Stdfss.* Stett. Ent. Ztg. 45, p. 195.  
*schulzi* Las. *Stertz* Iris 26, p. 27.  
*scribae* Las. (segr.) *Mats.* Journ. Coll. Agric. Hokk. 19, p. 18.  
*scribae* Las. (super.) *Mats.* Journ. Coll. Agric. Hokk. 18, p. 13. \*  
*seitzi* Selen. *O. B.-H.* Horae Macr. 1, p. 78.  
*semifasciata* (Las. querc.) *Wagner* Int. Ent. Zeitschr. 13, p. 157. \*  
*semifasciata* (Las. trifolii) *Faitla* Natural. Sicil. 7, p. 231.  
*shakojiana* Dendr. *Mats.* Journ. Coll. Agric. 18, p. 18. \*  
*simulatrix* Dipl. *Chrét.* le Naturaliste, 1910, p. 77.  
*siniscalchii* Lamb. *Trti.* Atti Soc. It. Sc. Nat. 65, p. 29. \*  
*sordidior* Las. *Rothsch.* Novit. Zool. 21, p. 314.  
*spadicea* Las. *Wagner* Ztschr. Oestr. Ent. Ver. 11, p. 25.  
*strandi* Dendr. *Krausse* Arch. Naturg. 83, A 6 (1919), p. 55.  
*submarginata* Dendr. *Mats.* Journ. Coll. Agric. Hokk. 18, p. 10.\*  
*subtilis-squamatus* Dendr. *Kramtg. & Köhl.* Monogr., p. 8. \*  
*suffusa* Cosm. *Closs* Int. Ent. Zeitschr. 11, p. 87.  
*takamuknana* Met. *Mats.* Ins. Mats. 2, p. 119. \*  
*takamukui* Er. *Mats.* Journ. Coll. Agric. Hokk. 19, p. 24. \*  
*tamanukii* Trich. *Mats.* Ins. Mats. 2, p. 119. \*  
*tenebrosa* Tar. *Rothsch.* Novit. Zool. 24, p. 371.  
*tenera* Poec. *O. B.-Haas* Horae Macr. 1, p. 77. \*  
*tenuifascia* Dendr. *Mats.* Thous. Ins. Add. 4, p. 923. \*  
*temilinea* Dendr. *Mats.* Thous. Ins. Add. 4, p. 914. \*  
*thomalae* Mal. *Gaede* Seitz *Macrolep.*, Suppl. 2, p. 110.  
*tingitana* Chondr. *Oberth.* Ét. Lép. Comp. 12, p. 298.  
*tokyonis* Dendr. *Mats.* Journ. Coll. Agric. 18, p. 17.  
*tomaiensis* Dendr. *Mats.* Ins. Mats. 3, p. 166.  
*transfuga* Macr. *Krulik.* Societ. Ent. 23, p. 11.  
*tricolor* Dendr. *Mats.* Journ. Coll. Agric. Hokk. 18, p. 19. \*  
*variegata* Er. (*Lenz*) *Osth.* Schm. S.-Bayern 2, p. 204. \*  
*veris* Epic. *Lenz* Berl. Ent. Ztschr. 52, p. 107.  
*vernetensis* Dipl. *Oberth.* Ét. Lép. Comp. 12, p. 326.  
*virago* Lamb. *Rothsch.* Novit. Zool. 19, p. 118.  
*virgo* Chil. *Oberth.* Ét. Lép. Comp. 12, p. 340. \*  
*vitellius* Las. *Oberth.* Ét. Lép. Comp. 5, f. 785.  
*vulpecula* Odon. *Dhl.* Entom. Zeitschr. 39, p. 115.  
*wagneri* Las. *Tutt.* Brit. Lep. 5, p. 29.  
*wolffi* Dendr. *Krausse* Arch. Naturg. 83 A 6 (1919), p. 55.  
*yatsugadakensis* Er. *Mats.* Journ. Coll. Agric. Hokk. 19, p. 23. \*  
*zanoni* Chondr. *Trti.* Atti Soc. It. Sc. Nat. 61, p. 143. \*







## 8. Family: Lemoniidae.

### 1. Genus: **Lemonia** Hbn.

*L. taraxaci* Esp. (Vol. 2, p. 181, pl. 30 a). **antigone** Std. is the oldest denomination for ♂ specimens with *antigone*. the small black spot on forewings absent. *depuncta* Steph. denoting ♂ and ♀ is for the same form and *immaculata* Krul., according to the name, signifies the same (I could not find a description). In this case it is interesting to observe the locality which is stated to be south east of Omsk in the Baraba Steppes. Hitherto and as stated in Vol. 2, p. 181 the nearest indication was "eastward to Southern Russia". — **strigata** ♀ Rbl. approaches the *strigata*. other *Lemonia* species by the presence of a dark grey outer line on forewings, which continues diffusedly on hindwings. — **montana** Buresch from the Rhodope Mountains at an altitude of 2000 m has highly transparent *montana*. wings of pale ochreous ground colour in ♂ and ♀. The discal spot is very small.

*L. dumii* L. (Vol. 2, p. 182, pl. 30 a). — In the variety **sauberi** Warn. ground colour of all wings is blackish *sauberi*. violet on upper and undersides, so that the clay coloured markings are very distinct on both sides. On forewings base also is very dark, so that a yellow inner line occurs before the discal spot. This is less clearly outlined than the main band. Also fringes of forewings are black. — **hauseri** ♀ Rbl. on the other hand has paler base. On *hauseri*. hindwings basal area as far as the main band is yellow, only the margin retaining the normal dark shade. On forewings the clay coloured patches are more extensive than customary. — *luteoornata* ♂ Klem. scarcely differs at all from same.

*L. sacrosancta* Püng. (Vol. 2, p. 182). A mistake was made in the description. It should have read: — "the pale band rather obsolescent." At all events the cotype in the PÜNGELER collection has a pale band.

**L. pia** Püng. (10 f). We are now giving an illustration of this species which was mentioned in Vol. 2, p. 182. *pia*.

*L. philopalus* Donz. (Vol. 2, p. 182, pl. 30 a). — **vazquezi** Oberth. The spanish form of this species, which *vazquezi*. chiefly occurs in northern Africa is much larger than type and generally rather darker, the pale veins consequently appearing more prominent.

*L. vallantini* Oberth. (Vol. 2, p. 182, pl. 29 f). — **unicolor** Oberth. (10 f) by its nice yellow ground colour *unicolor*. in the ♂ almost resembles a large *taraxaci* ♂ without transverse lines, but only with black discal spot. Also the body is a rich yellow. The ♀ is somewhat dusky brownish in basal area of both wings up to the area, where an outer line might be situate. Also underside similarly except for the absent discal spot.

**L. tancrei** Püngl. (10 f) from Tian-shan can be described as a paler *sardanapalus* Stgr. The outer lines *tancrei*. of both wings are slightly less undulate. The oblique basal band of *sardanapalus* is replaced here by a fine horizontal streak below the cell and the pale edge of the spot on costa is separated from the outer line. The ♀ is paler and consequently the spot mentioned is more striking.



### Alphabetical List

with references to the original descriptions of the forms of *Lemoniidae* enumerated.

\* signifies that the form is also illustrated in the place cited.

*antigone* Lem. *Std. Boll. Soc. Adriat.* 27, p. 105.

*depuncta* Lem. *Steph. Iris* 38, p. 204.

*hauseri* Lem. *Rbl. Verh. Zool.-Bot. Ges. Wien* 61, p. (29). \*

*montana* Lem. *Buresch Arbeit. Bulg. Nat. Ges.* 7, p. 100.

*sauberi* Lem. *Warn. Int. Ent. Zeitschr.* 17, p. 13.

*strigata* Lem. *Rbl. Berge's Butterfly Book*, p. 131.

*tancrei* Lem. *Püng. Iris* 28, p. 38. \*

*micolor* Lem. *Oberth. Ét. Lép. Comp.* 11, f. 4707. \*

*vazquezi* Lem. *Oberth. Ét. Lép. Comp.* 12, p. 365. \*

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### 13. Family: Saturnidae.

By CHR. BOLLOW †.

#### 1. Genus: **Actias** Leach.

**A. heterogyna** Mell (Vol. 10, pl. 55 B a) is very local in its occurrence. Like the related *A. duber-nardi* Oberth. (Vol. 2, p. 211), it occurs in mountainous territory. Its wing expanse is 114—124 mm in ♂ and 135 mm in ♀. The ♂ is of yellow colouration, the ♀ pale green. Both have a distinct undulate grey post-median band on both wings, which is indented on the veins. There is a less distinct submedian line. The discocellular spot resembles the ground colouration and is intersected longitudinally by a red streak. This is occasionally only narrow, but can expand embracing the entire outer half. The anterior half of forewings and the upper part of hindwings bear a narrow blue arched streak near the margin. This is edged with black, more heavily outwardly, less so inwardly. Between this streak and the red middle streak there is a narrow ochreous longitudinal mark. The tail of hindwings is about  $\frac{2}{5}$ ths of the length of same. In the ♂ it curves outwards, in the ♀ it is more twisted. In the ♂ forewing is yellow, base being greenish yellow and hindwings lemon yellow. Costal margin widely red-brown to beyond the middle of wing. S. China, presumably crossing here into palaearctic territory.

**A. apollo** Rüb. (14 a) described from a ♂ from Hiogo in central Japan. Its wing expanse is 88 mm *apollo*. and it differs from *A. selene*-♂ (Vol. 2, p. 211 and Vol. 10, pl. 55 C b) by the shape of the forewings. The apex is not elongated as in the latter but almost rectangular. The outer margin of forewings in general forms a straight line, but same is, like the outer margin of hindwings faintly but regularly undulate. Hindwings are shorter than in *selene*-♂, but longer than in the larger *artemis* Brem. (Vol. 2, p. 211, pl. 33 b). In the basal area hindwings are wider than in *selene*. Upperside is monotonous pale green, rather greener than *artemis*. The veins seem to be more boldly marked being of pale brownish colouration. The ocelli are approximately similar to those of *artemis*, but they are more pronounced and the yellow areola to ocellus of hindwing is wider. Fringes yellowish. Forewings have a shadowy blackish stripe in the middle between the outer margin and the discal spot which extends from costa to the middle of the cell between the submedian and the 1st median nervure. In front of same and not precisely in the middle between this stripe and outer margin, there is a shorter and very indistinct blackish stripe. The subbasal transverse stripes, which are very distinct in *selene*, are missing in *apollo*. On hindwings there is a rather indistinct blackish submarginal extending from the anterior radialis to base of tail. The red costal streak on forewings is paler than in *selene*, but darker than in *artemis*. Frons is darker yellowish than in *selene*. Underside is somewhat duller than upper-side. The antennae are darker than in the two related species, the single pectinations are slightly longer than in *selene* and the shaft of the antennae is strikingly darker.

#### 2. Genus: **Graëllsia** Grt.

**G. isabellae** Graëlls (Vol. 2, p. 212, pl. 33 c). The race established by OBERTHÜR with a flourish of *isabellae*. importance and denominated by the fine name of *galliaegloria* as representing the *isabellae* captured at *galliae-gloria*. L'Argentière-la-Bessée in the french High Alps, has proved to be descended from Spanish parents of *isabellae* that were let loose there and therefore *galliaegloria* must be withdrawn.

#### 3. Genus: **Samia** Hbn.

**S. cynthia** Drury (Vol. 2, p. 212). ab. *viridis* Mezg. ground colour of wings green or very slightly *cynthia*. brownish green. — ab. *bicolorata* Mezg. has wings marked with yellow and green. ab. *punctata* Mezg. has *viridis*. *bicolorata*. *punctata*.



a greenish brown mark on forewings between the white discal line and the interrupted subbasal line. — ab. *fenestrella* *Mezg.* has on forewings a 10 mm long conjunction of the basal band with the dentate discal band and through the absence of the white line in the reddish discal band a vitreous spot is created. — ab. *andrewesi* *Deb.* is notified from Sikkim on the border line. It resembles *walkeri* *Fldr.* (Vol. 2, p. 213) and has the lunular spot extending to the white discal band.

*watsoni*. *S. watsoni* *Oberth.* (11 b) was described and illustrated by OBERTHÜR from a ♂ from Ta-tsien-lu. He created for this new species a separate Genus "*Desgodinsia*" without however giving any justification. According to the illustration, which is being reproduced here, there is no reason why same should not be included in the *Samia* *Hbn.* The new species looks very like *cynthia*, but the ground colour is a richer mahogany-brown with faint claret hue. In the "Entomologist" Vol. 56, p. 172, WATSON describes a ♀ bred from Ta-tsien-lu, which is unfortunately slightly damaged and which is considerably smaller than *watsoni* ♂. He believes this is the yet unknown ♀ of *watsoni*. In any case it is a very rare species, at all events as far as the territories of Ta-tsien-lu and the Omeishan are concerned.

## 7. Genus: **Antheraea** *Hbn.*

*cinnamomea*. *A. pernyi* *Guér.* (Vol. 2, p. 216, pl. 34 d). — ab. *cinnamomea* *Niep.* denotes specimens with rich cinnamon red colouration in both sexes. Japan. — ♂-ab. *lugubris* *Niep.* has all wings an olive-brown on upper-side, costa of forewings a mouse-grey peppered with dark speckles to 2/3rds of the length of wings. Across the centre of forewings a dark shadowy stripe extends, which is continued on hindwings. The postdiscal transverse line is black with white outer edge, similarly the subbasal which has a white inner edge. The vitreous centre of ocelli is encircled by dark brown with a white inner edge; the postdiscal line on hindwings is dark and obsolete. Underside paler than upperside, widely white-grey within the postdiscal line; subbasal line sharply marked and dark brown. The dark shadowy discal band, as on upperside. — ab. *melaina* *John* is a dark form, the general colouration is dull olive, suffused with grey-black. It stands in relation to *pernyi*, as *melaina* *Gross* does to *Agria tau*.

*francki*. *A. francki* *Wts.* belongs to the *roylei-pernyi* group and is closer as far as general appearance goes to the former species (Vol. 10, p. 511, 55 B a) than to the latter. The antennae are pale brown, paler than in the other species named. Ground colour of wings is not quite so reddish as *pernyi* and is about half way between the two related forms. Forewings are more falcate, edged with brown and yellow. The eyespot is larger than in *roylei*, but somewhat smaller than in *pernyi* and the same applies to the vitreous centre spot. The brown submarginal is more excurved and in the centre has a continuous faint inner line, which is rarely found in *roylei*. Hindwings have only faint markings. A faint line extends from the anal end of the ocellus to anal angle, forming a fork. The upper branch of same ends at abdomen, the lower one near the faint submarginal. The band between the ocellus and base of wings is missing. Underside is darker and more brownish than the two related forms and has only diffuse markings. The submarginal has no white or grey edges. The length of forewings is 75 mm. Only a single ♂ from Kwanhsien in Szechuan is known.

*chengtuana*. *A. chengtuana* *Wts.* is only known from a single ♀ captured at light at Chengtao in Szechuan and which is in rather poor condition. It is relatively very similar to *A. assamensis* *Ww.* (Vol. 10, p. 511, pl. 55 B b). Wings are paler rusty brown. The ocelli of both wings rather deeper orange than ground colour; areola of ocellus of forewing more faintly black than that of ocellus on hindwing. Bands of both wings without white edge in contrast to *assamensis*. Submarginal line is further from margin than in the latter, especially at hind margin, where it turns towards base of wings. The band itself consists of two fine black-brown lines, which are confluent at apex and have a white edge outwardly, there is a faint whitish line along the lower half.

## Hybrids of palaearctic **Antheraea**.

*pernyi-yama*. The hybrids mentioned in Vol. 2, p. 217 without names are: *yamamai*-♂ × *pernyi*-♀ = hybr. **pernyi-yama** *Bourd.*, hybr. *pernyi*-♂ × *yamamai*-♀ = hybr. **inversa** *Tutt.*

## 8. Genus: **Caligula** *Mr.*

*privata*. *C. boisduvali* *Ersch.* (Vol. 2, p. 217, pl. 31 d). — ♂-ab. *privata* *Krnl.* is probably identical with *jallax* *Jord.* (Vol. 2, p. 217) or only a slight modification of same. — subsp. *chinensis* *Rbl.* from Szechuan in W. China is much more monotonous and duller in colouration than *jallax*, the disc of forewings is reddish grey. It differs from *jonasi* *Btlr.* (Vol. 2, p. 218, pl. 32 b, d) by its paler more reddish yellow general colouration, as well as by the more truncate apex to forewings, the less prominent reddish brown and not brownish claret basal area of forewings, the outer edge of which extends to costa. The ocelli are remarkable by their almost



perfectly circular shape. Costal margin of forewings is reddish grey, submarginal line of forewings pure white, but only in an oblique patch at inner margin.

### 9. Genus: **Dictyoploca** Jord.

**D. manonis** Mats. from Kyushu, Japan. It was not possible for me to obtain either a specimen, an *manonis*. illustration or the original description. The same position prevails in regard to *D. simla* Ww., subsp. *franchi* Wts.

### 10. Genus: **Neoris** Mr.

*N. stoliczkana* Fldr. (Vol. 2, p. 219). — **oliva** A. B.-H. is a ♂ from the Juldus territory which differs *oliva*. distinctly from *galerope* Pnglr. (Vol. 2, p. 219, pl. 32 a). Ground colour is much more unicolourous grey-olive with no such yellow admixture as in *schencki* Stgr. (Vol. 2, p. 219). Otherwise however in regard to markings of forewings it resembles same. Hindwings vary rather more, the black, rather less arched central line touches the inner side of the ocelli and ends coinciding with the outer transverse line of forewings. In *schencki* (Vol. 2, p. 219, pl. 32 a) however this line is far removed from the ocellus and ends joining or very close to the inner transverse line. Underside of all wings is much more uniformly olive-grey than the upper side. Wing expanse is 86 mm.

**N. haraldi** Schaw. from Thian-Shan in the Juldus territory is a ♂ that is much smaller than *hut-* *haraldi*. *toni* Mr. (Vol. 2, p. 219, pl. 31 d) and *schencki* Stgr. Ground colour is a dark impure grey-brown, that especially at outer margin, has a tinge of olive-brown. Towards base and abdomen it becomes a rosy brown. The black antemedian line has no pale inner edge and between same and base there is no wedge-shaped spot. The entire wings from base to outer double line are uniformly dusky. The double line has a white outer edge, it is much more weakly undulate than in *schencki* and ends at hind margin of forewings projecting less inwards, in softer colouration, not inside of the ocelli, but about in centre of same. The double band does not extend as far as the ocellus of forewing. The outer marginal area is paler olive-brown and not dusted. Ocelli of forewings are somewhat smaller than those of hindwings and with black surrounds. Apex as in *huttoni*. The broad bipectinated antennae and narrow collar are pale brown. Thorax and abdomen are darker brown, the latter without black belts. Underside same as upperside.

### 11. Genus: **Perisomena** Wkr.

*P. caecigena* Kupido (Vol. 2, p. 220, pl. 32 b). — ab. **unicolor** Schltz. are ♂♂ in which all wings have *unicolor*. a pure yellow colouration on uppersides; the reddish markings are completely absent. — **derosata** Schaw. *derosata*. from Bosnia, Herzegowina and Dalmatia are ♂♂ with a similar tendency as regards colour. They are also yellow without the rose coloured outer marginal band. — ♀-ab. **wiskotti** Niep. has upperside of all wings a *wiskotti*. rich rosy red without the dark dusting, except at base. Fringes are yellow; the discal, parallel dentate lines are diffuse, darker and wider, on hindwings double as wide and forming a single band. The bands are wider apart from one another, so that the median area appears wider. The vitreous spot has no black surround which is obsolete and scarcely visible. The unicolourous underside of all wings shows only a narrow diffuse dentate band and the vitreous spots are scarcely perceptible. Smyrna. — subsp. **transcaucasica** O. B.-H. from *transcaucasica*. Elisabethpol and Tiflis has a wing expanse of 52—65 mm. The ♂♂ differ from specimens from S. Dalmatia by the paler, sulphur-yellow colouration of all wings. The black dusting of forewings, the rosy violet hue in centre of wings are not to be seen in a single ♂ specimen from Transcaucasia. The ♀ is pale claret with occasional yellowish dusting in basal area.

### 12. Genus: **Saturnia** Schreck.

*S. pyri* Schiff. (Vol. 2, p. 220, pl. 31 b). — ab. **subrubicunda** Schltz. differs from typical specimens by the *subrubi-* very pronounced carmine reddish colouration, which partially covers all wings. — ♀-ab. **brunnea** Gschw. *brunnea*. has wings and body suffused with brown on upper and undersides. The general colouration is brown. — ♂-ab. **grisea** Gschw. has wings and body suffused with grey on upper and undersides. The general impression is *grisea*. consequently grey. Vienna. — **latifascia** Gschw. has thorax and basal area of forewings darker brown than name *latifascia*. type form. The 1st transverse band of hindwings is double as wide as is typical, excurved in centre, drawn in towards the base at hind margin. On hindwings it is wider but less sharply marked than in normal *pyri*. The 2nd transverse band is similarly double as wide, but less deeply dentate on hindwings than type form. On underside the 1st transverse band of forewings is reduced to a basal streak and on hindwings it forms a 12—14 mm large roundish patch lying between the hind margin and subcostal in the basal angle. Vienna. — ab. **kolleri** Gschw. is characterised by the shape of the 2nd transverse stripe, which forms a large dent- *kolleri*. ation on upper and undersides on forewings between cellules 6 and 7, whilst in the name type form and all



- known varieties, it forms a dentation in each of these cellules. In the apical part of the margin of forewings *kolleri* has only 2 arched lines, a large one over cellule 6 and 7 and a rudimentary one indicated in cellule 5. —
- abeli*. ♂-ab. **abeli** *Gschw.* has a pale brownish yellow band on upper and undersides of forewings between the two transverse bands and the marginal band. It extends from costa to hind margin. It follows the marginal band and is 3—8 mm wide being only intersected by the colouration of the veins, which is normal. Hungary. —
- attingens*. — ab. **attingens** *Gschw.* has the 2nd transverse band of all wings displaced inwardly, so that it borders on the ocelli. — ♀-ab. **conjuncta** *Gschw.* has the 1st and 2nd transverse stripes of forewings conjoined in cellule 1 of forewings by a deep dentation of the 2nd transverse stripe. Underside is normal. Vienna. —
- defascia*. ♀-ab. **defascia** *Gschw.*, the 1st and 2nd transverse stripes of forewings are missing on upperside of forewings. —
- aigneri*. Underside is normal. Vienna. — In ab. **aigneri** *Pillich* the undulate line beyond the eyespot on hindwings is quite extinct and the pale patch around the ocellus becomes gradually darker towards the outer margin. —
- umbrosa*. — ab. **umbrosa** *Amiot* strongly inclines towards melanism. The disc, submarginal bands and almost the entire costal margin are deep black, the latter with a few scattered pale scales. — ♂-ab. **melanopis** *Gschw.* has
- macropis*. no white intersecting line in the eyespots of both wings on upper and undersides. Vienna. — ab. **macropis** *Gschw.* has ocelli somewhat elongated and considerably increased in size, an analogous variation to *pavonia-reducta*. *macropis* *Schultz.* — ♂-ab. **reducta** *Gschw.* is a counterpart to the previous form and shows remarkably small
- alticola*. ocelli on all wings, about the size of those of a large *E. pavonia*-♀. Vienna. — **alticola** *Denso* denotes a ♀ and the descendants bred from same. It was captured extraordinarily late, in July at Bonneville near Geneva at an altitude of 1000 m (Saxonnet) and the ova deposited by this very small *pyri*-♀ produced again very small imagines. The colouration of same is generally more dusky; the zigzag lines on both wings are less distinctly marked and in all cases touch the ocelli. The pale dusting in central area is darker and the markings generally appear wider and more dusky. Perhaps this is a high altitude form, as *pyri* is rarely found above 600 m altitude.
- conjuncta*. *S. atlantica* *Luc.* (Vol. 2, p. 221, pl. 31 b). — ab. **conjuncta** *Gschw.* is captured at El Kantara in Algeria. The dentations of the 2nd transverse line of forewings touch the 1st transverse line on the 2nd cubitalis and in the centre of cell. On hindwings the two transverse stripes merge forming a single dark band from 2nd cubitalis to hind margin. — ♀-ab. **conjuncta-perrupta** *Gschw.* from the same locality as the previous variety. The dentation of the 2nd transverse line intersects the 1st transverse line on the 2nd cubitalis, so that the inner white edge of 1st line merges with the outer white edge of the 2nd line. In cellule 1 the dentation touches the 1st transverse line, also the dentation on the 2nd analis approaches same very closely, almost conjoining with same. On hindwings the two transverse lines are conjoined onwards from the 2nd cubitalis, similarly to the preceding form.

#### 14. Genus: **Eudia** *Jord.*

- cephalariae*. *E. spini* *Schiff.* (Vol. 2, p. 222, pl. 31 b, c). — We are reproducing an illustration of the form **cephalariae** (11 b), already mentioned in Vol. 2, p. 222. — ab. **lurida** *Gschw.* denotes ♂♂ of impure yellow ground colour. — ♀-ab. **infumata** *Gschw.* has upper and undersides uniformly dusky; all patches that are normally paler or white are clouded over. Hungary. — ♂-ab. **dilutibasis** *Gschw.*, also from Hungary, has a very pale basal area, almost of the same shade as the central area. The 1st transverse stripe is formed of three lines, of which the inner and outer ones are dark brown, whilst the central one is pale diffuse brown; the two dark brown lines extend to the costal area, the stripe itself is almost straight and vertical to the hind margin of forewings. The outer area of all wings is paler than in name type form. Underside almost identical with upperside. — ab. **albescens** *Gschw.* is a bred ♂ from Lundenberg with predominant white ground colour on all wings, especially the central area of hindwings is strikingly pale whitish grey over its entire area.
- conjuncta*. — ab. **conjuncta** *Gschw.* has 1st and 2nd transverse lines of forewings conjoined by a dentation of the latter in cellule 1 and on the 2nd analis. On hindwings the two transverse lines are conjoined from the 2nd cubitalis to the hind margin. Underside of all wings is normal. — ab. *continua* *Schultz* (Vol. 2, p. 222) should actually be **contigua** *Schltz.*
- citrina*. *E. pavonia* *L.* (Vol. 2, p. 222, pl. 31 c). — ♀-ab. **citrina** *Gschw.* has pale lemon yellow colouration.
- brunnea*. — ♀-ab. **brunnea** *Gschw.* quite buff. Both varieties from around Vienna. — ♀-ab. **erythrina** *Schltz.* has dull rusty red ground colouration to all wings, which uniformly covers the whole area and the typical markings stand out sharply and clearly. — **alboplaga** *Gschw.* (= *albophaga* *Boll.*) denotes very pale specimens in both sexes. Size and markings are normal, but the colours are so much paler that the ♂ ocelli are on creamy white and those of the ♀ on pure white ground. The creamy white areas between the 1st and 2nd transverse lines and between the 1st mediana and 1st cubitalis on the upperside of hindwings are quite especially striking. — ♀-ab. **saturation** *Schltz.* is the counterpart to the preceding form. It is very dusky but by no means identical with *infumata* *Newnh.* (Vol. 1, p. 223). The margins of all wings are intensively grey-black, in front of same there is a very narrow, but distinct pale transverse line. Basal area, central area below the ocelli and also the submarginal area are very dusky grey-black. The white areas contrast sharply



from the dark patches and are very distinctly outlined. — **vidua** *P. Schulze* are ♀♀ from the neighbourhood *vidua*. of Berlin, on which all the brown markings are more or less replaced by black, also the marginal edge of all wings is blackish inwardly towards the pale band, reddish on hindwings. In place of the zigzag band on forewings there is a narrow reddish line which is only distinctly incurved at one spot towards the inner margin. At apex there are similarly a few supernumerary red scales. Underside corresponds to upperside in colouration and markings. — **luteata** *Rocci* from Piedmont is a ♂ which has ochreous yellow basal area in- *luteata*. stead of brown. — ab. **micropis** *Lenz* denominates specimens of both sexes with ocelli of only half the size *micropis*. of normal *pavonia* \*). — In **melanopis** *Stätterm.* the blue, as well as the red crescents in the ocelli are ab- *melanopis*. sent, so that the centre of the ocelli is merely surrounded by a yellow ringlet. The black surround is much enlarged, especially on the inner side. The ♀♀ have hindwings with faintly roseate hue. — **caeca** *Stätterm.* *caeca*. have no mirror effect markings in the ocelli. The ocelli are more or less simply filled with deep black scales. — **conjuncta** *Gschw.* is a ♀ of *meridionalis* *Calb.* (Vol. 2, p. 223) which we are now illustrating (11 b). It occurs *conjuncta*. at Nice and the two transverse lines of both wings are conjoined in cellule 1 by a deep dentation of the 2nd transverse line. Underside is normal. — In ab. **laeta** *Lenz* the dark band before the margin of forewings *laeta*. is pale yellow-grey. Upper Bavaria. — In contrast to *meridionalis* (11 b) which is often very large, we have the small form **alpina**, already mentioned in Vol. 2, p. 223. We are now giving an illustration of same (11 a). *alpina*. — ab. **josephinae** *Schaw.* (11 a) is a ♀ from Chiclana, Spain, with very dark blackish bands which are of quite *josephinae*. similar formation to those of *spini*. — ab. **atromaculata** *Stätterm.* has the red of the apical spot almost com- *atromaculata*. pletely replaced by black, which continues in the marginal band. The black costal spot is much enlarged and conjoined with the apical spot by a faint streak. Marginal band of hindwings is similarly black, paler towards the anal region. The yellow ringlets of ocelli on all wings are reduced, the blue crescents on the other hand enlarged. Wings are dusted with blackish, but nevertheless retaining their hyaline character. Markings are distinct, but all the lines show a tendency to spread out and become confluent. — ab. **homophora** *Bryk* *homophora*. is an aberration of the veins. The 2nd cubitalis on all wings is forked, i. e. there is a supernumerary branch nervule.

#### A. Hybrids with *pyri*.

hybr. **macrotaos** *Rbl.* (11 a) is a new name for hybr. *major* *O.* (Vol. 2, p. 223), which became necessary *macrotaos*. for purposes of classification and nomenclature. We are giving an illustration of this hybrid.

hybr. **witzenmanni** *Gschw.* = *pyri* ♂ × *atlantica* ♀; shape of wings in both sexes as those of *atlantica*. *witzenmanni*. In size the hybrid only exceeds that of the female parent slightly. Underside about midway between that of the parents. On account of the shorter spur on the fore tibiae and smaller size it differs from:

hybr. **atlantpyri** *Niep.* = *atlantica* ♂ × *pyri* ♀; shape of wings has rather less inclination towards *atlan-* *atlantpyri*. *tica*. *atlantpyri* differs from *numida* *Aust.* (Vol. 2, p. 221) on account of a dark stripe of about 2 mm breadth standing off fairly well in the disc on upperside of hindwings and which extends from costal margin to ocellus. This is absent in *numida*. *numida* is probably a secondary or tertiary hybrid with *pyri* *Schiff.* as female parent.

♀ hybr. **julii** *Gschw.* = *pyri* ♂ × *spini* ♀. Neuration is midway between that of *pyri*, *spini* and *pa-* *julii*. *von*. Wing contour inclines to resemble *spini* on forewings, but *pyri* on hindwings. Was bred from a larva found at Hohenau in Lower Austria.

hybr. **standfussi** *Wisk.* (11 b) and **daubi** *Stdfs.* (11 d) which were both mentioned in Vol. 2, p. 223, *standfussi*. are now being illustrated here, similarly the pale grey specimens of *daubi*, which have been denominated *daubi*. *emiliae* *Stdfs.* (11 c).

hybr. **herberti** *Ronn.* = hybr. *schaufussi* *Stdfs.* ♂ (= *pavonia*-♂ × *spini*-♀) × *pavonia*-♀: is midway *herberti*. between *pavonia* and *spini*.

hybr. **gremmingeri** *Eh.* = hybr. *herberti* *Ronn.*-♂ × *herberti*-♀: as the parent forms. *grem-*

hybr. **grossei** *Eh.* = hybr. *herberti* *Ronn.*-♂ × *pavonia*-♀: more closely resembles *pavonia*. *grossei*.

hybr. **hedvicae** *Cast.* = hybr. *schaufussi* *Stdfs.* ♂ × hybr. *grossei* *Eh.* ♀ has characteristics of *spini*. *hedvicae*.

hybr. **emiliana** *Cast.* = hybr. *hedvicae* *Cast.* ♂ × hybr. *hedvicae*-♀: has characteristics of *spini*. *emiliana*.

hybr. **pokornae** *Cast.* = hybr. *bornemanni* *Stdfs.* ♂ × *hedvicae* *Cast.* ♀: has characteristics of *spini*. *pokornae*.

\*) This form is most probably the same as *reducta* *Schltz.* (Vol. 2, p. 223).



Genus: **Aglia** O.

- strigulata*. *A. tau* L. (Vol. 2, p. 224, pl. 35 a, b). — ab. **strigulata** Hoffm. are ♂♂ with stripes of forewings formed of 2 flat arcs, extending over the entire wing and the point of same, where the arcs meet is very close to the ocellus. — ab. **radiata** Lenz is a ♂ from Herrsching in Bavaria with 5 paler rays between the ocellus and the band of forewings. — ♂-ab. **macropis** Lenz. represents specimens with unusually large ocelli. — **hemitaenia** Schaw. is a ♂ from Hütteldorf which is very pale and sparsely dusted, only on hindwings is the black submarginal well developed, whilst same is missing on upper and undersides of forewings. — ab. **androides** Hnrrch. are ♀♀ of ♂ colouration, which REBEL had already mentioned in BERGE, without giving a denomination. — **obsoleta** Lamb. has the black of ocelli strongly developed, especially on hindwings the characteristic T-shaped mark is almost extinct and replaced by a pale blue mark of indefinite shape. — ab. **hüttneri** Stich. denotes specimens in which the characteristic ocelli and T-shaped marks on forewings are entirely absent. The wings therefore have no markings other than the blackish, rather faint submarginal band and a faint dusting at base. On hindwings the discal ocelli are reduced to small black spots of pinhead size.
- impulverea*. Similar to *caecata* Schltz. — ab. **impulverea** Nitzsche is a ♂ from Hermannskogel in which on the underside of the wings, the blackish dusting which for instance occurs especially in the apical part of forewings and along the costal margin of hindwings in normal specimens, is completely absent. — **dealbata** Günn. is characterised by the obsolescent white markings on underside. — ab. **cuspidata** Linst. is a ♀ of 70 mm expanse and usual, but somewhat darkly dusted colouration. In hindwings the ocellus is elongated to a point towards the margin, the blue pupil of same is missing and the T-shaped mark is grey and indistinct. The black scales are intermixed with white. Above the elongated ocellus there is a grey cloud in cellule 5, which corresponds to a black spot on underside. On hindwings the discal line is more distinct than on forewings and also here the ocellus is extended to a point which touches the discal line. The blue pupil is distinct, the white T-shaped mark often wide and sharply pronounced. On underside the black dusting is especially marked on hindwings. Also all the markings are very clearly defined there. — ab. **huemeri** Std. The dark subterminal line that usually extends a short distance from outer margin on upperside of both wings, is either entirely absent, or it is at all events quite free of any trace of black scales. In its place is at best a 1 mm wide violet-brown, pale shade which however is more or less distinctly visible. The ♀ has a white stripe along the costa of forewings, which is just off the margin and begins above the ocellus and ends at the white costal spot just before apex of wings. The ocelli incline to decrease in size. On underside the dark markings which traverse the wings from costa to hind margin are entirely absent on hindwings. This is the most striking feature of this remarkable form. The black stripe before the outer margin is heavier and darker than in name type form. This form also occurs, but rarely in *melaina* Gross (Vol. 2, p. 224). — **amurensis** Jord. was only described in Vol. 2, p. 224, we are now giving an illustration (11 d). — ab. **flavorosea** Kard. (11 d) from the Ussuri territory belongs to the preceding form. Upperside of all wings is tinged pinky yellow instead of yellow-buff, similar to the Japanese *tau*, but without the shadowy marks on forewings, only a submarginal line on both wings. — We are now also giving illustrations of *melaina* Gross and the Weissmann form **subcaeca** Strd. (11 c) which were only mentioned in Vol. 2, p. 224 but not illustrated.

## Addendum.

Genus: **Ludia** Wallgr.

- hansali*. **L. hansali** Fldr. (Vol. 14, p. 341, pl. 59 a). This species, which is illustrated in the African part of this work, occurs in Morocco and thereby reaches the boundary of palaearctic territory. Otherwise the species is purely an ethiopian one. It is interesting to observe that also in East Africa the corresponding *Ludia* form to *hansali* approaches the palaearctic boundary in Eritrea. (SEITZ.)



## Alphabetical List

with references to the original descriptions of the forms of palaearctic Saturniidae mentioned in Supplementary Volume 2.

\* signifies that the form is also illustrated in the place cited.

- abeli Sat. *Gschw. Ztschr.* Oesterr. Ent. Ver. 8 (1923), p. 79.  
 aignerii Sat. *Pill.* Rovart. Lapok. 16 (1909), p. 82.  
 albescens Eud. *Gschw. Verh. Zool.-Bot. Ges. Wien* 69, p. 71.  
 alboplaga Eud. *Gschw. Verh. Zool.-Bot. Ges. Wien* 69, p. 67.\*  
 alpina Eud. *Favre Mitt. Ent. Schweiz. Ges.* 10, p. 36.  
 alticola Sat. *Denso Iris* 26 (1912), p. 128.  
 amnrensis Agl. *Jord. Seitz Macrolep.* 2 (1911), p. 224.  
 andrewesi Sam. *Deb. Lambillionea* 29, p. 65.  
 androides Agl. *Hurch. Deutsch. Ent. Ztschr.* 1916, p. 511.  
 apollo Act. *Röb. Entomol. Mitt.* 12 (1923), p. 59.  
 atlantipyri Sat. *Niep. Int. Ent. Ztschr.* 5 (1912), p. 291.  
 atromaculata Eud. *Stätt. Ztschr. Oesterr. Ent. Ver.* 4, p. 60.  
 attingens Sat. *Gschw. Verh. Zool. Bot. Ges. Wien* 69 (1919), p. 68.  
 bicolorata Sam. *Mezg. Lambillionea* 28 (1928), p. 102.  
 brunnea Eud. *Gschw. Ztschr. Oesterr. Ent. Ver.* 8 (1923), p. 80.  
 brunnea Sat. *Gschw. Ztschr. Oesterr. Ent. Ver.* 8 (1923), p. 79.  
 caeca Eud. *Stätt. Ztschr. Oesterr. Ent. Ver.* 4 (1920), p. 60.  
 chengtiana Anth. *Wts. Entomologist* 56 (1923), p. 171.  
 chinensis Cal. *Rbl. Verh. Zool.-Bot. Ges. Wien* 1926, p. 143.  
 cinnamomea Anth. *Niep. Entomol. Ztschr.* 42 (1929), p. 264.  
 citrina Eud. *Gschw. Ztschr. Oesterr. Ent. Ver.* 8 (1923), p. 80.  
 conjuncta Eud. *Gschw. Verh. Zool.-Bot. Ges. Wien* 69, p. 70.\*  
 conjuncta Sat. *Gschw. Iris* 26 (1912), p. 128.  
 conjuncta Sat. *Gschw. Verh. Zool.-Bot. Ges. Wien* 69, p. 69.  
 configua Eud. *Schtz. Entom. Ztschr. Stuttgart* 23 (1909), p. 36.  
 cuspidata Agl. *Linst. Int. Ent. Ztschr.* 7 (1913), p. 173.  
 defaseia Sat. *Gschw. Ztschr. Oesterr. Ent. Ver.* 8 (1923), p. 79.  
 derosata Peris. *Schaw. Verh. Zool.-Bot. Ges. Wien* 64, p. 358.  
 dilutibasis Eud. *Gschw. Verh. Zool.-Bot. Ges. Wien* 69 (1919), p. 70.\*  
 emiliana Eud. *Cast. Int. Ent. Ztschr.* 16 (1923), p. 210.  
 erythrina Eud. *Schs. Entom. Ztschr. Stuttgart* 23 (1909), p. 37.  
 fenestrella Sam. *Mezg. Lambillionea* 28 (1928), p. 102.  
 flavosca Agl. *Kard. Entom. Mitt. Dahlem* 17 (1928), p. 417.  
 francki Anth. *Wts. Entomolog.* 51 (1923), p. 171.  
 francki Dict. *Wts. Trans. Manch. Ent. Soc.* 1919, p. 35.\*  
 galliaegloria Gra. *Oberth. Ét. Lép. Comp.* 20, p. 170; 21.\*  
 gremmingeri Eud. *Eh. Ztschr. Oesterr. Ent. Ver.* 6 (1921), p. 12.  
 grisea Sat. *Gschw. Ztschr. Oesterr. Ent. Ver.* 8 (1923), p. 79.  
 grossei Eud. *Eh. Ztschr. Oesterr. Ent. Ver.* 6 (1921), p. 13.  
 haraldi Neor. *Schaw. Mitt. Münch. Entom. Ges.* 1922, p. 40.  
 handeri Agl. *Schtz. Entomol. Ztschr.* 22 (1908), p. 160.  
 hansali Eud. *Fldr. Reise Novara Lep.* 4, Taf. 89.\*  
 hedvicae Eud. *Cast. Int. Ent. Ztschr.* 15 (1921), p. 75.  
 hemitaenia Agl. *Gschw. Ztschr. Oesterr. Ent. Ver.* 9 (1924), p. 90.  
 herberti Eud. *Ronn. Ztschr. Oesterr. Ent. Ver.* 3 (1918), p. 35.\*  
 heterogyna Act. *Mell Entomol. Rundsch.* 31 (1914), p. 31.\*  
 huemeri Agl. *Stndf. Entomol. Ztschr.* 26 (1912), p. 1.  
 hiittneri Agl. *Stich. Entomol. Ztschr.* 21 (1907), p. 100.  
 impulsorea Agl. *Nitsche Verh. Zool.-Bot. Ges. Wien* 60, p. 221.  
 infumata Eud. *Gschw. Verh. Zool.-Bot. Ges. Wien* 69, p. 70.\*  
 inversa Anth. *Tutt Entomolog.* 13 (1878), p. 154.  
 josephinae Eud. *Schaw. Ostheld. Schm. Südb.* 1 (2), p. 219.\*  
 julii Eud. *Gschw. Verh. Zool.-Bot. Ges. Wien* 69 (1919), p. 57.\*  
 kolleri Sat. *Gschw. Verh. Zool. Bot. Ges. Wien* 1919, p. 67.\*  
 lacta Eud. *Lenz Osthelders Schmett. Südb.* 1 (2), p. 219.\*  
 latifascia Sat. *Gschw. Verh. Zool.-Bot. Ges. Wien* 1919, p. 67.  
 lugubris Anth. *Niep. Int. Ent. Ztschr.* 22 (1928), p. 187.  
 lurida Eud. *Gschw. Ztschr. Oesterr. Ent. Ver.* 8 (1923), p. 80.  
 luteata Eud. *Rocci Atti Soc. Ligur.* 24 (1914), p. 141.  
 macropis Agl. *Lenz Osthelders Schmett. Südb.* 1 (2), p. 220.  
 macropis Sat. *Gschw. Verh. Zool.-Bot. Ges. Wien* 69, p. 69.  
 macrotaos Eud. *Rbl. Verh. Zool.-Bot. Ges. Wien* 69, p. 60.\*  
 manonis Dict. *Mats. Journ. Coll. Agr. Hokk.* 19, p. 51.\*  
 melaina Anth. *John Int. Ent. Ztschr.* 22 (1928), p. 318.  
 melanopis Eud. *Stätt. Ztschr. Oesterr. Ent. Ver.* 4 (1920), p. 60.  
 melanopis Sat. *Gschw. Ztschr. Oesterr. Ent. Ver.* 1923, p. 79.  
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 perrupta Sat. *Gschw. Verh. Zool.-Bot. Ges. Wien* 1919, p. 69.\*  
 pokornae Eud. *Cast. Int. Ent. Ztschr.* 16 (1923), p. 210.  
 punctata Sam. *Mezg. Lambillionea* 28 (1928), p. 102.  
 radiata Agl. *Lenz Osthelders Schmett. Südb.* 1 (2), p. 220.  
 redueta Sat. *Gschw. Ztschr. Oesterr. Ent. Ver.* 8 (1923), p. 79.  
 strigulata Agl. *Hoffm. Jahr. Ber. Wien. Ent. Ver.* 26 (1916), p. 3.\*  
 transcasicca Peris *O. B.-H. Horae Macrolep.* 1 (1927), p. 78.  
 umbrosa Sat. *Ami. Int. Ent. Ztschr.* 23 (1929), p. 66.  
 unicolor Peris. *Schz. Entomol. Ztschr.* 24 (1910), p. 65.  
 vidua Eud. *Schze. Deutsch. Ent. Ztschr.* 1915, p. 458.\*  
 viridis Sam. *Mezg. Lambillionea* 28 (1928), p. 102.  
 watsoni Sam. *Oberth. Ét. Lép. Comp.* 9 (2), p. 256.\*  
 wiskotti Peris. *Niep. Strands Lep. Niepelt.* 1, p. 19.\*  
 witzmanni Sat. *Gschw. Verh. Zool.-Bot. Ges. Wien* 69 (1919), p. 63.\*







## Family: **Sphingidae**, Hawk Moths \*).

Since the publication of the 2nd Volume of the main Series many new species, subspecies and forms have been described. But there have been a greater number of discoveries in regard to the early stages of many species, which were hitherto unknown, as well as other important and interesting biological observations. Especial credit is due to MELL, who at personal sacrifice has carried out scientific researches in China and who has recorded his labours in his valuable work „Fauna Sinica“, which will be of the greatest interest to every entomologist. Anyone who is keen on the subject and who takes entomology seriously or who is interested in breeding or does breed personally, will peruse this work with the greatest interest, as some of his observations are simply amazing.

In addition to what was stated in Vol. 2, p. 229 we must remark here that MELL ascertained that certain *Sphingidae* larvae hibernate in the larval stage. This hibernation however does not coincide with any cessation in the development of the larva, as same hibernate when fully grown and ready for pupation. It is thus in a prae-pupal state and has not lost its capacity for movement; this is retained until shortly before pupation. Larvae that have been in the earth for several months, have crawled away on being disturbed.

All that is said below when discussing the various species in regard to data of the early stages and biology is taken from MELL's work, unless otherwise stated. Neuration according to ROTHSCILD & JORDAN.

### 1. Genus: **Acherontia** O.

Contrary to what was said in Vol. 2, p. 232 and according to MELL, the *Acherontia* species do not visit flowers.

**A. lachesis** F. (Vol. 2, p. 232, pl. 36 a). The death's head mark on thorax and especially behind same, *lachesis*. often interspersed with cherry-red scales. — Ova cream coloured, longer (2 mm) than wide, frequently several on one leaf. — ab. **radiata** Niep. without the black discal band on hindwings, on the other hand the veins *radiata*. are black in the ordinarily yellow disc. Outer marginal band of hindwings is narrow, the black basal spot duller.

**A. atropos** L. (Vol. 2, p. 232, pl. 36 b). — ab. **obscurata** Closs. The large yellow apical patch of fore- *obscurata*. wings is grey-black, so that excepting for a slight indication on costa, it has disappeared. Discal bands of hindwing faint and asymmetrical. — f. **diluta** Closs has markings of forewings diffuse. All red-brown patches *diluta*. are grey-brown and scarcely discernible; the pale transverse bands are merely indicated by a few grey-white spots and the entire forewings are suffused with silvery grey. Hindwings dull yellow, inner band narrow and straight, both bands grey-brown instead of black. — ab. **myosotis** Schaw. has ground colour of fore- *myosotis*. wings bluish grey instead of black-brown, whilst head, thorax and dorsal band are light blue-grey. — ab. **confluens** Dhl. has outer band of hindwings so enlarged that the entire outer half of wing is black and only *confluens*. the basal area remains yellow. — ab. **moira** Dhl. has forewings so heavily darkened that the markings are all *moira*. merged in a unicoloured brownish black-grey except for the stigma. — The finest of all the *atropos* aberrations is without a doubt ab. **violacea** Lamb. It is a dusky specimen with quite straight discal band on hind- *violacea*. wings but which however is chiefly remarkable owing to the upperside of the antennae, head, palpi and forewings being covered with a glossy violet sheen, almost like that of *Apatura iris*.

**A. styx** Ww. (Vol. 2, p. 232). — In ab. **interrupta** Closs the outer black band of hindwings is dissolved *interrupta*. into small spots on the veins.

\*) As already stated, this family is not numbered, as in the old works it was not included in the series of the other families of the *Bombyces*; compare Vol. 2, p. 3 and 229.



2. Genus: **Herse** Oken.

*fasciata.* *H. convolvuli* L. (Vol. 2, p. 233, pl. 36 a). — ab. **fasciata** Pillich (mentioned in the original description as "*Protoparce*") has wide, dentate blackish central bands on forewings. — subsp. **peitaihoensis** Clark from *peitaihoensis.* Pei-tai-ho, N. China. The usual sexual dimorphism of *convolvuli* is absent here. Both ♂ and ♀ have white ground colour, on which the dark markings sharply contrast. — **aksuensis** O. B.-H. ♂. This subspecies from Aksu (*aksuensis.* Central Thien Shan) is remarkably pale, the forewings are almost whitish grey with reddish stripes below the stigma; the 4 bands of hindwing distinct. ♀ grey-white. (*peitaihoensis* and *aksuensis* appear to be identical; I have not seen specimens of them both.)

3. Genus: **Meganoton** Wkr.

*analis.* **M. analis** Fldr. (Vol. 2, p. 234, pl. 36 c). The following is now known regarding the early stages (according to MELL): Ova yellowish, glossy and relatively very small. The monophagous larva (food plant: *Sassafras Tzumu Hemsl.*) is monochrome green, each segment with a belt of yellowish short conical humps; 10th segment below the oblique stripe and entire 11th segment smooth, no humps, abdominal fold and claspers with dense, large conical humps of pale brownish colouration. Only the 7th oblique stripe is present, it is widely pale yellow and extends to the horn. This is the only marking. — Pupa dark brown, slightly glossy, the sheaths of the limbs are not dilated. Cremaster bold, conical, ending in a short, glossy bifurcated tip.

4. Genus: **Psilogramma** R. & J.

*eburnea.* *P. menephron* Cr. (Vol. 2, p. 234 and Vol. 10, pl. 60 d). Of this very variable species Closs has designated an extreme aberration ab. **eburnea**. The pale spots of forewings are extended forming 2 heavy yellowish white dentate bands, of which the outer one expands forming a large patch of the same colour. Hindwings with yellow costa and large yellow anal spot. W. China.

*incrata.* **P. incrata** Wkr. (Vol. 2, p. 234, pl. 36 b). In Vol. 2 Dr. JORDAN enumerated *incrata* as a subspecies of *menephron*. MELL, with abundant material available, has been able to ascertain \*) that *incrata* is a separate species and says: the main food plants of the larvae of the two species are different. The larvae can be differentiated after the 2nd moult. In breeding the two species at the same time hybridism did not occur, although 6 copulae took place in one night and 30 in a fortnight. The imago differs as follows: *menephron* has breast and underside of abdomen heavily intermixed with grey scales. Forewings generally with whitish markings in postdiscal area. *P. incrata* is smaller. Underside of body as far as and including 5th segment, white. Forewings without whitish markings, but discal streaks more pronounced. Proboscis shorter. — According to MELL the *Psilogramma*-♂ when excited emits a clear chirping tone, which is in higher key and less loud than that of the *Acherontia*. This sound is not created by the tongue case, which is not moved during the stridulation, but through active, lateral, sideways movements of the anal segment; if one holds this tight, the chirping ceases. ♂♂ that were encircling the ♀♀ prior to copulation emit the stridulation sound. It does not appear to be a defensive measure: MELL observed giant toads, birds and bats making a meal of chirping *Psilogramma*! — Ova relatively small, pale watery green in colour. They are deposited singly on the underside of young leaves and shoots. Differences between the two species not discernible. — The larvae of the two species differ as follows: *P. menephron* is always of green colour, cones on abdominal fold and claspers green, broad and not numerous; centre of stigmata narrowly black, edge simple; pupa colouration dull, impure brown. *P. incrata*: colour of body green or heavily brown mottled; cones on abdominal fold and claspers smaller and more numerous, the tips dark, centre of stigmata wide, edge double; pupa colouration glossy lilac brown. — It is very difficult to induce the depositing of ova in captivity. MELL had abundant material and every possible facility but had scarcely any success. Only one ♀ deposited, but it laid only 8 ova, which collapsed already the following day.

4. (bis) Genus: **Pseudodolbina** Rothsch.

The Genus has hitherto only been dealt in Vol. 10, p. 530, as it was not until 1926 that a subspecies of the two known species was ascertained on palaearctic territory. The rather small moths remind one of the american Genus *Dolba*. The 1st hind tarsal joint is shorter than the tibia and is not longer than the 2nd to 5th tarsal joints together. Aedagus with a single long and pointed spur which is directed towards the right.

*celator.* *Ps. fo* Wkr. (Vol. 10, p. 530, pl. 60 e). — subsp. **celator** Jord. can only be differentiated from the main type form by the harpe of the ♂ which has a spur near the apex ventrally, which can vary in size.

\*) Fauna Sinica II. 1922.



5. Genus: **Sphinx** L.

*S. ligustri* L. (Vol. 2, p. 235, pl. 36 c). — ab. **grisea** Closs (12 c) is a curious individual form, which *grisea*. on account of its grey colouration without any admixture of rose reminds one of the related american species *drupiferarum* Abb. & Sm. (Vol. 6, p. 860, pl. 95 c). Also hindwings and abdominal spots are grey instead of red. — A similarly very extreme aberration is ab. **perversa** Gehlen (12 b). Forewings with sharply outlined *perversa*. dark area towards base. On hindwings the two inner black bands are completely merged throughout their length, leaving however the rose basal area free and forming (when set) a continuation of the dark surface of forewings. As the black outerband is displaced outwardly a wide rose central band is created. — ab. **unifasciata** Gschw. has the two inner black bands absent, whilst the third, outer one is expanded and diffuse *unifasciata*. inwardly. The red of hindwings is very pale outwardly and duskily dusted over. — Two subspecies of *ligustri* are to be mentioned, one being from N. Africa, where until 1916 *ligustri* had not been captured, the other is from East Asia closely resembling *constricta* Btlr. and possibly only an aberration of same, as it is described from a single specimen: — **nisseni** R. & J. from Algeria reminds one of a dark european *ligustri*. Forewings without *nisseni*. yellowish tone; the 2 grey submarginal lines being confluent before the outer margin. On hindwings the 1st and 2nd black bands are wide and conjoined from near the cell to the abdominal margin; the black submarginal band is wider than the red discal band and the blackish grey margin is wider than in *lig. ligustri*. Underside darker; the black discal band of forewings uniformly black without any indication of subdivision. The black median band of hindwings expands behind the 2nd median and the grey band on its outer edge is not so distinct as in *lig. ligustri*. ♀ not yet known. — **chishimensis** Mats. from the Kurile Islands (Shiko- *chishimensis*. tan) is very similar to *constricta* Btlr. (Vol. 2, pl. 36 c). The main difference is that the two inner black bands of hindwings form a single band without a trace of rose between; the outer band is broader and therefore the margin is narrower. The pale rose median band is, according to the original description, abt. 4 times as wide as in *constricta* (?). On underside forewings have a wider pale postmedian band. Hindwings with 2 equally wide black bands (in *constricta* the outer one is paler) of which the inner one is not distinctly dentate along the veins; the white band between these bands is whiter. ♀ unknown.

*S. pinastri* L. (Vol. 2, p. 235, pl. 36 d). — ab. **albescens** Cockayne. From England. Body and wings *albescens*. cream coloured. Wings with sparse brown scales, the two transverse bands of forewing and the space between same at hind margin pale buff; apical streak and the 3 streaks behind same also buff. Longitudinal streak on thorax buff; that on abdomen similar to grey-brown. — ab. **vittata** Closs is a fairly common form with *vittata*. well developed transverse bands with dark streaks. — ab. **ferrea** Closs is a fairly dark, iron-grey form, which can *ferrea*. scarcely be differentiated from the type. — ab. **albicolor** Cockayne is also from England and only differs from *albicolor*. ab. *albescens* Cockayne by a denser interspersation of brown scales, so that it appears darker. Also the dark markings of body are darker. In both aberrations the blue-grey tone of the main type form is absent. — ab. **rubida** Cab. is red-brown on upperside of wings and thorax, streaks are brown-black, abdominal markings *rubida*. typically black. — ab. **stehri** Stephan (12 b) is remarkable owing to the strong contrast between fore and *stehri*. hindwings. The former are grey-white, whilst the latter are black with white streaks along costa; the central shade and the streaks on forewings are very prominent. Also patagia are white with narrow black longitudinal stripes; captured on the Kapuzinerplatte near Bad Altheide. — ab. **semilugens** Andreas is a nice form *semilugens*. with dark brown or black central area to forewings, which is edged on both sides by grey-white, thus forming a black band with white borders. — Finally we have ab. **minor** Stephan with indistinct apical streak and *minor*. abdominal marks; the dark marginal spots are absent and length of forewings is only 27—29 mm (this seems to be a degenerate or starved form). — Now follow 5 subspecies described by Dr. JORDAN, one being east-asiatic and the others, remarkable to relate, european. The latter vary from one another, solely by the different structure of the sexual apparatus. In all therefore there are now 7 *pinastri* subspecies known, which Dr. JORDAN divides into 3 groups according to the formation of the genitalia (Nov. Zool. XXXVI, p. 243, 1931). The 10th segment, with the exception of the 2 asiatic races, shows only individual differences and therefore has been left out of consideration in the subdivision. The differences refer partly to the aedeagus but chiefly to the valve, respectively the harpe:

I. Upper and lower branches of the harpe fairly equally long, the upper one being widest behind the centre; apical apophysis of aedeagus short: = *pinastri morio* R. & J. (Vol. 2, pl. 36 d), *pinastri arestus* Jord.

II. Upper branch of the harpe much longer than the lower, more or less heavily curved, almost always cylindrical in the apical half, no prongs or only rudimentary. Apical apophysis of aedeagus long: = *pinastri pinastri* L., *pinastri cenisius* Jord., *pinastri medialis* Jord.

III. Both branches of the harpe short, the upper one flat, pronged, triangularly elongated, pointed, proximally wide: = *pinastri massiliensis* Jord., *pinastri maurorum* Jord. — *arestus* Jord. from the mouth of the Amur, i. e. Ussuri territory, is very close to *p. morio* R. & J. from Japan. The black stripe on patagia not as wide as in *morio*, the stripe between this and base of wings fainter grey. Forewings more uniformly grey, the black-brown shade at hind margin and on the disc being less distinct, longitudinal streaks absent or only just traceable, apical streak narrow, white checks in fringe smaller on both wings. On underside the shadowy discal band is narrower on both wings than the grey marginal area (in *p. morio* they are equally large). The ♀ is unknown.



The following 4 subspecies have been denominated owing solely to differences in the genitalia, which have already mainly been stated above: — *cenisius* Jord. from La Grave, high Alps in S. E. France. — *medialis* Jord. from La Châtre, Dep. Indre, mid France. — *massiliensis* Jord. from Marseilles and Ste. Baume, S. France. — *maurorum* Jord. from the Pyrenees, mid Spain and Algeria. It should be remarked here that Dr. JORDAN only had 2 Spanish specimens before him, of which one did not differ from *massiliensis* in the formation of the harpe and should therefore also be named accordingly; according to this both *massiliensis*, as well as *maurorum* occur in Spain. To elucidate the matter further abundant material is essential.

*caliginus.* **S. caliginus** Btlr. (Vol. 2, p. 236, pl. 36 d). — Besides the 2 subspecies mentioned in Vol. 2 there is a 3rd: — *cal. brunnescens* Mell (Vol. 10, p. 531) occurring in S. China. It is a transition between the two, but no longer palaearctic. — According to MELL ova of *caliginus* are the green of fresh pine shoots. — Larva when full grown with 4 distinct longitudinal lines (rarely without stripes), a whitish green longitudinal line at the level of the spiracles and a wide creamy yellow line along the legs. Horn through all moults almost straight, its tip widely furcated, appearing almost like an anchor. Food plant: *Pinus massoniana* Lambert. Pupa dark brown and faintly glossy, darker on forehead and base of sheath of proboscis which is without gloss and slightly rough. — Imago: proboscis about 1/3rd the length of body. — A further species *S. jordanii* Mell (Vol. 10, p. 531) occurs in S. China, but does not extend to palaearctic territory.

## 6. Genus: **Dolbina** Stgr.

*elegans.* **D. elegans** A. B.-H. (12 a) from Syria (Iskenderun) is the smallest known *Dolbina* species. Expanse 39—41 mm. Head and thorax palely speckled, edges of collar and patagia delicately lined with black lines, metathorax with distinct white scales and black scales just where it joins on to paler abdomen. First abdominal segment laterally lighter than the rest. Abdomen without such spotted markings as *exacta* or *tancredi*. Ground colour of forewings grey-black, speckled with whitish grey, especially in central and marginal areas. Base with small white spot on costa. An irregular antemedian double line, which curves inwards before the hind margin and is less distinct anteriorly. There are 3 discal lines that curve outwards in the middle, the outer one is distinct, the inner ones are indistinct especially in the centre where they are partly confluent. A number of fine but clear longitudinal streaks on the disc. The hair-fine black line is very striking, it extends from near the base along 1st submedian to outer margin. Hindwings grey-black with traces of a band in the outer half of wings. Early stages unknown although the species has been bred in Syria.

In regard to the early stages of *Dolbina* species it is remarked that whilst according to GRAESER the larvae and pupae could scarcely be differentiated from those of *S. ocellata*, nevertheless, as MELL asserts in his Fauna Sinica II, there are considerable differences. Only of *D. inexacta* are the ova known, it is a southern species, that does not extend into palaearctic regions. They are relatively large, similar in shape and size to those of *Clanis* but yellow green, faintly glossy and elliptical.

## 7. Genus: **Kentochrysalis** Stgr.

*houlberti.* **K. sieversi** Alph. (Vol. 2, p. 237, pl. 37 a). — subsp. *houlberti* Oberth. from Ta-tsien-lu, W. China. Just as in *sieversi*, only the ♂ is known. Stigma of forewings larger, streaks and apical line more prominent, as the other black markings are more diffuse; thereby it reminds one of *pinastri*. The dark lateral marks on the tergites of the abdomen are smaller and not so conjoined as in the main type form.

## 8. Genus: **Oxyambulyx** R. & J.

Very little was known as to the habits of this Genus when the 2nd Volume was published. It emerges between 8 p. m. to towards the morning and is more irregular in this respect than any other Genus. When at rest, the wings are spread out, only slightly inclining downwards; the edges of the wings cover the sides of abdomen and only that part of the hindwings is visible that corresponds to the colour of forewings. The tip of the body is slightly curved upwards and through its remarkable markings it imitates a head. During the day the moths generally sit on large leaves at about the level of the human head. Each species varies in regard to the degree of liveliness it shows on being disturbed in day time. *schauffelbergieri* is very lively, it has the annoying custom of throwing itself on its back and sliding around, flapping and spoiling its wings. On the other hand *ochracea* is very sleepy, as also are the non-palaearctic *subocellata* and *kuantungensis*. The moths are not attracted to light. MELL has only once observed a single ♂ *ochracea* at light. (Vide further Vol. 10, p. 533 and 534).

*schauffelbergieri.* **O. schauffelbergieri** Brem. & Grey (Vol. 2, p. 239, pl. 37 a and Vol. 10, p. 534). Early stages: Ova, that are deposited singly, pale bright green, longer than wide. — Larva: the green ground colour can change



to white-green, yellow-green, yellow or rusty-red (mottled). No central longitudinal stripe, white subdorsal lines in anterior part, similarly a white line along the legs. 7 oblique stripes of curious blue-white colour, which are characteristic of the Genus. Stigma slightly reniform, graphite grey with white edge. Horn green or at base black-brown, roughly granulose. The larva is monophagous. Food plant: *Pterocarya stenoptera* C. D. C. — Pupa: sleek, dull, cremaster coarse and projecting ventrally, tip with 2 short sharp bristles conjoined at base. — Distribution to South China.

**O. ochracea** *Btlr.* (Vol. 2, p. 239, pl. 37 a and Vol. 10, p. 534). Early stages: Ova pale green. — Larva *ochracea*. brightly coloured. Back and sides yellow-green, underside and below head grey-green. Subdorsal lines distinctly white over the back of the head and 1st segment, thence less brightly yellow as far as and including the 3rd segment, further backwards they diffuse. Narrow but clear ventricular line from 1st to end of 3rd segments. 7 yellowish oblique streaks. In the angles between these and the subdorsal line from segments 4—6 violet-white cuneiform marks, which are often edged by rusty red. In the oblique and longitudinal streaks there are coarse conical humps; on underside of body are small raised white spots. Stigmata of the colour of the skin with brilliant flame-shaped brown-green central stripe. Horn long, slightly curved upwards, grey-green, point short and dull grey. The rusty red edges of the violet-white cuneiform marks vary considerably in size, so that the entire caterpillar can be rusty red or brown with the exception of the cuneiform marks and the green triangle in centre of head; the larva is known to occur also with yellow ground colour. In China the larva is monophagous, the food plant being *Poupartia Fordii* Hemsl. As this plant does not occur in Japan, *ochracea* must feed there on some other Anacardiaceae. — Pupa coarse-grained; cremaster longer than wide, it has a short rectangular glossy bar which is as thick as it is long and from its two extremities on each side a terminating bristle stands out sideways. — The species which was hitherto known from N. India and Japan, also occurs, as was to be expected, in China.

### 9. Genus: **Clanis** *Hbn.*

In Vol. 2 it was stated that the tongue at most extends to the base of the abdomen. MELL has ascertained that it is somewhat longer than half the length of the body. Although the proboscis appears to be capable of functioning, the *Clanis* species have never been observed visiting flowers. They are also not attracted to light. — MELL's observations as to the early stages and biology are very interesting. These refer also in part to the Genera *Leucophlebia* and *Polyptychus*. — Ova greenish yellow, large, longer than wide; deposited singly, but generally several on one plant and by preference in shady spots. Food plants Papilionaceae, plants that are not selected by other *Sphingidae* (excepting *Sataspes*) as regular food plants. — Larva plump (12.5—16 mm in *bilineata*), green, yellow is more frequent in *undulosa* than in *bilineata*. The formation of the horn shows an inclination to reduction, in *bilineata* it is 6—8 mm long, in *undulosa* it is only a short stump of 1 mm. Head with a sharp point until the last moult, after the last moult it is almost semi-circular and very thick; front of the head of different colour, gloss and surface to the back of same; these characteristics make the *Clanis* larvae immediately recognisable. Only in these a variation in the number of moults has been ascertained (4 in autumn broods = dry season period and 5—6 in wet season period). When disturbed the full grown larvae bite with their strong hooked mandibles and in breeding it is advisable to separate large and small larvae. The *Clanis* larva is a small eater (about one leaf a day, about the size and thickness of a large clover leaf). The period until it is fullfed and ready for pupation is correspondingly long (taking about 50 days). It is remarkable that hibernating larvae go into the earth for pupation in the autumn, where however they do not change immediately into a pupa, but they remain in the earth throughout the winter in the larval state and only change into a pupa in the Spring! The prae-pupal state therefore lasts up to 9 months, whilst the actual period in the pupa is only 6—16 days. Similar conditions prevail in the metamorphosis of *Leucophlebia* and *Polyptychus* and probably also in the African *Pseudoclanis*, *Leptoclanis* and *Platysphinx*. MELL reports that *Clanis* larvae that had been 220 days in the earth were able to crawl away on being disturbed! Pupa is sleek, a deep red-brown and resembling a small *Acherontia* pupa; cremaster stout with simple single point. — When at rest the moths fold their wings like a roof, the legs are widely apart, the 3rd pair standing off and in the air, body stretched straight. The moths are comatose and can easily be removed by hand.

**C. bilineata** *Wkr.* (Vol. 2, p. 239, pl. 37 c and Vol. 10, p. 537). The type emanates from Darjeeling. *bilineata*. Japanese and Chinese specimens vary somewhat. Those from N. China form the subsp. **tsingtauca** *Mell.* They *tsingtauca*. are smaller than Indian specimens; body and forewings are more yellow and olive; outer margin of forewings more convex, less retracted before the inner margin; 3 postmedian lines — especially in the ♂ — distinct, also the 2 antemedian lines are clearly recognisable, the 1st postmedian line is heaviest and is generally equally clear below the longitudinal streak, as costally of same; costal spot of forewings reddish leathery colour (pinkish buff) especially in ♂. Southern Chinese specimens are half way between the Indian and the N. China forms. In the south of China a form *acuta* *Mell* (Vol. 10, p. 536) occurs.

*C. undulosa* *Mr.* (Vol. 2, p. 239, pl. 37 b). — subsp. **jankowskii** *Gehlen* (12 c) from Saishin, N. Corea *jankowskii*. is more darkly marked over the entire upperside than the type form, the lunae, especially on forewings are



black and more heavily marked. Ground colour is more brown than yellow and the pale veins stand in sharp relief, especially in posterior area. Also the black colouration of hindwings is deeper and more extensive. Underside is also darker and all markings are heavier. In South China subsp. *roseata* Mell, *f. pallens* Mell and *f. acuta* Mell also occur; in regard to these compare Vol. 10, p. 536.

### 10. Genus: **Leucophlebia** Ww.

*lineata*.

**L. lineata** Ww. (Vol. 2, p. 240, pl. 37 c). — Ova pale green, roundish. — Special characteristics of the larva are its sleekness, the different colouration of the head to the rest of the body and the only markings which consist of a subdorsal line. Horn carmine red to pale red-brown, tip straightly truncate. The larva feeds up very slowly just as *Clanis*, taking 70 to 80 days! It eats very little quantitatively. Hibernation takes place in the larval stage. Also in summer specimens the prae-pupal stages take on an average double as long as the pupal stage. Just as in *Clanis* larvae it retains its prae-pupal capacity to crawl away. — Pupa roundish, smooth, the skin is thin and dull brown and it wriggles actively. Cremaster situate slightly dorsally, it is short and pointed (slight traces of bifurcation).

### 11. Genus: **Polyptychus** Hbn.

The food plants of both species, so far known to occur on palaearctic territory are tree-like Boraginaceae (which is quite exceptional as a food plant for *Sphingidae*). Young larvae have black bifurcated head-horn, which later on changes to green; after the last (5th) moult it is discarded, the head becomes roundish and tapers off towards the top. Horn bold, 10—13 mm long and roughly granulose. The larvae are generally in pairs on a bush, the ova appear to be deposited in pairs. On being disturbed the full grown larvae react in a curious way, the first 3 segments are rolled back ventrally. Pupae glossy red-brown, constricted on metathorax; cremaster wider than thick, edge rough and glossy black, tip widely bifurcated. Formerly only one specimen each of *trilineatus* and *dentatus* was known from China. MELL has discovered both species in the south of China. Compare Vol. 10, p. 537—538.

*trilineatus*.

**P. trilineatus** Mr. (Vol. 2, p. 240). Ova roundish oval, watery green, very transparent. The young larva has at the commencement its own particular peculiarity, as the first moult takes place before it has eaten any leaf food; a recently hatched larva devours a part of its egg shell and then rests immovable on a rib of a leaf nearby, awaiting the first moult. Besides from the first to the third moult it has an unusually well developed head horn with distinct bifurcation, giving the general impression of a tail at each end. The larval stage usually takes abt. 4 weeks. Also this species hibernates as larva in a prae-pupal state. — It may be assumed that the metamorphosis of *dentatus* Cr. (Vol. 10, pl. 66 a) is similar. The southern Chinese form of *trilineatus* is subsp. *tr. costalis* Mell (Vol. 10, p. 538). Besides there are several subspecies occurring in the tropics.

*draconis*.

**P. draconis** R. & J. (12 d). A species described in 1916 from Thibet, of which only a few specimens are known. Probably the largest *Polytychus* so far discovered; expanse of forewings of ♂ 57 mm, of ♀ 66 mm. Similar to *trilineatus*, but ground colour more ashy grey, mixed with blackish and without the brownish tone. Margins of wings more dentate. Apex of forewings more extended. Distribution of transverse lines on forewings like in *trilineatus*. Both discal lines more regularly curved inwards from costal to hind margin, the outer one more distinctly bordered with grey and not bending outwards. The cloudy subapical spot ends at radialis 3. Hindwings paler especially at costal margin. On underside of forewings the outer blackish line very faintly indicated (almost extinct in ♀) and edged outwardly by a distinct grey-white line. The inner discal line is extinct. The inner discal line on underside of hindwings is more heavily marked, the outer one almost extinct, the entire outer marginal area is very dark and contrasts sharply from the inner area of wings, as it is also edged on its inner border by a grey-white line. Genitalia are entirely different to those of *trilineatus* and *dentatus*. The 10th tergite ends in a wide, blunt hook; the sternite is a large shield, which is convex on the upperside and incurved apically, the two lobes separated by this intersection are widely round and slightly bent downwards. The valve is much larger than in *trilineatus* and outwardly intersected. (In spite of the plate number indicated, this species was not illustrated in Vol. 10.)

### 12. Genus: **Marumba** Mr.

*complacens*.

**M. gaschkewitschi complacens** Wkr. (12 d and Vol. 2, p. 241). — Ova elliptical, the bright pale green of a fresh leaf. — Pupa dark brown and coarse-grained; cremaster with 2 closely approximate points. —

*irata*.

subsp. **irata** J. & K. (12 e) from Thibet, is denominated as a species by J. & K., it is however a subspecies of *gaschkewitschi*, which can readily be differentiated from *g. complacens*, to which it is most closely related. Firstly the fringes of both wings are distinctly white in the interstices between the veins; the 2 outer of the 4 antemedian lines are heavily curved and are parallel to one another, the space between the ante and



postmedian lines is more densely filled with brown; the underside of wings is marked with brighter contrasts; all the lines of hindwings end at the anal angle and are not parallel to one another, in contrast to *complacens*. A sixth subspecies of *gaschkewitschi*, *fortis* Jord. occurs in S. W. China, but does not extend into palaearctic territory; it is very like *g. irata* J. & K.

**M. cristata** Btlr. (Vol. 2, p. 241, pl. 42 e). — Ova ivory coloured, relatively large. — Larva like that of *cristata*. *M. dyras* (Vol. 2, pl. 42 e), but the wide white subdorsal stripe on the head is missing. — Pupa dull, almost no gloss, somewhat sleeker than that of *dyras*; cremaster large and bold, rough. — *M. cristata* occurs in south China in slightly varying forms, viz: the winter form *f. vern. ochrea* Mell and in summer form *f. aest. jo-deides* Mell (Vol. 10, p. 538).

**M. dyras** Wkr. (Vol. 2, p. 241, pl. 42 e). Ova pale ivory colour with dull gloss, very large (2,8 : 2,0 mm), *dyras*. top rather flat and easily recognisable from other *Sphingidae* ova. — Larva varies in colour, it occurs occasionally in yellow to orange colouration (actually however only such found on *Büttneria*) and then has rusty red oblique stripes. On the other hand those found on *Pterospermum*, which has a white underside to its leaves, are occasionally white-green! — Pupa dark brown, slightly glossy, cremaster spines grown together. — The moth is much attracted to light. Vide also Vol. 10, p. 539.

*M. sperchius* Mén. (Vol. 2, p. 241, pl. 38 a and Vol. 10, p. 539). — subsp. **ussuriensis** O. B.-H. Contrary *ussuriensis* to its common occurrence in Japan, *sperchius* is rare in the Amur region; it forms here the above subspecies, which is smaller than the main type form (92—96 mm expanse). Forewings paler, outwardly almost white; hindwings are paler pinky brown. On underside the difference in colour is more marked: costa of forewings and apex almost white, hindwings similarly except for a brown anal spot. — ab. **ochracea** O. B.-H. is an aberration of same with ochreous yellow ground colour. — In the south of China a further subspecies *handeli* Mell occurs; in regard to same see Vol. 10, p. 539.

### 13. Genus: **Langia** Mr.

**L. zenzeroides** Mr. (Vol. 2, p. 242). Ova relatively small, yellow-green, glossy like porcelain. — Pupa *zenzeroides* is about double as stout, as other *Sphingidae* pupae of the same length; the tergites stretching towards the dorsum like wide plump cuneiform bulges; colour inky grey or dark blue grey; lustreless, rigid and almost immovable; smeared with earthy grey and thus resembling a clump of earth or a stone, but not like a live insect (MELL); it has a greater weight than any other known *Sphingidae* pupae, a ♂ weighed 22 g (roughly 8 oz) on the day of pupation. — *Langia* have only one brood. Duration of pupal stage abt. 10 months (from May, June to the following February, March). — When at rest the moths have their wings very obliquely downwards, the abdomen is curved upwards in a falcate attitude. After emerging from the pupa, until complete development of the wings a period of abt. 3 hours elapses! In south China the subsp. *nina* Mell. (Vol. 10, p. 540) occurs.

### 14. Genus: **Parum** R. & J.

**P. colligata** Wkr. (Vol. 2, p. 242, pl. 38 b and Vol. 10, p. 541). Ova small, whitish with faint lustre. *colligata*. Larva green, rarely whitish green, pale, yellow or varying yellow; head round with 2 pairs of white stripes; spiracles sky blue with white longitudinal intersecting streak; segments with white conical belt of humps; 7 oblique stripes; horn straight, granulose, medium length, tip bifurcated. — Pupa dull grey-black, almost without lustre and very immovable; cremaster large with 2 bold pointed straight projections, which bear small lateral projecting spines.

### 15. Genus: **Cypa** Wkr.

This indo-australian Genus was not discovered on palaearctic territory until 1926; only one species was known and that was from India. Today 4 species are known, of which the one occurs in Masuri, N. W. Himalaya touching our territory there. MELL has also found one species in south China. — The characteristics of the Genus, which was dealt with in Vol. 10, p. 541, are as follows: Proboscis very short and weakly; pilifer short with brush of long hairs; head small and with tuft; eyes small and ciliated; palpi small, not correct. Antennae with long end segment that bears a number of spines at or near the tip, the 3 anterior segments small, short, rhomboidal when viewed from the side, closely compressed in ♂, cilia long, cylindrical in the ♀. Outer edge of forewings with irregular lobes, or at all events not straight; 2nd radialis of hindwings below centre of cell, 2nd subcostal nervure on long stalk with 1st radialis, 2nd and 3rd radialis straight; upper angle of cell 90°, lower angle obtuse; costa of hindwings straight.

**C. pallens** Jord. has 2 subspecies of which the one occurs in Sikkim to Assam, the other in N. W. India: **pallens** Jord. (Vol. 10, p. 592) from Masuri, N. W. Himalaya. Probably the largest *Cypa* species. Length of forewings 34 mm in ♀, with 13,5 mm width. Body and basal half of wings grey-brown with faint rosy hue, outer half rather a pale sepia colouration. Forewings with dark stigma, beyond same a diffuse dark



transverse shade. Between this and the marginal shade, the outer marginal area is faintly paler. On the whole it is paler than *decolor* (Vol. 10, pl. 62 c). The pale, almost cream coloured hindwings contrast sharply from the forewings and the body.

### 16. Genus: **Mimas** Hbn.

*tiliae*. **M. tiliae** L. (Vol. 2, p. 243, pl. 38 c). As might be expected in such a variable species, a considerable number of aberrations and forms must be enumerated. First of all TUTT's forms. As already mentioned by Dr. JORDAN in Vol. 2, TUTT sub-divided according to ground colour; the brown, green and bleached forms therefore received a multiple name with the addition of *brunnea*, *virens* and *pallida*. — Further we have: ab. *bimarginalis* Gillm. the spots of central band of forewing are only retained as small marginal spots at costa and hind margin. — ab. *constricta* Gillm. has a complete band, but same is reduced in size to a narrow faint stripe. — ab. *excessiva* Gillm. has the anterior spot of the band enormously increased, whilst the posterior one is small. — ab. *trimaculata* Bromb. the anterior spot of band is intersected in 2 parts. — ab. *inversa* Gillm. the posterior spot is divided, whilst the anterior one is normal. — ab. *pseudotrimaculata* Gillm. is the same aberration, but the anterior spot does not extend to costa. — ab. *semicentripuncta* Punge is an ab. *centripuncta*, in which the posterior spot is only faintly retained. — ab. *viridis* Closs has pale yellowish green forewings without any variation in the shade of colour at marginal area. — ab. *clara* Closs has red brown central area with green band. — ab. *discifera* Closs the central band has a spot at the costa of the same colour as middle area. — ab. *roseotincta* Schaw. has rosy ground colour with green band and green outer margin. — ab. *vitrina* Gehlen (12 c) is a very remarkable aberration, differing from normal specimens by having a round transparent disk in the size of a pea on both hindwings. — ab. *rufobrunnea* Lenz are red-brown specimens with pale reddish ground colour. — ab. *atroviridis* Lenz are dark green with black green central band. — ab. *atrobrunnea* Lenz are dark brown with black-brown central band. — ab. *marginalis* Mecke has a complete band, but same does not extend as far as costa, ending 2 mm from same. — ab. *griseothoracea* Cab. has a grey-white thorax devoid of markings, only at base of same there are 2 greenish, barely visible dots.

The following denominations are in my opinion synonyms, as the minute differences do not warrant a sub-division: ab. *bimaculata* Gill. = *tiliae vera* L., ab. *colon* Gillm. = *bipuncta* Clark, ab. *fasciata* Gillm. = *transversa* Tutt. One must reject the denomination ab. *maculata* Wllgr., as the description is too vague. According to WALLENGREN one could name all *tiliae* that have the central band divided into any number of spots as ab. *maculata*, therefore also *tiliae vera*.

### 17. Genus: **Callambulyx** R. & J.

*tatarinovi*. **C. tatarinovi** Brem. & Grey (Vol. 2, p. 244, pl. 38 b). — Head of larva extended to a straight point, which is incised at the tip and is red-brown and bifurcate. Larva thicker at front and hind ends; it is completely covered with short pale conical humps; on the markings, lines and pronotum these humps are coarser. Horn 6 mm, glossy and porcelain-like with short dark granulations. — Pupa rich dark brown; cremaster grey-black with glossy black quill, which is bifurcated at tip. — ab. *flavina* Aust. from Japan is pale brown on upper-side with pale buff markings instead of dark green and pale green. The underside is lemon yellow instead of green. The author presumes that all specimens of the 2nd generation have this colouration. As the description is made on the basis of a single specimen (captured in August), one cannot assert, until further material is available, that this is a *f. aest.*, but can only consider same an aberration, which forms a transition to *f. eversmanni* Eversm. (Vol. 2, p. 244).

### 18. Genus: **Smerinthus** Latr.

The genus extends in Asia southwards over the Yangtse-kiang to south China, where MELL discovered *S. planus* Wkr. The area of distribution is therefore enlarged to the 8th degree latitude.

*obscura*. *S. kindermanni* Led. (Vol. 2, p. 244, pl. 38 d). — *f. aest.* *obscura* Closs from Syria is darker than the spring form; also hindwings are darker red. — subsp. *meridionalis* Gehlen (13 a) from Bashahr, N. India (Himalayas 5000 m) on the boundary of the palaearctic territory, is larger than *kindermanni* and has as dark a ground colour as *k. kindermanni*, although it is closer geographically to the pale coloured subsp. *orbota* Gr.-Grsh. and *obsoleta* Stgr. Antennae are dark brown on top; the pale markings of forewings more whitish grey and not so yellowish as the other races. Apex of hindwings rounder, not so pointed; the transverse bands are much more clearly pronounced in the anal angle of hindwings, the most anterior pale stripe expands forming a spot. On underside the carmine red basal area of forewings is edged outwardly by a deep carmine red transverse band. Pulvillus scarcely discernible. Length of forewings 38,5 mm. ♀ unknown. The area of distribution of *kindermanni* has been extended somewhat southwards by its capture in Bashahr. — The area of distribution of *S. caecus* Mén. (Vol. 2, p. 244, pl. 38 d) extends westwards over the Urals into the province of Leningrad, where larvae of the species have been discovered (MOEBERG).



*S. ocellata* L. (Vol. 2, p. 244, pl. 38 d). — ab. **diluta** Closs has markings of forewings diffuse and indistinct, so that the black postdiscal spot stands out prominently. — ab. **flavescens** Neumann has yellow replacing the red on hindwings and underside. — ab. **grisea** Closs with grey-brown instead of red-brown forewings. — ab. **ollivryi** Oberth. is a very remarkable aberration, which gives the impression of being a hybrid. The black ocellus of hindwing is replaced by a buff-brown patch, on which the dark brown veins stand out clearly. Also forewing markings are absent except for a few spots. Locality is the lower Loire.

**S. planus** Wkr. (Vol. 2, p. 245, pl. 38 e). Larva differs from that of *ocellata* chiefly by the green horn, spiracles red-brown, oblique stripes yellowish instead of white. Pupa differs from that of *ocellata* by a faint ivory-like gloss. The end point of the cremaster spine is about double as long. — f. **clarissimus** Mell (12 e) is the north Chinese spring form, of which MELL gives the following characteristics: pale markings on both sides of wings, pure white to „tilleul buff“, the subapical pale spot of forewings more sharply outlined on upperside than the postdiscal. Also on underside the paler patches are clear, especially the subapical spot and postdiscal band, which extends to inner margin; a whitish streak from 2nd radial to inner margin almost equally distinct; on hindwings the inner silvery patch on costal margin is very clear, the postdiscal band not so distinct as on forewings. — subsp. **alticola** Clark from Lungtan, N. China, is a dwarf form, expanse of forewings ♂ 23 mm, ♀ 26 mm. Upperside of forewings is a cinnamon brown, yellowish grey, markings less distinct, ground colour paler than the type form. The red of hindwings is reduced and not so bright.

### 19. Genus: **Amorpha** Ky.

*A. populi populi* L. (Vol. 2, p. 245, pl. 38 e). — ab. **schöngarthi** Closs has no central band on forewings, but 5 sharply dentate transverse bands. — ab. **angustata** Closs with very narrow central band on forewings. — ab. **flavomaculata** Mezg. has yellow-brown basal spots on hindwings instead of red-brown. — ab. *philiponi* Huard is probably identical with ab. *pallida* Tutt. — subsp. **philerema** Djakonov from Bokhara is smaller than *populi* and has ochreous ground colour, the rusty patch on hindwings is absent. Bands faint (this form is presumably identical with *A. amurensis* Stgr., or at all events a subspecies of the latter). — *populi austauti* Stgr. (Vol. 2, p. 245, pl. 39 a) ab. **brunnea** Huard from Algeria is dark brown and gives the impression of an oily specimen; markings diffuse, especially on hindwings.

### 20. Genus: **Haemorrhagia** Grt.

*H. tityus* L. (Vol. 2, p. 248, pl. 40 a) ab. **reducta** Closs has in place of the wide black abdominal belt on upperside only a narrow streak (only one segment is black). — ab. **ferrugineus** Steph. has hyaline parts of wings suffused with rusty yellow. — subsp. **aksana** LeCerf from Morocco is larger than type form, about as large as *fuciformis*. The green of thorax is less yellowish. On forewings the grey basal area is more extended, marginal band blackish.

*H. fuciformis* L. (Vol. 2, p. 248, pl. 40 b). — In ab. **circularis** Steph. the abdominal belt is black like *circularis* in *heynei* Bartel, but wider and intersected by two grey-white silvery glossy semicircles. — ab. **rebeli** Anger shows an increase in the pale red-brown scaling. On forewings and hindwings the margins are very wide, the spot at disco-cellular of forewings is extended to beyond the cell. On hindwings the olive-green basal area is edged outwardly by a wide pale red-brown transverse band with a diffuse outer edge. In consequence and in conjunction with the wide margin, the hyaline area is much reduced. In ab. **musculus** Wgn. all the usually olive-green patches are reddish grey. — subsp. **jordani** Clark from Morocco is larger and darker than european specimens and has dentate marginal areas on fore and hindwings. The cell is more filled out.

*H. croatica* Esp. (Vol. 2, p. 248, pl. 40 e) ab. **obscurata** Closs (12 a) from Dalmatia with dark blackish green forewings. The 2 red abdominal belts very dark red, the 2 anterior segments being black-green. — ab. **rangnowi** Closs from the Kalmück Steppes (Volga) has very narrow red-brown marginal bands to forewings. Hindwings are extraordinarily small and pale without any darker margin. The last abdominal segments are sulphur yellow, the anal tuft is velvety black without any red central mark. On underside the red belts have a yellow spot in centre.

### 21. Genus: **Cephonodes** Hbn.

**C. hylas** L. (Vol. 2, p. 249, pl. 40 d and Vol. 10, p. 544). — According to MELL the full grown larva tapers off towards the front, it is either a delicate green or yellow, an autumn specimen being pale rose-red; head devoid of markings; pronotum bulging in a collar, densely covered with yellow, rarely with white,



pearl-like markings; dorsum widely edged with white, therefore sometimes appearing like whitish porcelain; subdorsally it is clear white, often with reddish tinge on upperside, in the yellow form completely red. Generally at its lower edge, rarely also at upper edge there are black dots and streaks; a wide cinnamon-brown longitudinal line commences on the 4th or 5th segment, it proceeds from the region of the prolegs downwards, sometimes the entire ventral area is red-brown. 8 distinct anulae without conical belt on each segment. Stigmata vermillion with a distinct white spot above and below; true legs carmine red with black base; claspers and abdominal fold densely and distinctly granulose. Horn sharply bent with short end and sharply pointed, bluish green on upperside, green below, laterally yellowish, the short end with black granules, 4 moults. — Food plants: Rubiaceae and Cornaceae.

## 22. Genus: **Sataspes** Mr.

*infernalis*.

**S. infernalis** Ww. (Vol. 2, p. 249, pl. 40 e). Also of this interesting species MELL is able to furnish particulars of the early stages, which were unknown. — Ova pale bright green. They are laid on small Albizzia bushes, which is the chief food plant, always only one egg on a bush. About 88% of the eggs are infested by ichneumons. — The full grown larva is ambulycinous type, moults 4 times and is exceedingly variable in colour and markings. Ground colour is whitish green, through all shades of green, yellowish green to lemon yellow; 7 pale yellow or white oblique stripes, which occasionally are edged above with blue-green; anterior segments with small white or yellowish conical marks, which on the posterior segments generally change to rows of yellowish spots, similar to those of *Macroglossa* larvae. The oblique stripes consist of distinct rows of dots. The head on closer examination has two points, smooth with white marginal streaks; the back of the head is distinctly green, the front pale whitish. The 4—5 mm long green horn has dark granules on upperside, slightly convex and pointed. Stigmata ambulycid: a white central streak divides two small pale lilac elliptical areas, outer edge white. True legs black with white central segment. — Pupa uniformly red-brown; cremaster large with black glossy point. — In regard to the imago some biological observations are very interesting: At rest the wings are spread out, touching the abdomen laterally but not covering same; the antennae in bred specimens were extended; the insect gives the general impression of being a bumble bee. On any slight disturbance the abdomen is drawn up and curved as if to sting, so that the resemblance to a humble bee about to sting is so great, that even an expert unconsciously quickly withdraws his hand (MELL). Bred specimens emerge and commence to fly at break of dawn and are quite worn by midday. MELL never observed the moths in nature as being attracted to flowers, but he saw them visit patches of water. At a puddle of water about midday a specimen was an almost daily visitor, flying round the edge once or twice and then skimming the water 3 or 4 times. MELL could not decide whether it took up water with its proboscis or anal aperture. The insects always approached from the same direction and returned from whence they came, making a humming, droning sound like that of a bumble bee in flight.

*scotti*.

**S. scotti** Jord. (Vol. 10, p. 546) from Dehra-Dun in N. W. India, where it approaches the palaearctic boundary, which it probably occasionally reaches. Ground colour of upperside grey-brown. Segments 2, 5—7 and anal tuft blackish. The following parts of the body are dull yellow: 1. tergite, tips of spiracular hair tufts of abdomen, anterior surface of front femora, upperside of front tibia and tarsus, and outsides of middle and hind legs. No pronounced metallic gloss. Forewings not so extended; margin shorter and more convex.

## 23. Genus: **Deilephila** Lasp.

*confluens*.

**D. nerii** L. (Vol. 2, p. 250, pl. 39 c.) **confluens** Closs from Syria differs from type by the absence of the rose-red transverse band and its posterior dark green, dentate arched edge on forewings. The green discal and basal area are confluent forming a large longish patch, which fills the entire anterior half of the wings up to the pale border behind the disc and which is edged posteriorly by a narrow pale rose coloured streak along the hind margin. The discal band between costa and 3rd radialis is wider with yellowish white centre. Through the absence of the wide transverse band the forewing loses its characteristic type of the oblique markings and in place of same adopts a distinct longitudinal type of marking. — ab. **nigra** Schmidt does not vary in the markings, but only in the colouration. The markings on the wings are very dark, almost black, the pale bands are also suppressed by the monotonous black, so that they are only faintly visible.

*nigra*.

## 24. Genus: **Ampelophaga** Brem. & Grey.

*rubiginosa*.

**A. rubiginosa** Brem. & Grey (Vol. 2, p. 250, pl. 39 d and Vol. 10, p. 549). The particulars of the early stages can be amplified as follows: Ova pale green, somewhat longer than wide. — Larva tapers off considerably anteriorly, green with pale yellow streaks. Dorsal and subdorsal extend over the entire body. The dorsal forms an edge to the triangle of the head. 9 oblique stripes arise from the line of the legs and merge



in the subdorsal, so that this appears to be formed of arcs. Spiracles earmine red to red-brown, with a white spot above and below. True legs pale grey, black outwardly at base. Horn grey-green, convex and pointed. — Pupa dull red-brown on dorsum, faintly glossy, underside pale grey-brown with paler and darker markings; cremaster gradually decreasing in size and elongated. Tip dull but glossy, generally visibly bifurcated. — ab. *submarginalis* Mats. differs from the type by having a reddish yellow band beyond the postmedian band and the outer marginal area is darkened. *submarginalis*.

## 25. Genus: **Acosmeryx** Bsd.

**A. naga** Mr. (Vol. 2, p. 251, pl. 39 e and Vol. 10, p. 550). This species which was hitherto known from *naga*. N. India and Japan has now also been found by MELL in S. China, as was to be expected. About the early stages, the following is now known: Ova longer than wide, generally glossy brilliant green, more rarely pale green; apparently generally deposited in pairs. Larva pale green: back and sides with dense whitish or yellowish dots; subdorsal anteriorly white, in the 3rd segment yellow and beyond same bluish white, narrowly blue-red at upper edge and above same dark green; dorsal only on head, double, indistinct and pale. 7 whitish green oblique stripes, extending to subdorsal. True legs impure pale brownish with black base. Horn short, convex and pointed. — The larva feeds on Ternstroemiaceae, probably also on Vitaceae.

**A. castanea** R. & J. (Vol. 2, p. 251, pl. 39 e and Vol. 10, p. 551). The larva is apparently monochrome *castanea*. green; subdorsally white, in 4th segment yellowish and from thence with narrow but very distinct red edge on upperside, in the horn segment however widely white without red. Underside dull chocolate-brown, only dull pale greenish between the legs. Horn green, convex, 7 mm. True legs impure brown, black at base. — Food plants as for *A. naga* and Saxifragaceae. — According to MELL hibernated specimens differ from summer forms: the former are larger and have much brighter colouration and markings; the darker shades are darker and the paler shades more bluish grey-white. Summer specimens from the same locality (Yokohama) are more brown and markings diffuse. Specimens from S. China form a geographical race, they are much paler than the main type from Japan. (For further particulars compare Vol. 10.)

## 26. Genus: **Rethera** R. & J.

**R. komarovi** Christ. (Vol. 2, p. 251, pl. 39 b) subsp. **drilon** Rbl. & Zerny. The species, which hitherto *drilon*. was only known from Asia, was recently unexpectedly also discovered in Europe, at Brutti on the Drin in Albania, where it is found in subspecies *drilon*. It is smaller than the main type form from Transcaspia. Ground colour of forewings dark olive green, edges of marginal area more sharply marked, strikingly edged with black on inner edge. The white central band is more distinct and extends clearly to hind margin. Discoidal spot intersected by rusty transverse line. Ground colour of hindwings is ochreous without the rusty suffusion of the main type. Black submarginal line is much more distinct. Underside of wings not rose as in type but a rich elaret colour, inner marginal areas of wings rusty yellow. The white hairs on tegulae seem to spread wider. Abdomen appears to be shorter and forms a sharper point in ♂ and ♀.

## 27. Genus: **Gurelca** Ky.

In regard to the distribution of this Genus, it is remarked that it does not only occur in Asia, but also in America. CLARK has ascertained 2 mexican species (vide Vol. 6, p. 885). When the 2nd Volume was published only 2 asiatic species were known, namely *hyas* Wkr. and *masuriensis* Btlr. Meanwhile a 3rd species *G. montana* R. & J. (Vol. 10, p. 554) has been discovered and finally Dr. JORDAN has ascertained that *G. himachala* Btlr., which had hitherto been held to be synonymous with *masuriensis* Btlr., is a separate distinct species to which subsp. *sangaica* Btlr. (which until this discovery was considered a subspecies of *G. masuriensis* Btlr.) belongs. There are now therefore 4 asiatic species known, namely *G. hyas* Wkr., *masuriensis* Btlr., *himachala* Btlr. and *montana* R. & J.; of these *G. himachala* has a second subsp. *G. himachala sangaica* Btlr. A separation of *masuriensis* and *himachala* has become necessary because Major F. B. SCOTT has bred both species and ascertained that the larvae of the two sorts are dissimilar. The species described in Vol. 2 as *G. masuriensis* Btlr. is actually *G. himachala* Btlr. and the subspecies *G. masuriensis sangaica* mentioned there is really *G. himachala sangaica* Btlr. — In regard to the early stages and biology MELL has also here been able to supply details. Food plant of the asiatic *Gurelca* species is *Paederia tomentosa* Bl. The larvae are never on climbing branches, but always only on loose bits on the earth or adhering to rocks and which during the day are exposed to the full rays of the sun.

**G. hyas** Wkr. (Vol. 2, p. 251, pl. 40 g and Vol. 10, p. 554, pl. 64 d). — The ground colour of the larva *hyas*. varies considerably, from brilliant green through all shades of grey-green to earthy grey and quite dark black-brown. Subdorsal lines from segment 2 to 7 pale, however very distinct from segment 8 to the horn. Horn



6,5 mm long, dull green, black-brown on top with end cut off straightly. — Pupa pale parchment yellow to ivory coloured; cremaster with various forked spines standing out laterally.

*himachala.* **G. himachala himachala** Btlr. (= [Lophura] erebina Btlr.) (Vol. 2, p. 251, designated there as *masu-sangaica. riensis* Btlr.). From N. W. India, the Himalayas, Bhutan, Khasia Hills, Cherrapunji. — subsp. **sangaica** Btlr. (Vol. 2, p. 251, pl. 40 g) (designated there as well as in Vol. 10, p. 554, as a subsp. of *masuriensis*). From China, Corea, Japan and Formosa. — Larva of very variable colouration and marking as in *hyas*, horn however 16 mm long, tip forked; 10 tubercle bristly segments. True legs dull grey. — Pupa very similar to that of *hyas*. — ab.  
*purpureo-signata.* **purpureosignata** Closs. The uppersides of the palpi are a nice crimson, as also are a spot on the centre of the head and the edge of the collar.

*masuriensis.* **G. masuriensis** Btlr. More grey than *himachala*, the anal angle of forewings is shorter, the hindmargin is not so deeply excurved as *himachala*; the black marginal band of hindwings is wider anteriorly and not so clearly outlined there, the black-brown colouration extends in rays into the disc; the yellow area is paler, especially on the underside. Anal tergite more compressed than in *himachala*, the sternite less wide and gradually tapering off to a point. Harpe spatuliform, concave on upperside. Aedeagus at the end with a distinct ridge, ending in a sharp hook on both sides.

*montana.* **G. montana** R. & J. (= *saturata* Mell) (12 d) from Thibet and West Yunnan is similar to *himachala*, but somewhat larger; body greyer, palpi without yellow. Wings longer and narrower. Outer margin of forewings, especially behind the 1st radialis more heavily dentate than in the other species; also hind margin and anal angle more deeply excurved. Ground colour of forewings a nice silky ashy grey without the red-brown shades and streaks of the other species. There is a dark postdiscal band which has a clearcut outward white edge. The subapical spot forms 4 sagittate marks pointing inwards. On hindwings the dark marginal band tapers off posteriorly like in *h. sangaica*, being more diffuse, black-brown, extending considerably at apex and at the costal margin it extends basally to the inner fold; apical lobe grey-blue inwardly edged with black. On underside the forewings are dark brown to the postdiscal stripe, which is brownish or buff at hind margin. Hindwings ashy brown-grey. Anal area is pale straw-buff without distinct outline. — Larva is green with lateral dorsal stripes over the entire length, which enclose a rusty brown patch behind the horn; where the yellow oblique stripes intersect, the colour is rusty red. The spiracles are white and "8" shaped with black outer edges. True legs reddish. Underside posteriorly rusty brown. Horn of medium length, slightly inclining forwards, dull grey with a pale ring in the middle, the tip forked. The pale ring on the horn, its bifurcation in the full grown larva, the dark colouration of the ventral anal segment and the rusty red patch behind the horn in a green *Gurelca* larva are characteristic of this species.

## 28. Genus: **Sphingonaepiopsis** Wlgr.

According to MELL the larvae are similar to those of *Gurelca*, but unicoloured green or brown with simple or predominant longitudinal stripes. Horn is longer than in *Gurelca*, straight or faintly curved upwards; spiracles as in *Gurelca*. — Pupa of the southern Chinese species similar to that of *Gurelca* but immediately distinguishable from same by the black streakings. (Pupae of the other species of the Genus have not yet been described.) (In regard to this Genus see also Vol. 10, p. 555 and Vol. 14, p. 377.)

## 29. Genus: **Panacra** Wkr.

Of the many *Panacra* species none was known from palaearctic territory until 1926, nevertheless a number extend almost into same. The area of distribution is indo-australian. In 1926 CLARK discovered a subspecies in Tzekou, China and GEHLEN described one from N. W. India and these are so far the only representatives in palaearctic territory. The genus is fully dealt with in Vol. 10 (p. 551—553) and has the following characteristics: large head and very sleek and pointed abdomen of the ♂♂. Palpi large. Antennae of ♂ setiform, of ♀ slightly thicker distally, hooked tip short and truncate; the last segment is narrow, longish and conical not filiform, with long seti-fimbriatae (as *Theretra*). Abdomen terminating with a tuft of hair. Spurs of central tibiae almost equally long, those of hind tibiae very unequal, the longer ones being about as long as the second tarsal joint. Middle tarsus with brush of hair. Paronychium and pulvillus are present. — Ova longer than wide with rusty spotted lines (no other *Sphingidae* ova are known with markings). Larva green with longitudinal stripes, tapering off anteriorly; laterally a small ocellus on the 4th segment. According to MELL the larvae repose in an immovable and extended attitude during the day, resembling a twig and they do not change their attitude on being disturbed or attacked. — The pupa is a curious pale bone-grey or stone-like grey-brown with speckles of lichen-green and thereby closely resembling its surroundings; cremaster wide in the shape of a drake's bill.



*P. metallica* *Bibr.* (Vol. 10, p. 552, pl. 64 c) subsp. **anfracta** *Gehlen* from Simla, N. W. India, from whence *anfracta*. it may extend to palaearctic territory. It is smaller than type form, wing expanse of ♂ being 28 mm. Wings sleeker. Upperside darker with more curved discal bands. The two pale apical spots are smaller, the posterior one being nearer base. On hindwings the pale band is shortened, darker and not wider than the marginal area. Underside shows greater contrasts, the basal half of wing being darker; the light patches are a purer rusty red. ♀ unknown.

**P. perfecta** *Bibr.* (Vol. 10, p. 552, pl. 56 C b) subsp. **tsekoui** *Clark* from Tzekou, China, has sleeker wings *perfecta*. than the type form, thorax and abdomen being paler on upperside. Also mentioned in Vol. 10, as southern *tsekoui*. China belongs to the Indian territory.

## 29. (bis) Genus: **Thibetia** *J. & K.*

The Genus was established in 1917 by JOICEY and KAYE and is closest to the Genus *Panacra* *Wkr.* Head large standing out prominently, with a central comb. ♂ antennae long and stout, with short pectinations, and long tip which tapers off gradually. Palpi large, porrect, the 2nd segment much larger than the 1st. Hind tibiae with 2 pairs of long and almost equally long spurs. Central and hind tarsi with comb. The bent spur of front tibiae is very stout. Wings short, apex very blunt. Outer margin very concave before and behind the centre. Lower angle of cell almost rectangular. Hindwings without lobes at anal angle.

**T. niphaphylla** *J. & K.* from Thibet. Wing expanse 52 mm. Upper side: head, thorax, abdomen and fore- *niphaphylla*. wings dull black-brown. Forewings with 3 antemedian lines pointing towards the base; just beyond the cell an almost straight discal line; 2 undulate postdiscal lines. Below the apex a reddish yellow shade; a dark brown shade separates a large apical area. Hindwings impure black-brown or reddish brown with dark margin which is widest between 3rd and 2nd radialis. Underside: base of palpi, thorax, abdomen and discal areas of all wings dull reddish. An irregular brown marginal band, which is widest at 2nd radialis on fore and hindwings. On hindwings a pair of indistinct curved discal lines.

## 30. Genus: **Sphecodina** *Blch.*

**S. caudata** *Brem. & Gray* (Vol. 2, p. 252, pl. 39 e and Vol. 10, p. 555). — In regard to the larva MELL *caudata*. gives many interesting details, which in part I should like to recount here. The full grown larva is of striking appearance. The body tapers off anteriorly being somewhat wider than high. (The *Sphecodina* larva is probably the only known *Sphingidae* larva that is distinctly wider than high.) Instead of a horn it has a coral-red knob situate on a shield of the same colour or chocolate brown shade. Colour of body including the head is a nice pale leaf-green (the indication "blackish" in Vol. 2 probably refers to colour of pupa). Head larger than the 1st segment. On being disturbed the full grown larva rolls up from its head sideways, so that with its dark lateral chocolate coloured stripes it forms a spiral that imitates and looks just like the green and brown shell of a snail, the claspers remaining fastly adhering to the twig. The anal segment is somewhat raised over the claspers, bulging out laterally and sharply pointed posteriorly, giving the impression that it is a head. In consequence of the bulge, abrupt tip, startling knob and the remarkably contrasting colourations, the larva has a terrifying appearance, so that anyone, even an expert, observing same in nature for the first time, can scarcely "believe the story true". The shape and attitude of the body together with the markings are all three unique in the Genus and nevertheless they all harmonise together surprisingly. — Also the imago has its peculiarities. When resting the wings are lifted from the body, resting widely "spread-eagled", on small twigs they are almost at rightangles downward from the body. With the slightest disturbance, both ♂ and ♀ hop off, sitting on the earth with rapidly vibrating and droning wings, the head stretched down, the abdomen arched and stretching upwards, like an ant that is about to exude acid; the tufts of hair seem to stand out threateningly, sometimes the basal segment of the abdomen is withdrawn and stretched out again. The impression of a stinging Hymenoptera is astonishing. Neither MELL nor his men discovered the imago in nature. From its behaviour in the breeding cage MELL assumes that it flies by day.

## 31. Genus: **Proserpinus** *Hbn.*

*P. proserpina* *Pallas* (Vol. 2, p. 252, pl. 40 g). ab. **infumata** *Closs.* The black margin of hindwing is *infumata*. widely diffuse inwards, so that the yellow is quite dusky. — ab. **schmidtii** *Schmidt* is a more intensive yellow- *schmidtii*. grey on forewings. The yellow of hindwings is replaced by grey, only a trace of same is still visible at



*gigas*. base. — subsp. *gigas* Oberth. from N. Africa differs from european and syrian specimens by being larger. It is known since 1922 from N. Africa.

### 32. Genus: **Macroglossum** Scop.

*convergens*. *M. stellatarum* L. (Vol. 2, p. 253, pl. 40 f and Vol. 10, p. 556). ab. *convergens* Costantini differs from type, by having converging and partially merging median bands on forewings.

### 33. Genus: **Celerio** Oken.

*cyanca*. *C. euphorbiae dahli* Geyer (Vol. 2, p. 255, pl. 41 a). ab. *cyanea* Gehlen differs from type by having the pale area of forewings suffused with blue; also on the outer half of hindwings this blue suffusion is present, so that there the red band is partially violet. — ab. *infuscata* Trti. = ab. *praenubila* Schultz (Vol. 2, p. 255). —  
*dealbata*. L. subsp. *mauretanica* Stgr. (Vol. 2, p. 255, pl. 41 b) ab. *dealbata* Schltz. has no inner white edge to scapulae.  
*umbrosa*. — In ab. *umbrosa* Schltz. the costal margin of forewings is much enlarged; it projects in the form of a band, without any real dentation to about the middle of the wing, so that between it and the transverse band only  
*major*. a very small strip of the ground colour is left. — ab. *major* Oberth. is only larger with finer colouration. — In  
*kruegeri*. ab. *kruegeri* Schaw. the ground colour and outer margin of forewings are whitish rose; the oblique band, which is usually green, is deep claret, intersected by pale veins, whilst costa, costal spots and body are olive green, only the thorax is rose coloured in centre. — Contrary to what was said in Vol. 2 *mauretanica* can occur with heavy red suffusion, in fact it can possess the beautiful red colouration of *grentzenbergi*. Also *deserticola* occurs  
*rubescens*. with rosy suffusion. The red specimens of *mauretanica* have been named ab. *rubescens* Schaw. (= ab. *rubra* Closs). — Subsp. *deserticola* Bartel (Vol. 2, p. 255, pl. 42 c) without the white edge to scapulae (in contrast to  
*dealbata*. Vol. 2) are ab. *dealbata* Schltz. — Specimens with rosy suffused forewings are ab. *rosea* Closs. — In ab. *cingu-*  
*rosc.* *lata* Std. the fringes of the tergite are white throughout without interspersions of ground colour. — ab. *albeola*  
*cingulata*. Std. has a white stripe in the centre of the red band of hindwings, stretching from inner margin to costal margin  
*albeola*. and in extreme specimens it is so wide, that only 2 narrow strips of rose are left. — ab. *reverdini* Std. has  
*reverdini*. the dark markings of forewings heavily increased; the proximal costal spot is unusually large and conjoins with the transverse band, in which no pale veins are visible; the red band of the hindwings is cinnamon brown.  
*velulina*. — ab. *velutina* Std. has forewings heavily dusted with black. — ab. *satanella* Std. reminds one of *tithymali*, the  
*satanella*. markings of forewings are deep olive green, almost black. Abdomen with white belts. — *euphorbiae euphorbiae* L. (Vol. 2, p. 255, pl. 41 a). With the great variability of the Spurge Hawk moth it is not to be wondered at that since the publication of the 2nd Volume a swarm of new aberrations have been described and named. To facilitate reference I am enumerating firstly the forms that vary in regard to markings and then those in regard to colouration; then follow the forms that cannot be grouped in either of these classes or which combine both  
*latefasciata*. variations. — ab. *latefasciata* Schltz. is the counterpart to ab. *helioscopiae*, as the black submarginal band of hindwings is strikingly expanded inwards, and as the large basal spot is enlarged the red band is very  
*subvittata*. narrow. Through dark dusting it is also dusky. — In ab. *subvittata* Schltz. the oblique band of forewings is narrower, diffuse at proximal end and truncate anteriorly, so that it does not reach the apex. — In ab.  
*apiciplaga*. *apiciplaga* GEHLEN just the opposite is the case, the oblique band expands along the costal margin inwards to an extent of 7 mm. — One of the most extreme and finest aberrations is ab. *rühlii* Bandermann (13 d)  
*rühlii*. (= *clossi* Hannemann, which however is a one-sided aberration) which on both forewings has the oblique band widely united on hind margin with the basal area, the markings being in perfect symmetry. — A similar variation occurs (however only on the right wing) in ab. *conjuncta* Lütkeim., but the bar between the basal area and the oblique stripe does not lie along the hind margin, but more in the centre of the wing, so that along  
*philippsi*. the hind margin there is a strip of ground colour of about 3 mm width. — ab. *philippsi* Bdm. The oblique band in the anterior  $\frac{2}{3}$  rds of its length consists only of a thin line; the proximal costal spot (the outer one is missing) is oval with ray-like extensions outwards. — ab. *canarina* Wladasch is a sharply marked ab. *unimacula* with extraordinarily thin anterior tip to oblique band, similar to *philippsi*; also the black band of hindwings  
*canarina*. is very thin proximally. Further the black band of hindwings is a narrow thin line. — ab. *gönnéri* Bdm. The large costal spot merges with the oblique band, which forms an angle of 90° inwards on the hind margin. — Also  
*gönnéri*. in ab. *ernata* Bdm. the inner costal spot conjoins with the oblique band, but subapically there is a third costal  
*ernata*. spot and all 3 costal spots are joined together. — In ab. *unimacula* Closs the outer costal spot on forewings  
*unimacula*. is missing, the inner one is present in normal size. — The same is the case in ab. *demaculata* Schltz. but the remaining spot shows indications of disappearing, being only retained as a minute indistinct spot or cloud.  
*demaculata*. — ab. *viereckana* Bdm. is an ab. *unimacula* in which the costal spot has the shape of an angle and the olive  
*viereckana*. green markings are outlined in black. — ab. *annellata* Closs is the form in which both costal spots are conjoined by  
*annellata*.



an arch, or in which they merge. — ab. **umbrata** *Gehlen* has no definite outer edge to oblique band, same merges gradually fading into outer margin. — The ab. **ziczac** *Frisch* must be deemed synonymous with ab. **cuspidata** *Rbl.*, as it only has a shade less brilliant red on hindwings than type of **cuspidata**. What are we coming to if each minute variation in shade leads to new denominations! Also ab. **mosuna** *Lamb.* is nothing else than a red form of ab. **cuspidata** *Rbl.* — — Now follow the forms which vary chiefly in colouration: ab. **grisea** *Closs* reminds one of *hippophaes*, as the pale ground colour of forewings is dusted with ashy grey, the patches of body and forewings, usually olive green, are black-green and band of the hindwings is very pale. — ab. **perfulva** *Schltz.* has terracotta brown ground colour of forewings without any indication of olive. — ab. **olivacea** *Closs* body and markings of forewings clay-brown instead of green; also pale patches on costal margin are buff-brown, so that only a narrow band of ground colour is left (transition to ab. **restricta** *R. & J.*). — ab. **jachani** *Closs* is an ab. *helioscopiae* with yellow instead of red hindwings: — In ab. **pallida** *Closs* all dark markings very pale, hindwings pale grey instead of red. — ab. **rufomelana** *Tutt* has deep red ground colour to forewings, which are densely bestrewn with black scales. — A very remarkable form ab. **sulphurata** *Bdm.* has ground colour on upperside (also of hindwings) like the *Lasciocampid*, *Ch. potatoria* *L.*, without a trace of red; underside sulphur yellow with heavy markings as the upperside. — ab. **griseonympha** *Bdm.* Forewings as *grisea* *Closs*, hindwings as ab. *lajitolei* with very narrow black band. — In ab. **decolorata** *Closs* the upper side of all wings is delicate silvery grey, the parts of body and forewings that are otherwise green and black are blackish grey; there is not a trace of the usual green, yellowish or rosy red colourations; underside similarly uniformly silvery grey without markings. — ab. **albicans** *Closs*. Ground colour of forewings and distal margin of hindwings, whitish; red band of hindwings similarly very pale. — ab. **variegata** *Closs*. with colourations in strong contrast on upperside of forewings, the dark patches, very dark, the light ones, very light. Hindwings reddish white, the black band edged inwardly by a carmine red stripe. — ab. **virescens** *Gehlen* has an enlarged black hindwing band, similar to *latefasciata* but the extension is olive green; this green colour suppresses also the outer part of the white anal spot. — ab. **oberthüri** *Bdm.* combines the forms *rubescens* (on forewings) and *lajitolei* (on hindwings). — ab. **rudolfi** *Bdm.* has forewings of *suffusa* and hindwings of *lajitolei*. — In ab. **argustana** *Bdm.* the central area of forewings is pale red, outer marginal area red-brown, green oblique band with black edge, inwardly of same a white stripe; median band of hindwings sandy yellow, outer margin dark red, tegulae with red edge. — ab. **ilia** *Bdm.* has a bluish red outer marginal area to forewings; the red band of hindwings has an orange sheen (hence the name). — ab. **cyanea** *Wladasch* has ground colour of forewings and also outer margin of same suffused with dark blue. — The wonderfully coloured ab. **incarnata** *Wladasch* has whitish red ground colour to fore and hindwings, the otherwise green oblique band of forewings and costal margin of same dark carmine red. — Similarly remarkable is ab. **lilacina** *Wladasch*. The hindwings are a lovely lilac instead of red. The type has forewings with very dark markings and a black edge to oblique band. — The ground colour of forewings of ab. **testata** *Wladasch* is bluish grey, but dusted over with ochreous to rusty red, outer marginal area ochreous dotted with grey-black; body and markings of forewings pale brown instead of green. The black submarginal band of hindwings expands as in *latefasciata* and is dark carmine red, the outer marginal area being ochreous yellow. The black abdominal patches almost merge and are edged with ochreous yellow, instead of white; the white lateral stripe to head and thorax is reduced and is also ochreous on the head. — In ab. **roseata** *Bdm.* ground colour of forewings is carmine red, the oblique band through its entire length is lined proximally with dull white and distally black; outer marginal area red-brown. On hindwings the white anal spot is suffused with rose, median band white and red mixed, outer marginal area claret. Tegulae reddish white; the ordinarily white abdominal marks pale red; antennae green. — ab. **nigricans** *Closs* (= ab. *nigerrima* *Sälzl*) suffused with blackish grey; the ordinarily olive green markings black-green; the otherwise red hindwings grey with a faint rosy red hue in centre. Underside also suffused with grey. — ab. **nigra** *Gehlen* (nom. nov. um pro *nigerrima* *Gehlen*, nec. *Sälzl*) is a fine form. The black colouration in comparison with *nigrescens* and *nigricans* is so much increased that every trace of red has disappeared. On upperside all white patches remain white, so that these contrast vividly with the black colouration. Also the body is so black, that the black abdominal markings can scarcely be discerned. The usually green markings of forewings are black, the pale ground colour of forewings is suffused with smokey brown and is only paler at the stigma, in front of the oblique band and at hind margin. Underside dark brown with a few paler patches; oblique band of forewings and black band of hindwings more intensively dark. Edges of sternite white. — ab. **conspicuata** *Bdm.* has no trace of red. The central area and margin of forewings, band of hindwings and entire underside of all wings like white enamel. Markings much clearer and body paler than type form. — ab. **flavidior** *Rethel* is an ab. *grentzenbergi* with yellow hindwings, therefore a parallel form to *lajitolei*, but all usually olive green markings of hindwing and body deep golden yellow. The ordinarily white patches also yellow. — — Now follow the forms that vary both in markings and colouration: ab. **krancheri** *Bdm.* varies chiefly on underside: ground colour dark reddish, fore and hindwings with black discal bands; those of hindwings with pale veins; basal area of hindwings rose in front, whitish behind, costal margin green; besides the discal band hindwings have a further distinct black submarginal band. On upperside oblique band of forewings edged outwardly



- krombachii*, by a dentate black line, black basal area extends distally, inner costal spot almost black. — ab. **krombachii** *Closs* is a pale form. Collar pale grey. Oblique band of forewings dusted from outwards with pale yellowish between 2nd radialis and 2nd median nervure, so that there only the inner edge of oblique band exists. The black band of hindwings replaced by a narrowly marked line consisting of black dusting. — ab. **silesiana** *Wladasch* has on forewings between basal and costal spot, 2 distinct lines in the shape of darts, directed towards costal spot; hindwings orange instead of red. — ab. **caecigena** *Bdm.* is a *lafitolei* with whitish pale ground colour and very narrow oblique band to forewings. — In ab. **nymphaea** *Bdm.* the abdomen has 3 pairs of black-white lateral markings instead of 2; a dark streak in apical area of forewings. Basal area dark grey instead of black; antennae reddish. — In ab. **flaveola** *Bdm.* costal spots of forewings merge forming one spot which is incurved posteriorly; band of hindwings half red and half yellow. — ab. **grentzenbergi-ziczac** *Wladasch* is a ruddy *grentzenbergi* in which the outer edge of oblique band on forewings and black band of hindwings are sharply dentate. — ab. **typica-lafitolia** *Wladasch* is a very darkly marked combination of *suffusa*, *annellata* and *lafitolei* with black edged oblique band, the outer edge of which is sharply dentate; ground colour of forewings is grey-green. — ab. **elliana** *Bdm.* Markings of forewings as ab. *gönnéri*, otherwise as ab. *oberthüri*. — ab. **cleopatra** *Wladasch* has body and markings of forewings pale brown, central area of forewings ochreous yellow with lemon yellow dusting. Outer marginal area rusty brown, oblique band very narrow. Band of hindwings ochreous yellow. — ab. **multicolor** *Wladasch* has costal marginal region of forewings much expanded, so that costal spots are barely visible and the black dusted white-rose central area is much restricted; outer marginal area black-red. Band of hindwings dark carmine red, outer marginal stripes pale grey-blue. Underside pale rose with dark red margins. — In ab. **nebulosa** *Gehlen* (13 d) entire upperside appears cloudy, especially hindwings, where base is grey instead of the usual black; the red band is buff as is the very wide marginal band and has a red-brown antemedian band, the latter sharply angulated inwards on submedian 2 and then proceeding at a right angle to the white anal spot; submarginal band grey instead of black and displaced inwards. This completes the multitude of *euphorbiae* aberrations. — — subsp. **vandalusica** *Rbb.* from Andalusia has sleeker wings than main type. General colouration more reddish white. Outer marginal band of hindwings narrow. Scapulae always with white inner edge. — *REBEL* describes a subsp. **balearica** from Mallorca from a single specimen, which shows only minute differences, within the scope of the variability of the species and which can scarcely be held to establish a subspecies until more material is available. — subsp. **strasillai** *Std.* from Aspromonte, lower Italy, reminds one of ab. *grentzenbergi*. In regard to colouration, *STAUDER*'s particulars are not clear. In his original description in the "Iris" it says "intensively claret red", whilst in the "Lepidopterologischen Rundschau" it is stated "the intensive claret red is resolved into grey-violet". The black band of hindwings is 2—3 times as wide as in main form (even in small specimens); the narrow red band of hindwings has a dark brown shade. — subsp. **rothschildi** *Std.* from Palermo, San Martino, Cinisi, is smaller than *strasillai* and more dark brown than red; comes in colouration between *grentzenbergi* and ab. *ni-subjacensis*. *grescens*. — The subsp. **subjacensis** *Dhl.* from central Italy scarcely differs from main type. The author says it "belongs to the *grentzenbergi* group", there is however almost no mottling to the pale area of forewings, whilst however white hairs are often interspersed. — ab. **atrolimbata** is a denomination of *DANNEHL* for specimens with an outer black edge to the oblique band. — subsp. **etrusca** *Vrty.* from the coast of Tuscany reminds one partly of *dahli*, partly of hybr. *densoi* *Muschamp*; the pale greenish olive central area is suppressed anteriorly by the dark costal margin, it does not embrace the large costal spot and is only distinct posteriorly. — *euphorbiae* **conspicua** *R. & J.* (Vol. 2, p. 255, pl. 41 c). — ab. **nigrofasciata** *Igel* has deeply dark markings to forewings, black band of hindwings wider than the red band, thus it is parallel form to ab. *latefasciata* of *e. euphorbiae*; altogether *conspicua* varies in similar fashion to *e. euphorbiae* and the colouration is by no means so constant, as one would gather from the remarks in Vol. 2. — ab. **giganteomaculata** *Gehlen* has inner costal spot of forewings enormously increased in size (9 mm long and 5,5 mm wide). — *euphorbiae* **costata** *Nordm.* (Vol. 2, p. 255, pl. 41 d) *MELL* describes the larva of this fine subspecies as follows; Only centre of pronotum red, the black margin almost as wide as the red zone or wider, rarely pronotum quite black; 2 lateral rows of ocelli are merged to one wide row, sometimes still a pale stigmatal zone; only the basal  $\frac{2}{5}$  to  $\frac{3}{5}$  of horn is red. (The particulars are given from a small number of larvae in alcohol, which Prof. KURZ, Shanghai, collected at Pei-tai-ho in Chihli, N. China.) — Pupa with thorax and wing coverings pale wood colour, cremaster and anal segment dull rusty brown on top, tip black and glossy on upperside. — ab. **confusa** *Gehlen* has an extraordinarily wide oblique band with proximal edge bending forwards and not backwards as in normal specimens, extending to hindmargin and only reaching same near base, so that pale central area is thereby much reduced. Distally the oblique band edged with black. The pale veins (3rd radialis, 1st and 2nd mediana) expand in a cloudy effect within the oblique band, so that the impression is created that the scales are missing. — *C. centralasiae* **siehei** *Pnglr.* (Vol. 2, p. 255, pl. 41 c) ab. **privata** *Aust.* has no black hindwing band (as *helioscopiae*). — *C. gallii* *Rott.* (Vol. 2, p. 256, pl. 41 d) ab. **flavescens** *Closs* has the pale red of hindwings pale yellow, the deep red is orange. — ab. **scholzi** *Steph.* has a larger yellow brown spot on forewings beyond the oblique band. — The description of ab. **maculifera** *Klemensiewicz* was unfortunately not available to me, so that I am unable to give a description. — Specimens with dentate black band on hind-



wings are named ab. **cuspidata** *Fritsch*. — ab. **dentata** *Gschw.* is similar, however the black band is only *cuspidata*.  
dentate inwards on the veins, whilst outwardly it has a straight edge; it is situated closer inwards. — ab. *dentata*.  
**lutea** *Gschw.* has body and markings of wings an ochreous greenish, the white lateral stripes of thorax black *lutea*.  
on top, basal part of yellow central area pale grey; costal spot edged with black; transverse band darker  
than the costal margin, outwardly completely edged with black, inwardly only the posterior half. Band of  
hindwings deep yellow ground colour. — subsp. **chishimensis** *Mats.* from the Kurile Islands has a much wider pale *chishimen-*  
band on hindwings, so that the submarginal band is very narrow; veins in the marginal area are of the same *sis*.  
colour as the marginal band. On underside the black anal spot is extinct. — subsp. **sachalinensis** *Mats.* from *sachalinen-*  
Saghalin is close to *chishimensis* but differs by the much wider black band on hindwings which becomes narrower *sis*.  
anteriorly; the outer marginal stripe of hindwings is dark and distinctly wider.

*C. nicaea* *Prun.* (Vol. 2, p. 256, pl. 41 a). ab. **orientalis** *Aust.* is a form in which the transverse band *orientalis*.  
consists of a thin line from the 1st median nervure to apex. This form occurs especially frequently in North  
Persia and the Crimea. — OBERTHÜR has described some aberrations of the north african race **castissima** *castissima*.  
*Aust.*: — ab. **albina** *Oberth.* is entirely pale yellowish white, all markings are so pale that one might imagine *albina*.  
it to be a bleached specimen. On underside however the outer margins are dark and extend in rays inwards  
along the veins. — ab. **rubida** *Oberth.* has a reddish tone. — ab. **marginе-denticulata** *Oberth.* has dentate black *rubida*.  
band on hindwings. — subsp. **sheljuzhkoii** *Dubl.* from the Province Djetissu (Alma-Ata) has ground colour of fore- *marginе-*  
wings with pale grey rose hue like ab. *carnea* *Aust.*, but in contrast to main form, base and costal marginal area *denticulata*.  
of forewings are of the same colour. In the original description, which is not quite clear, it is stated that *sheljuzhkoii*.  
the ♀♀ have only delicate spots (probably the outer costal spots are intended) unlike the ♂♂ with wedge-shaped  
spots on costa. Rose band of hindwings is paler than that of main form. Underside is yellowish rose with pale  
olive-brown costal margin and a similar stripe. — subsp. **libanotica** *Gehlen* (13 a) from Zahlé, east Lebanon *libanotica*.  
is a large form. Body and markings of forewings paler olive-green, the green tone being predominant. Ground  
colour of forewings is still paler than in *castissima*, as the basal area is interspersed with white scales; ground  
colour in outer area and marginal area are pale reseda-green. The red band of hindwings has scattered white  
scales, in front of the black band colouration is deep olive-green, suppressing the black band considerably at  
anal angle. Underside as *castissima*.

*C. hippophaës* *Esp.* (Vol. 2, p. 256, pl. 41 e). ab. **crocea** *Rbl.* has saffron yellow hindwings; the white *crocea*.  
anal spot is missing. — ab. **flava** *Denso* has yellow band on hindwings. — ab. **obscurata** *Dhl.* is darker than *flava*.  
the main type form and finely dusted over with blackish; the pale area before the transverse band is missing; *obscurata*.  
the black band of hindwings is much expanded. As this form has been ascertained by the author to occur freely  
in the south Tyrol (together with the main type form), it may possibly constitute a race. — susp. **caucasica** *caucasica*.  
*Denso* from Aresh. The streak at discocellular is fainter; stigma absent or indistinct; transverse oblique band  
ends nearer the base on hind margin and is less dentate outwardly; the dark olive-brown of main type form  
is replaced by dark brown, marginal area grey-brown. On hindwings the black basal spot is larger and the  
black band wider, marginal area very narrow; white anal spot very small. — subsp. **transcaucasica** *Gehlen* from *transcau-*  
Transcaucasia at first glance reminds one of *euphorbiae*, as body and markings of forewings are olive-green *casica*.  
on upperside. Abdomen is longitudinally only olive-green in the centre, whilst the sides (also dorsally) and  
the posterior, generally white abdominal spot, are rose. Ground colour of forewings a bright reddish yellow,  
marginal area scarcely darker. Ground colour of hindwings including the margin deep carmine red. Underside  
similarly carmine red. — subsp. **chamyla** *Denso* (13 e) from Chamyl on the western boundary of the Gobi Desert *chamyla*.  
(Tian-Shan) has such a wide costal marginal area that the dark streak and the tip of the basal spot are merged  
in same. Transverse oblique band outwardly indistinct and much reduced subapically. Marginal area of a  
different shade to that of central area, often as dark as the oblique band and costal margin, which is all in  
contrast to main type form. The marginal and costal areas conjoin at apex, so that the light central area does  
not extend to apex. The areas that in type are dark brown, are pale fuscous in this form, central area yel-  
lowish white. The black band of hindwings is displaced inwardly and pales off towards the base. The marginal  
area is therefore relatively wide and brown-rose. Underside sandy-buff. Fringes white on upperside, yellowish  
white on underside.

*C. lineata livornica* *Esp.* (Vol. 2, p. 257, pl. 41 e). ab. **obscurata** *Niep.* is a dusky form, which reminds *obscurata*.  
one of *euph. restricta* (Vol. 2, p. 255). Costal margin of forewings is just as dark as the other olive-brown areas;  
the generally pale grey marginal area is black-brown; the yellow central stripe is narrower and shorter inwardly;  
the pale dusting of veins is fainter. Band of hindwings impure rose; the black band expands towards outer  
margin, so that the pale marginal area is suppressed. Fringes white. — subsp. **saharae** *Std.* (13 b) from Biskra, *saharae*.  
N. Africa is related to *livornica*, as *deserticola* is to *mauretanica*. It is much smaller and paler than the subspecies  
*livornica* (expanse 55—61 mm). The stripes, veins and bands are reduced by half. Band of hindwings very  
pale going over into whitish rose. Body and antennae correspondingly buff. Underside is almost precisely like  
a *deserticola*. — It must be remarked here that in S. Africa *livornica* is generally as small as *saharae*; also from  
Aleppo similarly small specimens are known.



34. Genus: **Pergesa** Wkr.

- lugens*. *P. elpenor* (Vol. 2, p. 257, pl. 42 a). ab. **lugens** Niep. is a transition form between *elpenor* and ab. *daubi*.
- hades*. Niep. (13 e). — ab. **hades** Rbl. is also close to *daubi*. Ground colour of all wings dusky brown with black markings; only the metathorax is red; abdomen yellowish with red tip. — ab. **alboradiata** Lamb. has hindwings with white rays between the veins from base to outer margin; these rays also occur on underside, but they are less distinct. — ab. **scheiderbaueri** Gschw. has hindwings with a green, 2—3 mm wide band at outer edge of basal area from costal to inner margin.
- wesloeensis*. *P. porcellus* L. (Vol. 2, p. 257, pl. 42 a). ab. **wesloeensis** Knoch. The narrow red costal stripe of normal specimens extends as a wide band obliquely across the forewing. — subsp. **porca** B.-H. from Kultuk on the Lake of Baikal, ♂ has brownish antennae; thorax and abdomen rose; basal area of forewings brown, central area rose on costa, discal band greenish brown, marginal area rose.
- sus*. *P. suellus* Stgr. (Vol. 2, p. 258, pl. 42 b). subsp. **sus** B.-H. from Central Tian-Shan, Issyk-kul, Aksu, Juldus. ♂ antennae pure white, collar reddish brown with rose edge, thorax rose, abdomen brown on upperside with 3 lateral marks. Base of forewings brownish, central area rose, discal band brown (rose at costa), margin rose.

35. Genus: **Hippotion** Hbn.

- rosea*. *H. celerio* (Vol. 2, p. 258, pl. 42 b). **rosea** Closs denotes a form heavily suffused with red. — ab. **luecki** Closs is a melanic form in which all black markings are heavily increased; consequently on hindwings the red band is much suppressed in the outer half. The silvery markings are quite absent except for rudimentary traces of the lateral spots on abdomen. — ab. **sieberti** Closs. The oblique band of forewings very wide and yellowish instead of silvery; of the two thin dark lines that extend through this band in the main type form, only one is indicated, whilst the band is divided through its entire length by a wide dull brown shade.

36. Genus: **Theretra** Hbn.

Also in regard to this Genus MELL deserves every credit on account of his researches in the early stages and modes of life. The *Theretra* ova are distinctly longer than wide, almost always green and generally deposited a few at a time in batches of 2—7 (*suffusa* always singly) on a plant. Head of larva always devoid of markings; ocelli present in all species. — Pupation generally takes place in a tough trellis network puparium on the surface of the earth or between leaves (*silhetensis*). The larva of *clotho* climbs upwards for pupating, spinning up on tree stems or in crevices of walls, on the other hand *oldenlandiae* enters the earth for pupation.

- nessus*. **T. nessus** Drury (Vol. 2, p. 258, pl. 42 c and Vol. 10, p. 565). In regard to the colouration of the larva, it should be added that same varies from whitish green over green to rusty yellow-red and the red-brown of autumn shades. Ocellus of 4th segment relatively small, dull buff, no pupil and indistinctly marked, at the best there is still a pale ocellus-like spot on 5th ring. The very large pupa (65—81 mm) is dorsally grey-brown with a brown dorsal stripe, ventrally in the sheaths of the limbs with sharply dark outer area, leaving a pale central zone; cremaster with 2 distinct bristles at tip. Food plants Dioscoreaceae. — The moth is a regular visitor at flowers. It is nervous and lively and when disturbed during the day flies away rapidly and excitedly.
- clotho*. **T. clotho** Drury (Vol. 2, p. 259, pl. 42 d and Vol. 10, p. 565). Pupa is dark stone-grey; cremaster groove large and deep, the long bristles at tip diverging slightly outwards like the tail of a swallow.
- alecto*. **T. alecto** L. (Vol. 2, p. 259, pl. 42 f and Vol. 10, p. 566). Pupa is sleek and of irregular colour; proboscis and tips of sheaths of limbs pale yellowish grey; dorsal region impure greenish brown; sides from eyes to anus grey brown shaded with grey and with longitudinal streakings; eyes pale yellowish grey. Tongue sheath is shaped like a drake's bill, projecting 7—9 mm above the frons. Cremaster terminating in a simple point. — The moth visits flowers and is very lively. — subsp. **transcaspica** B.-H. (13 c) from Transcaspia is much smaller than the main type form, 61—70 mm. Ground colour of forewings brownish grey. On outer edge of the bold oblique stripe of forewings there is a bright reddish stripe; this stripe, however, sometimes occurs in *a. cretica*. The black lateral patches at base of abdomen reduced in size. Black stigma more distinct.
- japonica*. **T. japonica** Orza (Vol. 2, p. 259, pl. 42 b and Vol. 10, p. 567). Pupa is sleek, impure yellowish brown, sheaths of antennae and legs darker, dotted with blackish as the veins of the wings, no striking sheath of proboscis, only projecting like a keel in the region of the eyes. Cremaster long, sleek, generally bent ventrally, at its tip 2 horizontal, projecting, slightly curved spikes. Pupa in the earth and under the ridge of rocks. — Also the *japonica* moths visit flowers.
- oldenlandiae*. **T. oldenlandiae** *oldenlandiae* F. (Vol. 2, p. 259, pl. 42 b and Vol. 10, p. 567). An indo-australian species that also occurs in China and Japan. Larva is generally dark, rarely green, thoracic segments with a subdorsal



row of yellowish or white dot ocelli. Horn thin and straight, black. Ocelli large, roundish; those on 4th and 5th segments with dark pupils. Pupation in the earth just below the surface in a spun puparium (not a network puparium as the other species and thus forming an exception). — Pupa is not unicolourous: thorax and sheaths of limbs dull greenish brown, sheaths of legs and wing cases dotted grey-black. Tergite pale reddish brown, posteriorly darker deep brown, sternite impure buff. Sheath of proboscis clumsy, frontally and ventrally arched 1,2—1,5 mm. Cremaster conical tapering off, with a black glossy horn at tip which is bifurcated, the tips standing out obliquely. — Hibernated specimens from S. China and also those bred in Berlin, have according to MELL an inclination to olive colouration on forewings. The dark oblique band is not distinctly outlined inwardly in its costal part, the abdominal lateral stripes and the pale lines of the tegulae are pure golden (= f. *olivacens* Mell.).

*olivacens.*

**T. silhetensis** Wkr. (Vol. 2, p. 259 and Vol. 10, p. 567) from Java to Japan. Similar to *oldenlandiae*, *silhetensis*. but there is only a single white dorsal line on abdomen. On upperside of forewings a brown oblique band analogous to that of *oldenlandiae*; line 4 more distinct; space between lines 3 and 4 somewhat silvery, between 4 and 5 not silvery and wide, line 5 heavier than line 6. — Larva is green or earthy grey to black-grey, it has 7 small longish pupilled ocelli, of which the middle ones are generally larger than the 1st and last pairs. The horn is only 3 to 4 mm long, straight or slightly bent, yellow-red to deep brown, end half grey-black, tip pale. Pupation takes place in the groove of the stem of a leaf or in the tip of a leaf; MELL presumes that if the food plant had not been placed in water, the pupation would have taken place in the earth. — Pupa earthy brown, sleek, smooth; sheath of proboscis projects more longitudinally than transversely. Cremaster short with simple grey-black tip of abt 1 mm length.

### 37. Genus: **Rhyncholaba** R. & J.

**R. acteus** Cr. is dealt with in Vol. 10 (p. 568) and illustrated there on pl. 68 d, as the species had hitherto *acteus*. not been known to occur on palaearctic territory. It occurs however in Szechuan, China and presumably forms a subspecies there in which the markings of the underside are much more distinct and black. So far insufficient material is available to decide this question. — Ova pale green. Larva tapers off considerably from 4th segment to head. It has 7 obliquely situate ocelli, of which the 1st is much enlarged, having a double edge. Colour of body is green, more rarely brown with green ocelli. Horn short 2—3 mm, brick-red and convex. True legs somewhat paler red. Food plants are Araceae and Vitaceae. The pupa is remarkable as it is the only one of the *Sphingidae semanophorae* that has a handle shaped tongue case; it forms a bold arch to the breast, where it ends in a small groove. Colour is yellowish grey, darker dorsally. Cremaster widely flat like a drake's bill, flatly hollowed out underneath, terminating in 2 widely separated short bristles, of which there are also some laterally.

### 38. Genus: **Rhagastis** R. & J.

**R. mongoliana** Btlr. (Vol. 2, p. 259, pl. 42 f and Vol. 10, p. 568). DR. JORDAN indicates (in Vol. 2) *mongoliana*. that the larva had been observed on Balsamina; according to MELL his collectors also found same on knot-grass (apparently *Polygonum aviculare* L.). — The pupa is brown mixed with grey, reminding one in shape and colouration of *japonica*. Sheath of proboscis scarcely projecting frontally and ventrally. Cremaster terminating in 2 black glossy spikes of barely 1 mm length, which are bifurcated at tip and hooked. — In S. China *mongoliana* forms the subspecies *pallicosta* Mell with pale costal margin to forewings (Vol. 10, p. 568).

*R. albomarginatus* Rothsch. hitherto known from Sikkim and Assam and dealt with in Vol. 10 (pl. 47 e), forms in China the subsp. **dichroae** Mell (Vol. 10, p. 569). It not only occurs in the south of China, but *dichroae*. has also been discovered on palaearctic territory near Shanghai (Mokan-Shan) by HÖNE. The subspecies is smaller than the main type form, more inclined to olive and almost without brown on wings and thorax; the coppery golden brown is paler and yellowish brown. Stigma on the wings less distinct, sometimes almost entirely extinct on forewings. Also the genitalia differ. — Ova greenish white, up to 5 ova on one shrub (of *Dichroa febrifuga* Lour). Larva pale leaf green, laterally darker than dorsally. Subdorsal line indistinct from 1st segment to ocellus, edged on upperside by darker green. Seven 1,5—2 mm wide oblique stripes. Horn barely of medium length, clumsy, angulated like a knee above the base and thickest at the bend, tip stumpy. Pupa with earthy coloured abdominal tergites; thorax, clypeus, base of tongue sheath and wing cases tinged with black. At dorsal base of cremaster there are two steely blue glossy spikes.

### 39. Genus: **Cechenena** R. & J.

**C. minor** Btlr. (Vol. 2, p. 260, pl. 42 d and Vol. 10, p. 570). Ova yellowish, slightly glossy. Larva up *minor*. to the last moult green, then at thoracic end (also ventrally) dark earthy grey-brown, posteriorly only the



back to the subdorsal is coloured thus, laterally and ventrally it is paler grey-brown. The subdorsal extends over the entire length but is intersected on the 4th segment and posteriorly to same it consists of convexly shaped arched streaks; from the 9th segment onwards it is distincter and finally merges clearly and distinctly in the horn; 6 oblique stripes (the usual 7th stripe of *Sphingidae* larvae that merges in the horn is missing). Horn thick-set, graphite-grey, slightly curved, its tip as wide as the middle. Food plants: Ampelopsis, Actinidia, more rarely on Araceae. Pupa woody grey-brown, dorsally pale earthy grey with black dorsal line. Sheath of proboscis projecting frontally 6 mm. Cremaster with 2 pairs of bristly spikes.

The following *Sphingidae* forms from Japanese territory were described by MATSUMURA in 1921. The descriptions were unfortunately not available to me, as the literature relating to same was destroyed at the time by the earthquake: *Dolbina parva*, *curvata*, *lateralis*, *Oxyambulyx takamukui*, *Smerinthus tokionis*, *Rhagastis trilineata*.

We are now giving illustrations of the following *Sphingidae* dealt with in Vol. 2: *Meganoton scribae* Aust. (p. 234) (12 a), *Marumba gaschkewitschi complacens* Wkr. (p. 241) (12 d), *Pergesa elpenor* ab. *daubi* Niep. (p. 257) (13 e).

## Appendix.

### Hybrids of Sphingidae.

By B. GEHLEN.

#### I. Hybrids of the Genera Calasymbolus, Smerinthus, Amorpha.

##### A. Primary Hybrids.

- worms-*  
*bacheri.* C. hybr. **wormsbacheri** John (12 f) (*Calasymbolus myops* Abb. & Sm. ♂ × *S. ocellata* L. ♀) rather inclines to resemble *myops*, but is about midway between the parent forms. In comparison with *myops* the apex of forewings is more acute, the nice violet dusting is absent, the yellow spots at apex and anal angle of forewings and on costa of hindwings are absent, stigma only indicated. Hindwings are not yellow, but pale rose with relatively very large black eyespot, which as in *myops* has a blue pupil. Underside is nearly the same as in *myops*, only here also the yellow is suppressed and replaced by dull reddish grey.
- ocello-*  
*planus.* S. hybr. **ocelloplanus** John (12 e) (*S. ocellata ocellata* L. ♂ × *S. planus* Wkr. ♀). Antennae almost as thick as those of *planus*. Foretibiae with shortened spur process, as is characteristic of *ocellata*. The eyespot of hindwings varies in size between that of *ocellata* and *planus*. In this hybrid the difference in size between ♂ and ♀ is remarkable; whilst the ♂♂ are 75 mm, at most 80 mm expanse, the ♀♀ are 90—95 mm.
- melania.* S. hybr. **melania** John (12 f) (*S. planus* Wkr. ♂ × *S. ocellata ocellata* L. ♀) resembles the reciprocal cross exactly (also the spur on foretibiae is present) only the eyespot of hindwings is never as large as in *planus* and the disparity in size between the sexes is not evident; wing expanse for ♂ and ♀ is 75 mm on the average.
- ocello-*  
*astylus.* S. hybr. **ocelloastylus** John (12 f) (*S. ocellata* L. ♂ × *Calasymbolus astylus* Drury ♀) is very close to the product of the reciprocal cross, hybr. *interfaunus*, but differs by the increased ruddiness on forewings and hindwings; further the antemedian band of forewings extends more straightly from costal margin to anal angle, whilst in *interfaunus* Neumög. (Vol. 2, p. 262) it is much more sharply angulated immediately below the cell.
- platei.* S. hybr. **platei** Stndf. (12 f) (nom. nud. sine descript.) (*S. ocellata* L. ♂ × *S. jamaicensis geminatus* Say ♀) inclines in contour of wings, colouration and markings more to *ocellata*, in size it is midway between the two parent forms. On forewings the bands and dark marginal area of *ocellata* are present, but also the apical spot of *geminatus*. The dark antemedian band forms a right angle. The small dark discal spot of *ocellata* (between the 2nd and 3rd radialis) is only faintly indicated. The red of hindwings is generally like that of *ocellata*, in such cases the pale marginal area of *geminatus* is quite absent; sometimes there is a paler marginal area, but never so pronounced or clearly marked as in *geminatus*. The eyespot is more like that of *ocellata* in



shape, but the subdividing tendency of *geminatus* is always visible. Underside very like *ocellata*, but the apical spot of forewings of *geminatus* impresses its characteristic also here. Antennae like *ocellata*. — (Described from 4 specimens in my collection.)

**S. hybr. eisneri** Gehlen (12 d) (*S. kindermanni* Led. ♂ × *A. populi* L. ♀ or reciprocal cross) was captured in nature in Syria, I have only a specimen without antennae before me. This interesting hybrid looks at first glance very like *populi*, but the thoracic spot gives the clue. All wings are reddish brown on upperside and of the size of a large *populi*. Body grey-brown with a pale thoracic spot and diffuse but distinct dorsal line on abdomen. Wing contour reminds one more of *kindermanni*, especially the hindwings are not so rounded as *populi*, but more elongated, on the other hand costa of hindwings more closely resembles *populi*. The shape of the outer margin of forewings is midway between the parent forms; the indentations between 1st and 3rd radialis and before the anal angle distinctly remind one of *kindermanni*. The markings on forewings are much bolder than in *populi* and there is a sharp discal double line, which is indented inwards along the veins. The antemedian line is very distinct and bent outwards at the centre. The white apical line of *kindermanni* is present, extends however in an arch from apex to 2nd subcostal nervule and then immediately inwards. It therefore does not form an outward dentation on 5th subcostal nervule as in *kindermanni*. Anal spot of forewings (of *kindermanni*) distinct, as also the white stigma of *populi*. Hindwings with only an indication of the rusty red basal area and a double discal band (*populi*). Anal spot of *kindermanni* is almost completely extinct and is only indicated by a darkening of the discal line at that spot. It is edged paler outwardly. Underside is ruddy brown as upperside, but somewhat paler and has the distinct characteristics of *kindermanni* in the markings.

**A. hybr. bertae** Dannenberg (*A. populi austauti* Stgr. ♂ × *S. planus* Wkr. ♀). Only ♂♂ specimens resulted, which are rather smaller than the related *metis*, *varians*, *oberthüri* and *operosa* (Vol. 2, p. 262). Wing contour of *bertae* varies considerably from these, as in this respect it strongly inclines towards *planus* and in general has a striking resemblance to a healthy *planus* ♀. A few specimens have wider wings, thereby approaching *metis*. Although the ♂ parent was a reddish specimen, the colouration is a nice blue-grey with darker bands situate as in *metis*. The large eyespot of hindwings immediately typifies this hybrid from all others; the eyespot expands over half the wing, it is clearly marked and has a wide black edge; the blue centre mark generally contains a dark pupil; in some specimens the black edge is so wide, that the blue is almost suppressed. Basal area is fairly intensively carmine red in a moderate expanse. The anterior section of the wings is very pale and sharply outlined from the rest. The general impression of the hindwings is that of *planus*. The thoracic spot varies in size, but is generally darker than in other hybrids.

KLEMANN gives a new name **populata** to the well known hybrid *A. hybr. rothschildi* Stndfs. His explanation, which seems to me inadequate, is to give a new name to the product of the crossing of *A. populi* L. ♂ × *S. ocellata* L. ♀, which STANDEFUSS had named *hybr. rothschildi*. KLEMANN asserts that the specimens of his breeding are entirely different to *rothschildi* and even goes so far as to say that STANDEFUSS may have made a mistake in the particulars of the parent forms from which he had bred his *rothschildi*! — The *populata* specimens resemble *hybridus* with very large eyespot on hindwings, which are wider than high, whilst in *rothschildi* eyespots were almost extinct. Further in contrast to *rothschildi*, *populata* resembles *ocellata* more than *populi*. Ground colour of forewings is violet-grey, markings as *hybridus*, but with much more distinctly blue and black marked eyespots. Red colouration at basal area of hindwings is very brilliant. Underside bright reddish.

As hybrids in the same or in different broods can vary quite enormously and as further, of the many experiments only 4 imagines were bred, it is not so very remarkable that 2 specimens of one brood differ from 2 specimens of another brood. One could enter into a discussion of races in conjunction with atavism and mendelism, but this is not the place for a digression of this nature.

### B. Secondary Hybrids.

**S. hybr. aemilii** Klemann (*S. hybr. ocelloastylus* John ♂ × *S. ocellata* L. ♀). This hybrid shows marked characteristics of both parents. Those specimens that resemble *ocellata* in markings and colour, are also of the size of *ocellata*. Two-thirds of the specimens have diffuse forewing markings. Eyespots of hindwings generally smaller than *ocellata*, higher than wide. A few specimens with nice rose suffusion, a few violet-grey and reddish grey.

**S. hybr. szczodrowskii** Müller (*S. hybr. hybridus* Steph. ♂ × *A. populi* L. ♀) resembles on upper and underside deeply dark grey *populi* specimens. The *ocellata* eyespot on hindwings is however, still indicated by a very faint bluish sheen. Only 2 ♂♂ were successfully brought through.

**S. hybr. alice** Klemann (*S. hybr. neopalaearcticus* Stdf. ♂ × *S. ocellata* L. ♀) is of the same size as normal *ocellata* and in its general appearance is midway between the parent forms. Indentations of margins of wings almost exactly like *neopalaearcticus*. Also the eyespot is like the latter, it is higher than wide and is halved in the (3) ♂♂; only in the upper part is there a vivid blue, whilst the lower part has a brownish tone.



In the 2 ♀♀ brought through, the eyespots of one resemble the eyespots of *excaecata* with wide black edge in lower part. In the other ♀ there is a large deep black spot without any blue colouration at all in the place of the eyespot.

*kunzi*. S. hybr. **kunzi** Dannenberg (hybr. *gertrudis* Dannenb. ♂ × *A. populi populi* L. ♀). — This hybrid is midway between *hybridus* and *fringsi*, but is rather closer to *fringsi*. Wing expanse 62—71 mm. Forewings are narrower than *hybridus*, outer margin not so bulging. Outer margins of all wings less undulate than *hybridus* and *fringsi*. Colouration a rich dark grey, partially with reddish tinge. Thoracic spot not wider, but paler than in *fringsi*. Markings pale and diffuse, central area darker, the inner edge of same never shows the sharp partially right angle as in *hybridus*. It extends in an obtuse angle or in an undulate line similar to that of *fringsi*. The rusty spot on hindwings is dull yellowish or reddish yellow; eyespot markings are much less pronounced and incline to be completely extinct.

*standfussi*. S. hybr. **standfussi** Dannenberg nec Bartel (*A. populi austauti* Stgr. ♂ × S. hybr. *gertrudis* Dbg. ♀). — Is closer to hybr. *metis* Oberth. than to hybr. *varians* Stdfs., but the wings are considerably narrower than in the latter. Outer margin of forewings moderately undulate. Colouration is pale grey to light yellow-grey with dark central band. Thoracic spot narrow as in *metis*, but generally darker. Markings of subterminal lines on forewings more indistinct, whilst the inner edge of the central area is more sharply marked (as in *metis* in contrast to *oberthüri*) and this line has 2 sharply marked dentations pointed outwards (which are not present in *metis*, *oberthüri* and *varians*). The red of hindwings is paler and less extensive than in *metis* and *oberthüri*. Eyespot of hindwings distinct as in *metis*, but the black border of same is narrower.

The following further hybrids of this group have been bred, of which hitherto no descriptions have been published:

- |                                     |   |
|-------------------------------------|---|
| <i>populi-</i><br><i>formis</i> .   | A. hybr. <b>populiformis</b> Stdfs. ( <i>A. populi</i> L. ♂ × <i>A. hybr. langi</i> Stdfs. ♀).                            |
| <i>tremulae-</i><br><i>formis</i> . | A. hybr. <b>tremulaeformis</b> Stdfs. ( <i>A. hybr. langi</i> Stdfs. ♂ × <i>A. populi</i> L. ♀).                          |
| <i>exstin-</i><br><i>guenda</i> .   | A. hybr. <b>exstinguenda</b> Stdfs. ( <i>A. hybr. tremulaeformis</i> Stdfs. ♂ × <i>A. hybr. tremulaeformis</i> Stdfs. ♀). |
| <i>miranda</i> .                    | S. hybr. <b>miranda</b> Stdfs. ( <i>S. ocellata</i> L. ♂ × S. hybr. <i>neopalaeartica</i> Stdfs. ♀).                      |
| <i>complicata</i> .                 | S. hybr. <b>complicata</b> Stdfs. ( <i>S. ocellata</i> L. ♂ × <i>A. hybr. tremulaeformis</i> Stdfs. ♀).                   |
| <i>discrepans</i> .                 | S. hybr. <b>discrepans</b> Stdfs. ( <i>S. ocellata</i> L. ♂ × <i>A. austautoides</i> Stdfs. ♀).                           |
| <i>planoger-</i><br><i>trudis</i> . | S. hybr. <b>planogertrudis</b> Kunz ( <i>S. planus</i> Wkr. ♂ × S. hybr. <i>gertrudis</i> Dannenb. ♀).                    |
| <i>planatlan-</i><br><i>ticus</i> . | S. hybr. <b>planatlanticus</b> Kunz ( <i>S. planus</i> Wkr. ♂ × <i>S. ocell. atlanticus</i> Aust. ♀).                     |
| <i>fischeri</i> .                   | S. hybr. <b>fischeri</b> Kunz ( <i>S. ocellata</i> L. ♂ × S. hybr. <i>charlotta</i> Dannenb. ♀).                          |
| <i>schneideri</i> .                 | S. hybr. <b>schneideri</b> Kunz ( <i>S. hybr. charlotta</i> Dannenb. ♂ × S. hybr. <i>gertrudis</i> Dannenb. ♀).           |
|                                     | S. hybr. (sine nom.) ( <i>S. hybr. fischeri</i> Kunz ♂ × <i>S. ocell. atlanticus</i> Aust. ♀). (Bred by DR. E. KUNZ.)     |
|                                     | S. hybr. (sine nom.) ( <i>S. hybr. fischeri</i> Kunz ♂ × <i>S. hybr. fischeri</i> Kunz ♀). (Bred by DR. E. KUNZ.)         |

## II. Hybrids between the Genera *Celerio* and *Pergesa*.

### A. Crosses between races of the *C. euphorbiae* group.

*euphothymali*. C. hybr. **euphothymali** Niep. (13 c) (*C. euph. euphorbiae* L. ♂ × *C. euph. tithymalia* Bsd. ♂) is exactly midway between the races. The olive-green costal zone as in *tithymali*, but not so wide, so that the central area appears to be wider. Outer edge of the oblique band as in *euphorbiae*. Olive-grey marginal area wider than in *tithymali*.

### B. Primary Hybrids.

*flavescens*. C. hybr. *galiphorbiae* Dso. (Vol. 2, p. 266, pl. 43 a, c). ab. **flavescens** Günther has yellow instead of red median band to hindwings (of the same colour as central area of forewings); cloudy dusky brown before the anal spot.

*rosacea*. C. hybr. *pernoldi* Jacobs (Vol. 2, p. 268, pl. 43 c). ab. **rosacea** Günther. The entire central area of forewings heavily suffused with pale rose. Markings very distinct. — ab. **pallida** Günther has central area of forewings and hindwings and underside yellowish rose and reminds one consequently somewhat of hybr. *geschwandneri*. —  
*imperfecta*. ab. **imperfecta** Günther has no submarginal band on hindwings or only traces of same. — ab. **unicolor** Günther  
*unicolor*. has such an expanded costal zone of forewings that the atavistic line and the inner edge of the oblique band are no longer visible and the outer edge of the oblique band appears diffuse.



*C. hybr. harmuthi* Kordes (Vol. 2, p. 266, pl. 43 a). ab. **unicolor** Günther is a parallel form to *hybr. unicolor. pernoldi* ab *unicolor* Günther.

*C. hybr. kindervateri* Kys. (Vol. 2, p. 265, pl. 43 a). ab. **engadina** Waldasch. is a dwarf form having *engadina*. only the size of *porcellus*. Central area of forewings yellowish white dusted with black. Oblique band blackish green with pale centre. Band of hindwings yellowish white.

*C. hybr. euphaës* Dso. (Vol. 2, p. 265, pl. 43 a). ab. **clara** Aust. has yellowish grey-white ground colour- *clara*. ation of forewings. Costal zone pale olive. Middle streak fainter, Hindwings like *euphorbiae*.

**C. hybr. galidahli** John (*C. gallii* Rott. ♂ × *C. euph. dahli* Geyer ♀). In comparison to *hybr. galiphorbiae galidahli*. Dso. the costal zone and oblique band of forewings are deeper and darker green. The narrow central area (which is scarcely wider than in *gallii*) is more whitish yellow dusted with black. Pale streaks along the veins are present but much reduced as compared with *dahli*. Anal spot on hindwings is smaller. Median band darker and redder, inclining towards carmine red. Colouration of entire upperside brighter and markings more pronounced. Dorsal stripe of abdomen distinctly visible. Only ♂♂ were bred.

**C. hybr. livopenor** Müller (13 b) (*C. l. livornica* Esp. ♂ × *P. elpenor elpenor* L. ♀). Body almost like *livopenor*. *elpenor*, but the red is suppressed, so that it is green with the exception of red traces on thorax. Markings of wings more closely resemble *livornica*; costal zone of forewings is green, without interruption, the pale middle band is rose; outer margin violet grey-red. Hindwings have an olive-black submarginal band, which is outwardly very wide and becomes fainter towards the inner margin. Underside grey-yellow.

**C. hybr. livorneuphorbiae** Wolter (13 e) (*A. l. livornica* Esp. ♂ × *C. euph. euphorbiae* L. ♀) has generally *livorneu-* speaking more of *euphorbiae* than *livornica* characteristics. Base and tips of antennae white, middle area dark. *phorbiae*. Tegulae with narrow impure white inner edge. The hairs at edge of tergites from the 3rd tergite remind one of *livornica*. Brush at tip of anus with white central line. On forewings veins are marked with light colour. Oblique band similar to that of *euphorbiae*. Central area occasionally wider than in *livornica*, dusted with white anteriorly and posteriorly. Costal zone more like *livornica*. Markings of hindwings like *euphorbiae*, however, the outer marginal band narrower, but wider than in *livornica*.

**C. hybr. güntneri** Niep. (13 d) (*C. l. lineata* F. ♂ × *C. euph. euphorbiae* L. ♀). Antennae grey-white. *güntneri*. Head and tegulae with white edges, the white *lineata* markings on thorax almost extinct. Abdomen with 2 dark dorsal lines. The black-white lateral marks on abdomen only to the 3rd segment and there only represented by a small black spot. Markings of forewings very pronounced with deep olive-green costal zone and oblique band and of very definite *lineata* character, only the veins are not quite so prominent. Hindwings remind one more of *euphorbiae*.

**C. hybr. gallivornica** Grosse & Kunz (*C. gallii* Rott. ♂ × *C. livornica* Esp. ♀) is about midway between *galli-* the parent forms. Antennae dark as in *livornica*. The white inner edge to tegulae of *livornica* is only indicated by *voronica*. a few whitish green scales. Abdomen with dorsal line as in *gallii*; the short white subdorsal streaks of *livornica* only indicated on the 3rd but last segment. On forewings the costal area is wider than in *gallii*. Basal spot and outer costal spot remind one of *livornica*, the 1st and 2nd of *gallii*, between these white scales as in *livornica*. Central area somewhat narrower than in *gallii*. Oblique band like *livornica*, but in width more like *gallii*; the narrowing of the band towards the hind margin midway between that of the parents, outer edge not so dentate as in *gallii*. Veins with white scaling, but not so pronounced as in *livornica*. On hindwings the central band is a rich red, as in *euphorbiae*, but the costal margin is somewhat paler. Marginal area very narrow.

**C. hybr. frömkei** Dso. (*C. gallii* Rott. ♂ × *hippophacēs* Esp. ♀). Antennae olive green in the upper two *frömkei*. thirds. Very wide costal zone to forewings, the oblique band is more strongly marked towards the base than in *hybr. euphaës*, outwardly it is less dentate. Central area wider than in *gallii* with grey scales near the costal markings. Hindwings with rich red median band.

**C. hybr. pulcherrima** Dso. (*C. euphorbiae mauretania* Stgr. ♂ × *P. elpenor elpenor* L. ♀) resembles the *pulcher-* reciprocal hybrid *elpotanica* Dso., but all colours are more vivid and more sharply sparated from one another. *rima*. On forewings the red patch before the olive green central area line is extended to the stigma. The white anal spot of hindwings is more faintly developed than in *elpotanica*.

**C. hybr. euphorbiaella** John (13 c) (*C. euph. euphorbiae* L. ♂ × *P. porcellus* L. ♀) is a very nice but *euphor-* very variable hybrid, of which the description given here is based on an average specimen. Antennae white, *biaella*. somewhat longer and thicker than in *porcellus*. Head and thorax olive green, often interspersed with red. Tegulae red anteriorly, with white outer edge, abdomen dorsally olive-green, ventrally and laterally unicolourous red. Ground colour of forewings red, sometimes tinged with dull yellowish. The black basal spot intermixed with white hairs. Oblique band of forewings pale olive yellowish, darker only at apex, hind margin and on 2nd radialis. Formation of oblique band as in *euphorbiae*, outwardly however very dentate and with dark edge both there and on inner border. The atavistic line generally present. Outer marginal area violet-red. The black basal spot of hindwings is wide and less incurved than in *euphorbiae*. Median band yellowish rose, partially with pale



green scalings. The white anal spot is absent. Submarginal band grey-black, outwardly very diffuse and changing into violet-red.

*hippothy-mali.* **C. hybr. hippothymali** Vlach (*C. hippophaës* Esp. ♂ × *C. euph. tithymali* Bsd. ♀). Antennae white with olive-green. Abdomen similar to *hippophaës*, but the lateral abdominal spots remind one of *euphorbiae*. On forewings costal zone is like that of *gallii*, but posteriorly to same it is more widely shaded, so that the somewhat dusky central area appears narrower. Oblique band like that of *hippophaës*, intersected by some of the pale veins. Band of hindwings of deep rose without paler patches. Black band very wide, outer marginal stripe very narrow. Anal spot pure white.

*tenerifana.* **C. hybr. tenerifana** Fischer (13 d) (*C. lineata livornica* Esp. ♂ × *C. euphorbiae tithymali* Bsd. ♀). In this hybrid the *livornica* characteristics are much more predominant than is the case in the nearly related hybr. *livorneuphorbiae* Wolter (*livornica* ♂ × *euph. euphorbiae* ♀). The chief difference between the two is that in *tenerifana* the pale veins are almost as definitely pronounced on forewings as in *livornica*, whilst in *livorneuphorbiae* they are considerably suppressed. Also the body is quite like *livornica*. Antennae show a white club on upperside, but the shaft is not as dark as in *livornica*. On forewings the oblique band is not so straight as in *livornica*, but somewhat bent outwards in centre and before the hind margin it bends slightly undulating towards same. The pale ground colour is faintly dusted with blackish. Hindwings about midway between the parent forms.

*selmonsi.* **C. hybr. selmonsi** Fischer (*C. euph. tithymali* Bsd. ♂ × *C. gallii* Rott. ♀). Very close to hybr. *kindervateri* Kys. as was only to be expected. A few differences should be mentioned. Body dark olive-green, not varying materially from parents. Central area of forewings narrower than in *kindervateri*. Basal spot is almost always sharply rectangular; between same and the large costal spot an almost black streak arises in the ground colour extending towards the latter. This is scarcely indicated in *kindervateri*. The oblique band is clearly intersected towards the centre by 2—3 veins and ends in a short arc on hind margin. The dark red central band of hindwings extends almost to costa and is faintly lighter only at its anterior extremity. Underside as *gallii*, but the pale central area of all wings appears reddish buff and the blackish anal patch is almost completely extinct.

*paranicaea.* **C. hybr. paranicaea** Fischer (*C. nicaea* Prun. ♂ × *C. euphorbiae* L. ♀) closely resembles *nicaea*. Wing expanse of ♂♂ 75—82 mm. Ground colour of upperside including antennae and legs faintly reddish. Forewings more or less dusted with blackish. In some specimens markings of forewings appear cloudy, which in extreme cases tends towards actual melanism. Oblique band is wider in its anterior part than in *nicaea* and bends inwards in a flat curve towards the hind margin. Basal and costal spots are always well marked, costal margin is slightly dusky, outer marginal area dark olive-grey. On hindwings the black basal spot and band are wide, the latter merges somewhat inwards in the variable red and is almost always accompanied by an olive-green shade. Anal spot partially pure white, partially dull reddish. Underside always red. Forewings with dark central streak and a median and postmedian undulate line.

*elpomali.* **P. hybr. elpomali** Muhr (*P. elpenor* L. ♂ × *C. euphorbiae tithymali* Bsd. ♀) is less variable than the nearly related *pernoldi* and considerably more dusky. Body olive-green, head and thorax suffused with delicate rose, in the original description it says "patagia with white hairs", but it must be presumed that this only applies to the edges. Abdomen laterally rose, the anterior black lateral mark bold, the posterior one only indicated. Legs and antennae white on top. Costal margin of forewings widely olive-green to base and sometimes conjoining with central band, so that the central rose-coloured area is extinct. Apex of wings and marginal area rose (sometimes dusky suffused), intersected daintily by the olive-green oblique band, which expands widely at hind margin and which has occasionally a dentate outer edge. The spot in the centre of the wing, as in *tithymali*, is more or less clearly marked, differing thereby from *pernoldi*. Hindwings similar to *pernoldi*. Submarginal band black. — The larvae are lemon-green with orange-red dorsal stripes, differing from those of *pernoldi* and having no resemblance to those of *elpenor* and showing practically no variation.

*dannen-bergi.* **C. hybr. dannenbergi** Kunz (*C. euphorbiae mauretana* Stgr. ♂ × *C. gallii* Rott. ♀) is the reciprocal cross to hybr. *galitanica* Dso. Only 5 ♀♀ were brought through. They have an expanse of 55—69 mm. The hybrid has naturally a strong resemblance to *galitanica*, *kindervateri* and *johani*. Wing contour more closely resembles that of *mauretana*, ground colour that of *kindervateri*. In central area a grey dusting expands from costa. The widely darkened costal zone and the apical expansion of the spot on the 2nd radialis are characteristic. Oblique band dark olive-green like the costa but paler than in *kindervateri* and with a reddish yellow hue, dusted with yellow on the median nervures, diffusing outwardly. Marginal area dark violet-grey and relatively narrow with dark atavistic line. Hindwings similar to *galitanica* and *galiphorbiae* with diffuse inner edge to the black submarginal band. Marginal area narrow, yellowish. Thorax olive-green, but paler than the costal zone and oblique band. Tegulae with sparse white hairs. Abdomen with pale olive-green dorsal stripe and white dorsal spots. One specimen has a 3rd pair of black-white lateral marks, though same are smaller. Antennae whitish. Underside of wings almost uniformly yellowish, partially with salmon rose sheen and some indications of darker markings.



In addition to the hybrids of this group enumerated in Vol. 2, PERNOLD has singularly published new names without any description for 2 hybrids that were already known, viz: for *C. hybr. gschwandneri* Kordesch, which he now denominates **jacobsi**, whilst for *C. hybr. pernoldi* (!) *Jacobs* he gives the name **philippsi**.

*jacobsi.*  
*philippsi.*

### C. Secondary Hybrids.

**C. hybr. ebneri** Grosse (*C. hybr. kindervateri* Kys. ♂ × *C. euphorbiae* L. ♀) must be sub-divided into *ebneri*. 2 groups according to the appearance. The specimens of the one group (50 %) cannot be differentiated in any way from *kindervateri* and a further description is therefore unnecessary. Those of the other group show a marked difference: antennae grey with white tip or quite white. Body like that of *euphorbiae*, dorsal line sometimes indicated. Wing contour and ground colour as *euphorbiae*. Costal area of forewings almost like *kindervateri*, but paler with indistinct edge and much paler than the oblique band. This has an irregular outer edge, shaped like that of *euphorbiae* with steep incline at hind margin. Outer costal spot forming an arc as in *euphorbiae*. Hindwings almost exactly like *euphorbiae*. Underside always more or less reddish. — The full grown larvae look identically like those of *euphorbiae*, only the rudimentary or completely absent dorsal line reminds one of *gallii*.

**C. hybr. helenoides** Grosse (*C. hybr. helenae* Grosse ♂ × *C. hybr. helenae* Gr. ♀) cannot be differentiated from typical *gallii* or *helenae* ♀♀ with *gallii* characteristics. It is remarkable that this tertiary hybrid reverts to type in spite of the considerable differences in its secondary parents. Also the larvae are very similar to those of *gallii* in all stages.

**C. hybr. pseudogallii** Grosse (*C. hybr. helenae* Grosse ♂ × *C. gallii* Rott. ♀) is very similar to *gallii*, but smaller than same. The pale middle area appears wider owing to the narrower costal marginal zone and the heavy incurving of the oblique band. The white anal spot of hindwings is much enlarged, the marginal area is paler and the median band, especially in the ♀♀ is not so red. The dorsal line is well marked on all specimens. — The author wishes to lay stress on the fact, that this tertiary hybrid seems to prove that cross-breeding twice with the original type suffices to revert to same, viz: the hybrids cannot be differentiated from the type and in any case neither the larvae nor imagines show any traces that indicate the original female parent *euphorbiae*.

**C. hybr. zwerinai** Grosse (*C. hybr. helenae* Grosse ♂ × *C. euphorbiae euphorbiae* ♀) closely resembles *zwerinai*. *hybr. galiphorbiae*, but differs from same by the narrower and reduced costal zone of forewings; the central area is faintly reddish. In contrast to *galiphorbiae* the underside is always red. It can easily be differentiated from *hybr. ebneri* with its *euphorbiae*-like wing contour, as its wing contour resembles that of *gallii*. Dorsal line either rudimentary or absent.

**C. hybr. bikindervateri** Grosse (*C. hybr. kindervateri* Kys. ♂ × *C. hybr. kindervateri* Kys. ♀). Antennae and body darker than in *kindervateri*. Dorsal line reduced or absent. On forewings costal zone and central area like *kindervateri*, but the latter is more or less darkly shaded, similar to *helenae*. (This dark shading appears to occur frequently in secondary hybrids of the *gallii* and *euphorbiae* groups, as it occurs in *helenae*, *kindergallii* and *casteki*.) Oblique band very narrow anteriorly, then suddenly wider and expanding to the hind margin in such a way that in 2 cases it is more than half of the width of the latter. Outer edge of the band very irregular, partly dentate. Outer area darker than in *kindervateri*. Hindwings almost like those of *helenae*.

**C. hybr. bergeri** Ehinger (*C. hybr. densoi* Musch. ♂ × *C. euphorbiae* L. ♀) forms 2 groups. The first inclines to the extent of 50% towards *euphorbiae*, especially in the ♀♀. In the majority of the specimens of this group, the ground colour is dull pale grey-yellow. The oblique band is often narrow in its apical extremity and descends vertically to hind margin. The 2 outer costal spots are always present. The marginal area is wider than in *euphorbiae* and grey. Contour of forewings sleeker, that of hindwings similar to *densoi*. The black submarginal band bolder than in *euphorbiae*. Black basal area reduced as in *densoi* and straighter outwardly, i. e. not so dentate as in *euphorbiae*. Antennae pure white. — In the second group, which inclines towards *densoi*, the two outer costal spots are generally confluent. The central area is dusky, occasionally more so than in *densoi* and some of the specimens can scarcely be distinguished from *densoi*. Underside dull grey-yellow, suffused with rose.

**C. hybr. turragallii** Aust. (recte *turagallii*) (*C. hybr. turatii* Dso. ♂ × *C. gallii* Rott. ♀) has the appearance of a very pale discoloured *galiphorbiae*. Band of hindwings very pale yellow-red. Submarginal band narrow and irregular. White anal spot very small and with olive shading at the anal angle. Body pale, similar to that of *galiphorbiae*. Antennae white. Underside white-grey.

**C. hybr. euphorbiae** Aust. (*C. euphorbiae* L. ♂ × *C. hybr. hippophorbiae* Dso. ♀) (= *hybr. isolde* *Pasold*) reminds one of *hybr. euphaes* with a slight inclination towards *euphorbiae*. Body very similar to that of *euphorbiae*. Forewings pale yellow-grey; the middle costal spot larger and more boldly marked than in *euphaes*, almost as in *euphorbiae*. Oblique band almost like that of *euphaes*. Hindwings similarly almost



identical with those of *euphaes* but the anal spot is larger and whiter. Underside more brightly red than in *euphaes*.

*euphorion*. **C. hybr. euphorion** Hornstein (*C. hybr. pernoldiana* Aust. ♂ × *C. hybr. epilobii* B. ♀) closely resembles *hybr. vesperdiana*. Antennae white. Body grey-green, darker towards middle, beyond the 2 black-white lateral markings there is still a third small black-brown spot. Ground colour of forewings grey-olive-green with faintly lighter central area. The large costal spot appears to be darker and merges with the outer costal spot in an indistinct mark. The oblique band has a dark edge with dentate outer border. Stigma blackish with pale circumscription. Wing contour longish with pointed apex. Hindwings rose like *vespertilio* with wide black submarginal band. Outer marginal stripes grey-rose and narrow, but wider than in *vespertilio*. Anal spot suffused with rose. (In the single specimen on which the description is based, the right hindwing is albinotic.)

*tykaci*. **C. hybr. tykaci** Vlach (*C. euph. euphorbiae* L. ♂ × *C. hybr. kindervateri* Kys. ♀) is a reciprocal cross to *hybr. ebneri* Gr. and corresponds to same, except for the underside which in *tykaci* is more or less reddish.

*euphogrossei*. **C. hybr. euphogrossei** Günther (*C. euph. euphorbiae* L. ♂ × *C. hybr. grossei* Dso. ♀) can partly not be distinguished from *grossei*, but it has a more reddish underside. Other specimens vary between *euphorbiae* and *galiphorbiae* with an inclination towards *euphorbiae*. In these the underside is also often red.

*pseudogrossei*. **C. hybr. pseudogrossei** Günther (*C. hybr. galiphorbiae* Dso. ♂ × *C. hybr. euphogrossei* Günth. ♀). Wing contour as *euphorbiae*. In all specimens the central area of forewings is duskily suffused. This shade is however almost always edged by the atavistic line and it is only occasionally that it extends beyond same. Some ♀♀ were obtained occasionally with yellow central area.

*rosea*. **C. hybr. euphaes rosea** Fischer (*C. euphorbiae* ab. *grentzenbergi* Stgr. ♂ × *C. hybr. euphaes* Dso. ♀). Actually under this name the products of two different crosses are grouped, viz: the result of the above named parents and that from the crossing of *C. euph. vandalousica* Ribbe ♂ × *C. hybr. euphaes* Dso. ♀. As however the author does not deem *e. vandalousica* to be a race of *euphorbiae* and therefore considers the red *e. vandalousica* specimen utilised, only to be an *e. ab. grentzenbergi*, he holds the two hybrids to be equal to one another. Nevertheless it is clear from the original descriptions that the two results are different and therefore do not favour his standpoint. The crossing of ab. *grentzenbergi* × *euphaes* was achieved in 1924, whilst that of subsp. *vandalousica* × *euphaes* was in 1926. The original description reads as follows: "The reversionary cross of 1926 with a deep carmine-red ♂ of the andalusian *grentzenbergi* race (!), which in its glow of colour seems to exceed the form occurring at Capri, gave a different result from that of 1924. Whilst in this latter a distinct grouping of the forms resulted, the one inclining strongly towards *euphorbiae* L., the other equally to *hippophaes* Esp., whilst the rest resembling the intermediary form *euphaes* Dso., in the 1926 brood all the specimens had a distinct *euphaes* character. The hybrid therefore, except for the usual moderate variation, which is natural, remained constant in its markings in spite of the reversionary crossing. Only the general tone of the colour differed in that it was interesting to observe, the red of *grentzenbergi* Stgr., proved not to be a volatile superficial characteristic, but, as I had hoped, was transmitted throughout to the hybrid progeny. As was only natural the rosy red tone lost some of its brilliance by intermixing with the pale grey to dull yellow ground colour of *euphaes* and as in nearly all individual specimens a whitish line occurs on inner edge of the olive-green oblique band, this new combination again reminds one of just that variation that C. RIBBE had actually intended under the denomination *vandalousica*. Therefore I should like to name this nice hybrid form *euphaes rosea* Fischer. Its size considerably exceeds that of *euphaes* Dso. (♂ 7—7.5 cms, ♀ 7.5—8 cms expanse)."

*josephi*. **C. hybr. josephi** Hornstein (*C. hybr. pernoldiana* Aust. ♂ × *C. euphorbiae* L. ♀) is a reciprocal crossing of *euphorion* Hornst. and can scarcely be distinguished from *euphorbiae* L. The marginal band of hindwings is narrower, the underside is much paler with larger and more intensive central spot.

*casteki*. **C. hybr. casteki** Grosse (*C. hybr. galiphorbiae* Dso. ♂ × *C. hybr. kindervateri* Kys. ♀). This hybrid, which is described from a single ♂, differs from all other hybrids of the *gallii* and *euphorbiae* group by the almost completely *vespertilio* like, moderately grey-blue shading of the central area of forewings. Antennae and body like *galiphorbiae*. Dorsal line is absent. Wing contour more like *euphorbiae*. Costal zone like *galiphorbiae* with indistinct markings. Stigma distinct and large. The shading of the central area only outwardly of the narrow atavistic line pale yellow. Oblique band like *euphorbiae*, descending steeply to hind margin. Outer area grey-lilac. Hindwings deep red as *euphorbiae*. Outer band expanding towards the base with dusky shading. Marginal area reddish grey. Underside reddish.

*srđinkoi*. **C. hybr. srđinkoi** Oberth. ([*C. hippophorbiae* Dso. ♂ × *C. euphorbiae* L. ♀] ♂ × *C. hybr. hippophorbiae* Dso. ♀) differs from a large *euphorbiae* ♀ only through the median band of hindwings, which is not so clearly red, but rather a dusky carmine. Marginal stripe narrower (described from a single ♂ specimen).



**C. hybr. juliana** Rbl. (*P. elpenor* L. ♂ × *C. hybr. epilobii* Bsd. ♀) generally speaking inclines towards *juliana*. *elpenor*. Antennae white on upperside, yellow-red below. Thorax olive-green with red longitudinal streak. Posterior edge of collar and tegulae pure white. Abdomen unicoloured olive-green on upperside without longitudinal streak, laterally red. Only a single deep black lateral mark. Half the costal marginal zone and oblique streak of forewings are olive-green, the rest of the surface is red. Hindwings pale red, never so brilliant as in *elpenor*. Black basal spot narrower. Black submarginal band always more or less present. Anal angle paler, but never white. Underside rosy red with olive-green. Differs from *elpenor* by the pure white antennae, absence of the dorsal line on abdomen, olive-green costa of forewings, absence of the white stigma and the much more prominent oblique stripe of forewings.

**C. hybr. vesperdiana** Hornst. (*C. hybr. pernoldiana* Aust. ♂ × *C. vespertilio* Esp. ♀). According to *vesperdiana*. outward appearance the specimens can be divided into 2 sharply distinct groups. In the 1st most striking group the forewings are grey inclining towards ochreous yellow and of almost uniform colouration. Basal and costal spots, as well as the oblique stripe are extinct, whilst the oblique band that is usually darker, appears here to be paler, being an ochreous yellow on the greyish ground. At base of forewings there is a grey-black spot that turns to whitish grey at hind margin. In centre of wings there is an obsolete dark spot and inwards of same a white-yellow mark. Hindwings like those of *vespertilio*, but the marginal stripe is somewhat wider, the red darker. Body pale yellow-grey, grey on thorax and laterally whitish grey. Antennae yellowish white. Underside dull reddish with grey-violet sheen. — The specimens of the 2nd group look like very dusky *epilobii* nevertheless with distinctly visible *euphorbiae* markings on forewings, however not olive-grey, but grey. Basal costal spots and oblique band diffuse. Also in this group the hindwings are like those of *vespertilio*, the anal spot is deep rose. The band is often very wide and intensively black. Body grey-olive-green, with pale grey edges on thorax. Abdomen often with 3 black lateral spots. Antennae white. Underside grey-rose with blackish shading, very like *vespertilio*.

**C. hybr. kostiali** Ehinger (*C. hybr. bergeri* Ehinger ♂ × *C. euphorbiae* L. ♀). The progeny of a crossing of an *euphorbiae* like ♂ of hybr. *bergeri* could not be distinguished from typical *euphorbiae*. From a crossing with a hybr. *bergeri* ♂ which had faintly dusky forewings, 62 specimens were produced, all of very good size. Of these 35 had very dusky forewings; the duskiness of forewings through the olive-green scales exceeds that of *bergeri*, in fact it surpasses that of *densoi* and generally contains the atavistic central line. 41 specimens retained a purely *euphorbiae* type and 14 formed a transition of *bergeri* to *euphorbiae*. If one considers that the *kostiali* hybrids were of  $\frac{7}{8}$  *euphorbiae* extraction, the result is remarkable.

**C. hybr. löffleri** Ehinger (*C. kostiali* Ehinger ♂ × *C. euphorbiae* L. ♀). I could not find a description of this quaternary hybrid. At the time of publication only one ♂ was in existence from the copula. *löffleri*.

**C. hybr. pseudophorbiae** Hornstein (*C. euph. euphorbiae* L. ♂ × *C. hybr. pernoldiana* Aust. ♀) resembles *pseudophorbiae*. *euphorbiae* L. to an extraordinary degree, differing by the sleeker shape of the body and more pointed wings. Central area sometimes suffused with grey and the costal zone more diffuse. Hindwings more extensively rose. Outer margin narrower.

**C. hybr. kindertanica** Gehlen nom. nov. (= *zwerinai* Vlach., nom. praeoccup.) (*C. hybr. kindervateri* Kys. ♂ × *C. euph. mauretanica* Stgr. ♀) resembles *mauretanica*, but the hindwings are narrower and red-brown instead of carmine. Head, antennae and thorax like *euphorbiae*. On abdomen a row of white spots reminds one of *gallii*, whilst on account of the heavier white edge to the last abdominal segments one is reminded of *kindervateri* and *galiphorbiae*. *kindertanica*.

**P. hybr. degenerata** Kotzsch (*P. hybr. luciani* Dso. ♂ × *C. euphorbiae* L. ♀) is smaller than *elpenor* *degenerata*. (expanse 46—55 mm) and inclines in its markings towards *euphorbiae*, but the dark central line on forewings is mostly present, as in *harmuthi*, *gshwandneri*, *gillyi* etc. Ground colour of upperside reddish like *elpenor*, redder than in *luciani*. Oblique band relatively narrower than in *euphaes* Dso. The large costal spot larger than in *galiphorbiae*. Basal spot less developed than in *euphorbiae*. Abdomen olive-green on upperside, red below with a single black lateral spot. Antennae white. Underside of wings reddish.

**P. hybr. elpenorides** Kotzsch (*P. hybr. luciani* Dso. ♂ × *P. elpenor* L. ♀) differs little from *elpenor*. *elpenorides*. The red marking is bolder and more extensive. The red margin of hindwings on the other hand is narrower and on underside the red margin of forewings is wider and towards the apex it does not approach the outer margin.

**P. hybr. stollei** Zoological Institute, Vienna. (*P. hybr. luciani* Dso. ♂ × *P. porcellus* L. ♀) is generally smaller than *porcellus*. The colouring and marking characteristics are as different as in hybr. *luciani* Dso., so that it is difficult to describe a type. All specimens vary and partly revert to the forms of the primary hybrid. Of the two delicate oblique lines traversing the forewings, the outer one always extends to the costal margin, whilst the inner one generally diffuses in the costal zone, which is usually *porcellus* like and reddish or greenish-ochre. Hindwings as a rule are like *porcellus*, but as is seen from the illustrations, specimens occur having an almost monotonous olive-grey hindwing without black basal and costal zones and no submarginal band. The white lateral spots in the anal region of abdomen are almost always present. *stollei*.



In addition the following hybrid has been bred for which hitherto no description has been published:

*C. hybr. (sine nom.) (C. hybr. kindervateri Kys. ♂ × C. hybr. hippophorbiae Dso.-♀).*

All the hybrids enumerated here, with the exception of *eisneri* Gehlen, which was captured in nature, have only been obtained in captivity.

The following hybrids of this group have also been bred. No descriptions have been published and no denominations made:

(sine nom.)  $\left\{ \begin{array}{l} C. \text{ hybr. } hippophorbiae \text{ Dso. } \♂ \times C. \text{ euphorbiae } L. \text{ } \text{♀.} \\ C. \text{ gallii } Roll \text{ } \♂ \times C. \text{ euphorbiae deserticola Bartel } \text{♀.} \\ C. \text{ hybr. } wagneri \text{ Dso. } \♂ \times C. \text{ hybr. } hippophorbiae \text{ Dso. } \text{♀.} \end{array} \right.$

The hybrid *S. hybr. hybridus Steph.* dealt with in Vol. 2 is now illustrated in this volume (13 b).

#### Supplement 1.

The following further hybrids of this group have been achieved, for which so far no denomination has been given and no description published:

(sine nom.)  $\left\{ \begin{array}{l} C. \text{ euphorbiae deserticola Bartel } \♂ \times C. \text{ euphorbiae } L. \text{ } \text{♀.} \\ C. \text{ centralasiae Stgr. } \♂ \times C. \text{ euphorbiae deserticola Bartel } \text{♀.} \\ C. \text{ gallii Rott } \♂ \times C. \text{ euphorbiae deserticola Bartel } \text{♀.} \\ C. \text{ hippophaes Esp. } \♂ \times C. \text{ euphorbiae deserticola Bartel } \text{♀.} \\ C. \text{ hippophaes Esp. } \♂ \times P. \text{ elpenor } L. \text{ } \text{♀.} \\ C. \text{ lineata livornica Esp. } \♂ \times C. \text{ gallii Rott } \text{♀.} \end{array} \right.$  Bred by JOHN.

#### Supplement 2.

(sine nom.) *C. hybr. wormsbaeheri John ♂ × S. ocellata L. ♀.* Bred by JOHN.

*miranda.* **S. hybr. miranda** Stdfs. (*S. ocellata* L. ♂ × *S. hybr. neopalaeartica* Stdfs. ♀). Size and form as *ocellata*. Outer margin of wings generally slightly dentate. Body and forewings inclined to rusty brown on upperside, not grey or grey-red as *ocellata*. Stigma not black, but pale in crescent form; the dark spot in the outer discal band clearly indicated. Hindwings as *ocellata*, but the eyespot and the blue pupil smaller, the latter sometimes being only an arc in the black area. Underside inclines towards *ocellata*, but the dark colouration is more rusty brown, the rose transverse bands more widely separated and their centre line dentate. In the centre of forewings a pale lunular mark as on upperside. As many ♂♂ as ♀♀ were bred.

## Alphabetical List

with references to the original descriptions of the forms of palaearctic Sphingidae in this Supplementary Volume.

\* signifies that the form is also figured in the place cited.

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- orientalis Cel. *Aust.* Ent. Ztschr. 18, p. 143.
- pallens Cypa *Jord.* Novit. Zoolog. 33, p. 380.
- pallicosta Rhag. *Mell* D. Ent. Ztschr. 1922, p. 121.
- pallida Cel. *Closs* Int. Ent. Ztschr. 7, p. 89.
- pallida (×) *Günth.* Ent. Ztschr. 38, p. 106.
- paranicaca (×) *Fischer* Schweiz. Ent. Anz. 5, p. 1.
- parva Dolb. *Mats.* Jap. Fig. Add. 4, 1921, p. 747.
- peitaihoensis Herse *Clark* Proc. New-Eng. Zool. Club 8, p. 2.
- perfulva Cel. *Schultz* Int. Ent. Ztschr. 5, p. 184.
- perversa Sphinx *Gchl.* Int. Ent. Ztschr. 21, p. 391. \*
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- philipponi* Am. *Huard* Misc. Ent. 31, p. 25.  
*philippsi* Cel. *Banderm.* Entom. Anzeig. 9, p. 248. \*  
*philippsi* (×) *Pernold* Ent. Ztschr. 21, p. 179.  
*planatlanticus* (×) *Kunz* (nond. ed.)  
*planogertrudis* (×) *Kunz* (nond. ed.)  
*platei* (×) *Stdjs.* Mitt. Schweiz. Ent. Ges. 1914, Heft 5/6, Tab. C.  
*populata* (×) *Klemann* In. Ent. Ztschr. 22, p. 443.  
*porea* Perg. *B.-H. Horae* Macrolep., p. 80. \*  
*privata* Cel. *Ausl.* Ent. Ztschr. 18, p. 143.  
*psendogallii* (×) *Grosse* Int. Ent. Ztschr. 6, p. 316.  
*pseudogrossei* (×) *Günth.* Int. Ent. Ztschr. 22, p. 61.  
*pseudophorbiae* (×) *Hornst.* Ent. Ztschr. 38, p. 10.  
*pseudotrimaculata* Mim. *Gillm.* Int. Ent. Ztschr. 10, p. 94.  
*pulcherrima* (×) *Dso.* Iris 27, p. 119. \*  
*purpureosignata* Gur. *Closs* Int. Ent. Ztschr. 11, p. 154.  
  
*radiata* Ach. *Niep.* Int. Ent. Ztschr. 25, p. 278. \*  
*rangnowi* Haem. *Closs* Int. Ent. Ztschr. 5, p. 275.  
*rebeli* Haem. *Anger* Ztschr. Oest. Ent. Ver. 4, p. 15.  
*redueta* Haem. *Closs* Int. Ent. Ztschr. 11, p. 82.  
*reverdini* Cel. *Std.* Ztschr. Wiss. Ins.-Biol. 9, p. 358.  
*robusta* Haem. *Alphér.* Horae Soc. Ent. Ross. 17, p. 17.  
*rosacea* (×) *Günth.* Ent. Ztschr. 38, p. 106.  
*rosea* Hipp. *Closs* Int. Ent. Ztschr. 5, p. 276.  
*roseata* Cel. *Banderm.* Ent. Anz. 11, p. 6.  
*roseotincta* Mim. *Schaw.* Verh. Ent. Ges. Wien 71, p. 152.  
*rothschildi* Cel. *Std.* Lep. Rundsch. Wien 2, p. 113.  
*rubescens* Cel. *Schaw.* Int. Ent. Ztschr. 8, p. 135.  
*rubida* Cel. *Oberth.* Ét. Lép. Comp. 12, p. 189.  
*rubida* Sphinx *Cab.* Rev. Namur Mens. 25, p. 278. \*  
*rubra* Cel. *Closs* Int. Ent. Ztschr. 11, p. 241.  
*rudolphi* Cel. *Banderm.* Int. Ent. Ztschr. 18, p. 4.  
*rufobrunnea* Mim. *Lenz* Osthelders Schmett. Südb. 1925, p. 174.  
*rufomelana* Cel. *Tull* Brit. Lep. 4, p. 204.  
*rühlhii* Cel. *Banderm.* Soc. Ent. 30, p. 37.  
  
*sachalinensis* Cel. *Mats.* Ins. Matsumur. 3, p. 166.  
*saharae* Cel. *Std.* Iris 35, p. 179.  
*satanela* Cel. *Std.* Ztschr. Wiss. Ins. Biol. 9, p. 358.  
*saturata* Gur. *Mell* D. Ent. Ztschr. 1922, p. 119.  
*seheiderbaueri* Perg. *Gschw.* Ztschr. Oest. Ent. Ver. Wien 9, p. 87.  
*sehmiddti* Pros. *Schmidt* Ent. Ztschr. 27, p. 16.  
*sehneideri* (×) *Kunz* (descr. nond. ed.)  
*sehöngarthi* Am. *Closs* Int. Ent. Ztschr. 6, p. 346.  
*seholzi* Cel. *Steph.* Iris 38, p. 20.  
*seotti* Sat. *Jord.* Novit. Zoolog. 33, p. 381.  
*selmonsi* (×) *Fischer* Int. Ent. Ztschr. 23, p. 139.  
*semicentripuncta* Mim. *Pungc-Billw.* Ent. Ztschr. 19, p. 91.  
*semilugens* Sphinx *Andreas* Int. Ent. Ztschr. 18, p. 241.  
*sheljuzhkoii* Cel. *Dubl.* Ent. Ztschr. 42, p. 38. \*  
  
*sieberti* Hipp. *Closs* Berl. Ent. Ztschr. 54, p. 224.  
*silesaina* Cel. *Wldsch.* Beitr. System. Ins. 3, p. 29.  
*srđinkoi* (×) *Oberth.* Ét. Lép. Comp. 21, p. 109. \*  
*standfussi* (×) *Dannenb.* Ztschr. Ins. Biol. 9, p. 295.  
*stehri* Sphinx *Stephan* Entom. Anzeig. 6, p. 4.  
*stollei* (×) *Ver.* Naturb. u. Samml. Wien 2, p. 7.  
*strasillai* Cel. *Std.* Iris 35, p. 31.  
*subjacensis* Cel. *Dhl.* Mitt. Münch. Ent. Ges. 19, p. 99.  
*submarginalis* Ampel. *Mats.* Coll. Agr. Hokkaido 19, p. 4. \*  
*subvittata* Cel. *Schultz* Int. Ent. Ztschr. 5, p. 184.  
*sulphurata* Cel. *Banderm.* Ent. Ztschr. 39, p. 113.  
*sus* Perg. *B.-H. Horae* Macrolep., p. 80. \*  
*szezodrowskii* (×) *Müller* Int. Ent. Ztschr. 20, p. 352.  
  
*tatsienluica* Ther. *Oberth.* Ét. Lép. Comp. 12, p. 202.  
*tenerifana* (×) *Fischer* Int. Ent. Ztschr. 23, p. 137.  
*testata* Cel. *Wldsch.* Societ. Entomol. 44, p. 18.  
*tokyonis* Smer. *Mats.* Thous. Ins. Jap. Add. 4, 1921.  
*transcaspica* Ther. *B.-H. Horae* Macrolep., p. 80.  
*transcaucasica* Cel. *Gehl.* Ent. Ztschr. 44, p. 174. \*  
*tremulaeformis* (×) *Stdjs.* Mitt. Schweiz. Ent. Ges. 1914, Heft 5/6, Tab. C.  
*trimaculata* Mim. *Bromb.* Int. Ent. Ztschr. 9, p. 137. \*  
*tsekoui* Pan. *Clark* Proc. New-Eng. Zool. Club 9, p. 51.  
*tsingtaueia* Clanis *Mell* Fauna Sinica II, p. 114.  
*turrigallii* (×) *Ausl.* Int. Ent. Ztschr. 8, p. 93.  
*tykaci* (×) *Vlach* Oberth. Ét. Lép. Comp. 21, p. 107. \*  
*typica-latifolia* Cel. *Wldsch.* Societ. Entomol. 44, p. 18.  
  
*umbrata* Cel. *Gehl.* Int. Ent. Ztschr. 21, p. 401. \*  
*umbrosa* Cel. *Schultz.* Int. Ent. Ztschr. 5, p. 184.  
*unieolor* (×) *Günth.* Ent. Ztschr. 38, p. 106.  
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*unifasciata* Sphinx *Gschw.* Int. Ent. Ztschr. 5, p. 375.  
*ussuriensis* Mar. *B.-H. Horae* Macrolep., p. 79.  
  
*vandalusia* Cel. *Rbb.* Iris 23, Beih. 1—2, p. 212.  
*variegata* Cel. *Closs* Int. Ent. Ztschr. 7, p. 89.  
*velutina* Cel. *Std.* Ztschr. Wiss. Ins.-Biol. 9, p. 358.  
*vesperdiana* (×) *Hornst.* Ent. Ztschr. 35, p. 103.  
*viereckana* Cel. *Banderm.* Societ. Entomol. 43, p. 42.  
*violacea* Ach. *Lamb.* Rev. Namur Mens. 1905, p. 35.  
*vireseens* Cel. *Gehl.* Int. Ent. Ztschr. 24, p. 217. \*  
*viridis* Mim. *Closs* Int. Ent. Ztschr. 5, p. 275.  
*vitrina* Mim. *Gehl.* Ent. Ztschr. 45, p. 203.  
*vittata* Sphinx *Closs* Int. Ent. Ztschr. 14, p. 94.  
  
*wesloeensis* Perg. *Knoch* Int. Ent. Ztschr. 23, p. 182.  
*wormsbaeheri* (×) *John* Ent. Ztschr. 42, p. 322. \*  
  
*ziczac* Cel. *Frilich* Ent. Ztschr. 1919, p. 16.  
*zwerinai* (×) *Grosse* Int. Ent. Ztschr. 6, p. 324.  
*zwerinai* (×) *Vlach* Ét. Lép. Comp. 21, p. 108.



## 14. Family: Drepanidae.

Whilst WARREN classified the *Drepanidae* before the *Sphingidae* and *Saturnidae* in accordance with ancient custom, most of the newer catalogues, as also HAMPSON (1925) place them much lower in the genealogical tree. HAMPSON places them with the *Callidulidae*, to which they are presumably closely allied, immediately after the *Thyrididae*, which on their part follow the *Pyalidae* and these are Microlepidoptera. We are therefore placing them here after the *Sphingidae* in view of the opinion held by many people, that they are related to the *Notodontidae* and by this method they are brought closer together.

In regard to the *Callidulidae* there is only to be mentioned in addition to what was written in the main Volume 2, that this family, that is so difficult to define, is now rather differently composed to what it was 20 years ago. The form *Schistomitra funeralis* Btlr. from Japan, which in Vol. 2, p. 208 was classified as a *Callidulidae*, is today placed close to *Nossa* (*Atossa*); this change, which we had already anticipated, as we had our doubts as to the original classification, will explain why we had placed the illustration (Vol. 2, pl. 48 g) next to the Genera *Nossa* and *Psychostrophia*. — There is no need to refer further to the family *Callidulidae*; on the other hand a number of new forms have to be added to the *Drepanidae*.

### 1. Genus: **Euchera** Hbn.

**E. nigralbata** Warr. As the author himself indicates that specimens from Gensan (Corea) represent *nigralbata*. transitions to *E. capitata* Wkr., dealt with in Vol. 2, p. 196 and illustrated on pl. 23 f., the main locality for which is Hongkong, this does not appear to be a separate species, but only a distinctly marked form. In typical *capitata* the forewings closely resemble those of the specimen illustrated as *substigmata* on pl. 23 f., whilst the hindwings generally show the outer dark band wider than the central one. *nigralbata* has forewings just like the illustration of *capitata* Wkr. on pl. 23 f, but the bands are somewhat darker and the dark marginal band is generally wider. The hindwings of *nigralbata* are said to have rather darker bands. To sum matters up: all *capitata* designated thus and from Japan (which includes the specimens in the PÜNGELER Collection) would be more correctly classified as *nigralbata*. I have only a single ♀ from Gensan before me. In this the white bands each side of the dark central band on forewings are wider. The central band itself is narrower; the same applies to the hindwings. The only feature that would enable one to refer to it as a "transition to *capitata*" would be the paler colouration of the dark bands. I have numerous specimens of the genuine *capitata* from Canton before me. PROUT ascertained in 1918 that *substigmata* Hbn. was an older name for *capitata* Wkr., both being typical from South China. Consequently a name is necessary for the Indian form of *substigmata*: **superstigmata** Prout. The typical *substigmata* (*capitata*) from China, Formosa, Tonkin is similar to the form **intermedia** Prout from Thibet, but less dark grey than the latter. The cell spot on hindwings is fainter <sup>*superstigmata*</sup> *intermedia*. on upperside, the submarginal spots are generally more distinctly conjoined by grey shadings.

### 9. Genus: **Drepana** Schrk.

#### A. European species.

*D. falcatoria* L. (Vol. 2, p. 199, pl. 23 g). Very pale specimens with almost obsolete markings on hindwings and which occur everywhere are named **pallida** Steph. — The counterpart, the dark form, has three *pallida*. denominations: **infernalis** Hoffm. (= *curvatuloides* Wgn., *obscura* Std.). All the markings of both wings are *infernalis*.



much darker, especially the costa, apex and marginal area of forewings. On hindwings costa and base are not darkened. Typical from Styria (1000 m altitude), the other 2 names denote specimens from Polsi and the *ochracea*. Aspromonte mountains. — *ochracea* Lamb. is a superfluous name for dark specimens, whose colouration approaches that of *harpagula*, being about as dark as the somewhat pale illustration of *harpagula* in Vol. 2, pl. 23 h.

*flavomarginata*. *D. curvatula* Bkh. (Vol. 2, p. 199, pl. 23 h). Only the form *flavomarginata* ♂ Closs. is to be mentioned, having hindwings with orange-yellow beyond the outer line. Also in 2 ♂♂ from Sei shin (Corea) the margin of both wings is very light. — I have before me some very dark specimens from Berlin, the ground colour of which is approximately like the illustration of *muscularia* Wkr. (Vol. 2, pl. 30 f). Only the margin of forewings is rather paler, similar to *scabiosa* Btlr. (pl. 30 f), as also are the edges of the very dark central band. Hindwings scarcely show any markings. This form does not appear to have been denominated so far.

*erosuta*. *D. lacertinaria* L. (Vol. 2, p. 200, pl. 23 h). The summer form, which was already dealt with in Vol. 2 as *aestiva* Rbl., should according to P. SCHULZE be given the older name of *erosula* Lasp. The *lacertinaria*. Spring form *lacertula* is somewhat dimorphous, the ♂ is rather greyer, the ♀ browner. In the summer generation *erosula* both sexes are much more similar, the ♂ being almost as brown as the ♀. In the 2nd generation the hindwings in both sexes are paler, so that one can recognise a ♀ of this brood without seeing the date label. In specimens of the 1st generation the outer line of forewings normally has a rather acute angle at base of upper median nervure and above this there is an indentation. — A ♀ that in consequence should be of the 1st generation, but which has the ochreous yellow ground colour of the 2nd generation is named *interpres*. *tacoraria*. Schulze. — In England a small 1st generation occurs: *tacoraria* Schulze. The ♂ is monotonous ochreous yellow, similar to *erosula*, the transverse lines are blackish grey, devoid of dark freckle markings. The pale subterminal line on forewings is more or less absent. The ♀, except for its small size, resembles many of the Berlin specimens, but the ground colour is rather more reddish brown and more uniformly spread over the surface. The grey freckling is indistinct. — As LINNÉ's type is not available, it is difficult to state whether it agreed with the 1st or 2nd generation from Central Europe or whether it represented the northern forms *scincula* Hbn. and *brykaria* Schulze from Finland. The only specimen I have from Finland, in the PÜNGELER Collection, corresponds as exactly as is possible to HÜBNER's illustration of *scincula*, when one takes into consideration the rough and ready ways of that time. The name *brykaria* would therefore appear to be superfluous.

The following additional 2 asiatic species.

*thermopasta*. *D. thermopasta* Hmps. Body and forewings orange, densely dusted with red-brown. A curved inner and 2 similar outer lines indicated. Besides these a spot in marginal area below apex. This mark also red-brown. Hindwings have basal and inner marginal areas similarly dusted with red-brown. At inner margin there are traces of a curved inner, outer and submarginal line. Underside orange. ♂ 26 mm. W. China.

*cretacea*. *D. cretacea* Hmps. Body and forewings chalky white, thinly scaled. At lower angle of cell a brown spot is indicated. A rather oblique outer line from discoidal nervure to inner margin, delicately marked, reddish yellow and in front of the margin on discoidal and subcostal nervures similarly coloured spots. Hindwings chalky white with traces of a curved outer line. ♀ 48 mm. W. China.

### Genus: **Canucha** Wkr.

All that is necessary in regard to this Genus has been said in Vol. 10, p. 475. The only new species is described as a *Drepana*.

*bouvieri*. *C. bouvieri* Oberth. is probably identical with *C. duplexa* Mr. dealt with in Vol. 10, p. 475 and pl. 49 l. Ground colour is yellow-brown. From apex of forewings to the centre of inner margin a pale line extends, that is widely edged with dark brown outwardly, the area inwardly of same to costa and to the cell is similarly dark, only the costa at apex remaining light. At end of cell widely whitish and a whitish spot posteriorly. In basal area a few dark brown dentate lines. On hindwings the pale central line is curved, its surround similar to that on forewings. In outer area numerous dark lines. ♂ 70 mm. Ta-tsien-lu.

The following species described by OBERTHÜR as *Drepana* probably all belong to the

### Genus: **Albara** Wkr.

In regard to this Genus please also refer to Vol. 10, p. 467. The distinctions from *Drepana* are not great. *robusta* is only classified here provisionally. It probably will require a separate Genus.

*robusta*. *A. robusta* Oberth. (10 g). Ground colour violet-brown. From apex of forewings a wide dark brown line extends to centre of inner margin. Near the base there is a curved line, forming a quarter of a circle. Posterior to same on costa at equal distances 3 horizontal dark streaks of which the last one is conjoined



with a line proceeding from apex. In the marginal area there are dark shadings, outer margin heavily excurved. On paler hindwings a line from  $\frac{2}{3}$ rd of inner margin in the direction of apex but curving inwards before reaching same. 45 mm. Ta-tsien-lu.

**A. agna** Oberth. (10 g). This and the following 2 species have a similar scheme of markings, the *agna*. excurvation of outer margin is only as pronounced in the first 2 as in *robusta*. Ground colour bluish brown with 2 reddish brown transverse lines. On forewings the inner line is about vertical, the outer one diverges from it at costa. There are a few blackish dots before the outer margin. On hindwings the two lines are parallel and slightly curved. 25—35 mm. Siao-lu.

**A. opalescens** Oberth. (10 g). Most probably this is only a dark form of *lilacina* Mr., dealt with in *opalescens*. Vol. 2, p. 203, pl. 48 d. The colour of forewings is approximately like that of *agna*. Both lines are also red-brown, of which the inner one inclines towards the base at the costa. Both lines with pale edges on averted sides. The inner line commences at costa in a black triangle, behind same on the costa there is a similar triangle. Hindwings deep orange-yellow, at  $\frac{3}{4}$ ths of inner margin there are indications of a brown transverse line. 23—30 mm. Tien-tsuen. — The species is also very like *bicostata* Hmps. (Vol. 10, p. 470, pl. 49 g as *bicolorata*), but in the latter the inner line of forewings is more vertical and on underside the costa of both wings is not dark.

**A. ocellata** Oberth. (10 g). Ground colour is paler than the two previous species, but otherwise similar. *ocellata*. On forewings the two transverse lines are like those of *agna*, but the outer one is faintly incurved. The two spots on costa correspond to those of *opalescens*. At upper and lower angles of cell 3 small white spots. In marginal area there is a white line edged on both sides with dark shading. On pale yellow hindwings the two transverse lines are only visible near inner margin and besides there are dark streaks near anal angle. ♀ 28 mm. Siao-lu. This species is probably only a form of *vira* Mr. (Vol. 10, p. 470 and pl. 49 g as *vera*). In the latter the white submarginal line is not so distinct as in OBERTHÜR's illustration of *ocellata*. The curving of the outer line varies considerably in *vira*, this will probably also be the case with *ocellata*.

**A. pulvis** Oberth. (10 g) varies somewhat in the shape of the wings and formation of the lines. Ground colour pale grey-violet, somewhat darker in the anterior part between the two dentate white lines at costa. *pulvis*. The inner line dentate obliquely outward to median nervure, thence inwards and parallel to the outer line. Beyond the latter there is still a white submarginal line. There are 4 transverse lines at inner margin of whitish yellow hindwings. The 1st and 3rd are short and less distinct, the 2nd and 4th clearer and longer. ♀ 28 mm. Siao-lu.

**A. ogasawarae** Mats. ♂ ashy grey intermixed with brown scales. All lines brown. The inner line *ogasawarae*. finely drawn, heavily excurved, parallel to the outer line at the extremity. At disco-cellular 2 black dots. Outer line darker, from  $\frac{3}{4}$ ths of costa very obliquely outwards to vein 6, thence to  $\frac{2}{3}$ rd of inner margin. The submarginal line vertical on vein 1 to outer line, above vein 2—4 brown scales. On hindwings there are two straight parallel lines from inner margin extending over  $\frac{2}{3}$ rd of width of wing. The ♀ is generally white with only a large brown spot behind the cell. Markings as in ♂. 32—42 mm. Honshu.

### 11. Genus: **Deroca** Wkr.

*D. phasma* Btlr. (Vol. 2, p. 203, pl. 48 e). A larger form is named **decisa** Warr. In the ♂ the dark *decisa*. marking is blacker, the discal spot is large. The white dividing line is absent in the black margin, only 2 white dots of it are left near the apex. The black apical spot has 3 obtuse dentations of which the lowest between veins 3 and 4 does not extend to the margin. On hindwings there are only traces at the inner margin of the 3 rows of spots. The ♀ is very hyaline as in *phasma*. The submarginal band is very narrow forming an obtuse angle above veins 6 and 4, otherwise it expands and is rounder between the veins. Beyond same there are grey triangular spots on the veins in front of the dark marginal band which consists of oval spots. Japan.

**D. coreana** Hmps. Probably similar to *phasma*. Forewings white, somewhat transparent. Costa blackish *coreana*. at base, beyond same a few black streaks on costa. Anterior to disco-cellular an oblique black streak and another above same at costa. Outer line curved, diffuse, pale brown with fine black striations on veins. Beyond same a row of small brown spots, also having black striations on veins. Brown spots in the interstices between the veins at margin. Hindwings white, transparent with curved diffuse brown outer and submarginal bands. Marginal spots as on forewings. ♀ 25 mm. Corea.

### 13. Genus: **Cilix** Leach

*C. glaucata* Scop. (Vol. 2, p. 204, pl. 48 d). If one restricts the name *asiatica* B.-H. to specimens of the form that is already illustrated on pl. 48 d with central band of forewings reduced to a small spot at inner margin and with minute marginal spots still present, then the name **aeruginata** Trti. can be retained *aeruginata*. for specimens on which these marginal spots are absent. In specimens from the typical locality Ficuzza,



Sicily, the head and abdomen are pure white, generally they are slightly dusky. All my specimens of *asiatica* from a variety of localities have a more or less silvery base to veins 2—5 on forewings, whilst in the only specimen I have from Ficuzza, this is not the case. Unfortunately this point is not touched on in the original description. The same form occurs occasionally in the south Tyrol in both generations, only in these the white hindwings have a faintly darkened margin. The name *angelina* Dhl. has been given to such specimens. — Around Terlan among otherwise quite typical *glaucata* specimens occur with not only dusky, but actually blackened hindwings, these have not yet been named. — In East Asia on the other hand the central band of forewings is well developed and transformed to eyespots with light and dark circumscription. There are 2 names for these: the form *tatsienluica* Oberth. has apex fairly widely dark, the outer margin and the entire hindwing are white. only the terminus of cell of the latter is delicately black. — *filipjevi* Kard. (10 g as *filipjeri*) from Vladivostock has apex only faintly brownish, but 2 rows of brown spots at margin, of which the inner one forms a line in typical specimens. Hindwings are as dark as also sometimes occurs in typical specimens.

#### 14. Genus: **Oreta** Wkr.

*thermidora*. **C. thermidora** Hmps. Body and wings bright fuscous with numerous fine dark striations. A blackish submarginal line from below the apex to inner margin near anal angle, indistinct, incurved in centre, diffuse. Hindwings of similar colour with approximately 5 rows of indistinct small black spots, except in basal area. Underside with rosy suffusion. ♀ 28 mm. Japan.

### Alphabetical List

with references to the original descriptions of the forms of palaearctic Drepanidae in the 2nd Supplementary Volume.

\* signifies that the form is also figured in the place cited.

*aeruginata* Cilix Trti. Natur. Sicil. 20, p. 22. \*  
*agna* Alb. Oberth. Ét. Lépid. Comp. 12, p. 373. \*  
*angelina* Cilix Dhl. Entom. Zeitschr. 39, p. 119. \*

*bouvieri* Can. Oberth. Ét. Lépid. Comp. 12, p. 372. \*

*coreana* Der. Hmps. Ann. Mag. Nat. Hist. (8) 14, p. 107. \*  
*cretacea* Drep. Hmps. Ann. Mag. Nat. Hist. (8) 14, p. 107.

*decisa* Der. Warr. Novit. Zoolog. 21, p. 401.

*erosula* Drep. Lasp., Schrift. Nat.Freunde (Berlin) 4, p. 27.

*filipjevi* Cilix, Kard. Entom. Mitt. Dahlem 17, p. 417. \*  
*flavomarginata* Drep. Closs Int. Ent. Zeitschr. 11, p. 64.

*infernalis* Drep. Hoffm., Entom. Rundsch. 29, p. 158.  
*interpres* Drep. P. Schulze, Berl. Ent. Zeitschr. 57, p. 117. \*

*intermedia* Euch. Prt. Ann. Mag. Nat. Hist. (9) 2, p. 416.

*nigralbata* Euch. Warr. Novit. Zoolog. 21, p. 401.

*ocellata* Alb. Oberth. Ét. Lépid. Comp. 12, p. 375. \*  
*ochracea* Drep. Lambill. Revue Mens. Nam. 6, p. 18.  
*ogasawarae* Alb. Mats. Journ. Coll. Agr. Hokk. 19, p. 47. \*  
*opalescens* Alb. Oberth. Ét. Lépid. Comp. 12, p. 374. \*

*pallida* Drep. Steph. Iris 38, p. 206.

*pulvis* Alb. Oberth. Ét. Lépid. Comp. 12, p. 375. \*

*robusta* Alb. Oberth. Ét. Lépid. Comp. 12, p. 372. \*

*tacoraria* Drep. P. Schulze, Berl. Ent. Zeitschr. 57, p. 118. \*  
*tatsienluica* Cilix Oberth. Ét. Lépid. Comp. 12, p. 371. \*  
*thermidora* Or. Hmps. Ann. Mag. Nat. Hist. (8) 14, p. 104.  
*thermopasta* Drep. Hmps. Ann. Mag. Nat. Hist. (8) 14, p. 106.



## 16. Family: **Uraniidae**.

The inconsistencies of the Genera united in this family have already been mentioned in various places and make certain amendments necessary. In Vol. 2 several forms were incorrectly classified. As a matter of fact however little fresh knowledge has come to hand to establish clarity in the position of the *Uraniidae* to one another. The connection between many Genera and the purely exotic, geographically widely separated, but nevertheless decidedly nearly related group *Urania* (neotropical) with the exclusively ethiopian Genus *Chrysidia* continues to be doubtful. In certain groups (for instance *Strophidia*) however it is observed that the differences from other Genera, as for instance *Alcidis*, varying considerably in outward appearance and colouration, are not so structurally fundamental. Similar differences occur in other groups, which are nevertheless united in a family, as for instance in the *Lymantriidae*, *Porthesia* and *Chelepteryx*.

Generally speaking it may be presumed that in the future the *Epipleminae* (which can partly furl or roll their wings) will be separated sensu angustiori from the *Uraniinae*. This we have already done in Vol. 10, where the *Alcidis* and *Nyctalemon* are classified near the *Arctiidae* (p. 93—104), whilst the *Geometridae*-like *Epipleminae* are dealt with on p. 577—604, where they are close to the *Notodontidae*. With these, as well as with the *Drepanidae*, they have a certain relationship. This would appear to be a more natural classification.

### 1. Genus: **Nossa** Ky.

We now enumerate a species of this Genus from North Korea which was omitted from Vol. 2:

**N. alpherakyi** Herz (15 c). It is decidedly close to *N. nelcinna* (Vol. 2, p. 277, pl. 48 e) having exactly *alpherakyi*. the same size and shape, but the black markings are so much increased that the light ground colour is only represented by minute pale patches imbedded in the black. The general appearance is like some of the Chinese butterflies of the *Delias subnubila* group. Korea.

### 2. Genus: **Schistomitra** Btlr.

A specimen was denominated *Nossa nipponica* Gaede, which in accordance with LEECH we classified *nipponica*. under the *Callidulidae* in Vol. 2, p. 208 and illustrated there on pl. 48 g. All details were given there. It was described as a *Chatamla*, to which it is certainly very close, but this Genus was at that time held to belong to the *Chalcosiidae* to which it is related by mimical resemblance. In Vol. 10 (p. 578) the *Chatamla* are classified in their correct place. The species is **S. funeralis** Btlr. Its correct place in classification immediately after *Nossa* we have indicated in Vol. 2 by illustrating same on pl. 48 g. Compare also this Volume p. 167.

### 3. Genus: **Epiplema** H.-Schäff.

There are two corrections to be made in this Genus in Volume 2, the author of *nubifasciaria* (p. 278) was LEECH and not BUTLER and the name on p. 279, line 24 from bottom should be **morataria** and not *morataria*. *monatoria*.

Of *E. exornata* Ev. (Vol. 2, p. 278, pl. 48 i) a northern form was described in 1924, viz: **sibirica** Kosh. *sibirica*. (15 a) which differs from typical form by having a wide and irregular central band. This median band is however not constant either in the palaearctic *exornata* and dark spots also occur at apex of forewings, from which a brown band proceeds obliquely inwards to the main band. This form emanates from the Sajan



territory on the Kasyr river. — Of *bicaudata* Mr. which occurs on the palaearctic boundary in Kashmir and is also distributed over southern China, extending northwards to Ningpo and the Yangtsekiang, two further forms are illustrated — *rufimargo* Warr. and *fuscifrons* Warr. in Volume 10, pl. 59 d. These very probably belong to the group of *exornata* forms, although they have not yet definitely been found on palaearctic territory.

### Genus: **Decetia** Wkr.

Of this mainly Indian Genus one today knows about 2 dozen species, which remind one strongly of certain american *Geometridae* species. Besides other species the Genotype *numicusaria* Wkr. from N. India is illustrated in Vol. 10, pl. 58. — Of palaearctic species are classified here:

*argentineline-aria.* **D. argentinelinearia** *Leech*. In Vol. 2, p. 196, this was classified under *Mimozethes* as a *Drepanidae*. The illustration there on pl. 48 a is very good. In Vol. 10, p. 580 it is described from the Indian territory (Formosa, where it is not rare). Besides this, 2 other species that are best known from Indian territory, occur in the south east of the palaearctic region, viz:

*violacearia.* **D. violacearia** *Leech*. This is almost as large as *numicusaria* (Vol. 10, pl. 58 e) and of very similar grey colour with violet shade, wings brown anteriorly and towards the margin, all wings with dark central spot and with a brown line that extends from apex of forewings to centre of inner margin and continues over the hindwings to the inner margin, so that a superficial resemblance is created with the (much larger) *Dalima acutaria* (Vol. 4, pl. 16 h). West China. — Further

*lilacinaria.* **D. lilacinaria** *Leech*. Ground colour dark brown with violet hue, wings with golden brown colouration in outer area; forewings with central spot and 2 parallel transverse lines, of which the outer one is angulated below the costa and extends to inner margin of hindwing. Somewhat larger than previous species. Similarly from West China. In regard to this and previous species, compare also Vol. 10, p. 280.

### Genus: **Paradecetia** Swh.

In regard to this Genus and the species classified here of which one occurs in North India and 2 in N. W. China, please refer to what is said in Vol. 10, p. 581.

*vicina.* **P. vicina** *Swh.* Size as previous species. Grey with violet hue. The transverse line which extends from the projecting apex of forewings to middle of inner margin of hindwings is crimson-red. Compare also Vol. 10, p. 581.

*myra.* **P. myra** *Swh.* is also of the same size as *lilacinaria* (36 mm). Buff with darker dustings. Oblique line brown. In this and previous species there is a white cell spot on each wing. West China.

## Alphabetical List

with references to the original descriptions of the forms of palaearctic Uraniidae in the 2nd Supplementary Volume.

\* signifies that the form is also figured in the place cited.

alpherakyi Nossa *Herz*, Annuaire Mus. Pétersb. 9, p. 376. \*  
argentinelinearia Dec. *Leech*, Ann. Mag. Nat. Hist. (6) 19, p. 183.

lilacinaria Dec. *Leech*, Ann. Mag. Nat. Hist. (6) 19, p. 184.

moratoria Epipl. *Leech*, Ann. Mag. Nat. Hist. (4), 20, p. 401.  
myra Parad. *Swh.* Trans. Ent. Soc. Lond. 1902, p. 593.

niphonica Nossa *Gaede*, Intern. Ent. Zeitschr. 8, p. 185.

sibirica Epipl. *Kosh.* Jahrb. Martjn. Minuss. 2 (1), p. 71.

vicina Parad. *Swh.* Trans. Ent. Soc. Lond. 1902, p. 593.  
violacearia Dec. *Leech* Ann. Mag. Nat. Hist. (6) 19, p. 133.



## 17. Family: Notodontidae.

### 1. Genus: **Tarsolepis** Btlr.

**T. japonica** Wilem. This is the form illustrated as *sommeri* Hbn. in Vol. 2, pl. 48 g (p. 284). The *japonica*. differences between the form *japonica* and the species *sommeri* are very insignificant. *japonica* is smaller (68—70 mm), the hindwings are dark brown, still darker than shown in the illustration on pl. 48 g. The silver spots are shorter than in *sommeri*, but this does not appear to be always the case. On the other hand the inner edge of the lower spot is indented, which is not the case in *sommeri*. Japan.

### 4. Genus: **Cerura** Schrk.

*C. furcula* Cl. (Vol. 2, p. 286, pl. 44 c). In this species LENZ has drawn attention to a material difference in the northern and southern german races. As it is not certain which of them is typical, both have been denominated. Specimens from Pommerania are almost as white as *bicuspis*. Their larvae feed chiefly on birch and also on willow; they are named var. **betulae** Lenz. The race from the Maine and Upper Bavaria is darker. *betulae*. The larvae feed on willow and beech: var. **salicis** Lenz. The larva of *betulae* will not feed on beech. — Very *salicis*. dark specimens similar to *borealis* Bkh. occasionally occur very far south. For instance DANNEHL reports such a specimen from Terlan (S. Tyrol). In the South Carpathians a race occurs in which only the hindwing is black. Markings of forewing, clear and distinct, quite typical: **transsylvanica** Dhl. — In **alpina** \* Bartel *transsylvanica*. (15 d) from Zermatt only the outer half of hindwings is shaded. Basal area of forewings is normally white. *alpina*. Central and marginal areas are somewhat suffused with grey, so that the black dentate lines are indistinct. — *ajatar* Schilde is indicated in Vol. 2, as being synonymous with *bifida*. From a cotype in the collection of PÜNGELER, I am inclined to classify it with *borealis*. — **pallesens** Rocci has a grey band displacing the customarily black band. Apical markings and marginal spots are paler. The orange-yellow edge to central band is missing. Liguria. — The northerly *obsoleta* Haanshus appears to be similar to *pallesens*. — Specimens occur in which the dark band is interrupted as in the species *interrupta*.

*C. bifida* Hbn. (Vol. 2, p. 287, pl. 44 c). In spite of the wide distribution of this species, from polar regions to North Africa, its variability is not great. A sub-form of the northern race *saltensis* Schöyen is described corresponding to *furcula-alpina*. Only the basal area of forewings is white, the rest of the wing is a deeper grey than in *alpina*. On the other hand the hindwing is white, only slightly grey at margin. The usual black marginal dots are conjoined forming a fine grey line: **poecila** Stichel. — **renigera** Bub. is a curious *poecila*. form. Only the inner edge of the median band and a small patch at inner margin is retained, the rest is *renigera*. paler. But the space behind same, which is usually pale, is dark as far as the disco-cellular and more narrowly to the submedian fold. There it conjoins with an extension of the subapical spot. — **interspersa** Rothsch. *interspersa*. from Algeria is a subsidiary form to the southern *urocera* Bsd., in which in the ♀ the dark median band is sharply contracted on the median vein. In the ♂ it is reduced to a line there or completely interrupted. — **intervalla** Kosh. is an aberration in which the blackish median band is only retained in the form of two *intervalla*. patches on costa and inner margin. It is not stated whether the edge lines of the median band are complete or whether they only outline the patches.

*C. interrupta* Christ. (Vol. 2, p. 287, pl. 44 c). **leucotera** Stichel is a form, which is close to *syra* Gr.- *leucotera*. Grsh., but the ground colour is pure white and not faintly yellowish. The narrow median band and subapical spot are interspersed with white scales. Sultanabad in Persia. — It is a matter of personal opinion whether one considers **petri** Alph. (15 d) as a form of *interrupta* (as was done in Vol. 2) or whether one considers *petri*. same as a species (as PÜNGELER did). The general impression is in any case a very different one. We are illustrating a ♂ of *petri*, in which the outer median area is unusually dark, so that the white subterminal line contrasts very strongly.

\* This and the other forms described by BARTEL were classified in this way in the PÜNGELER collection, I have not been able to find the original descriptions anywhere, so that possibly these have hitherto only been trade names.



- persica*. **C. persica** Brtl. (15 d) is described as a species, but is possibly only a form of *furcula*. The dark median band is much narrower and appears to be somewhat more oblique. There are 2 dark bands on hindwings, as occasionally also occurs in *furcula*. The pale patches on the body somewhat more yellowish. N. Persia.
- nicetia*. **C. nicetia** Schaus. Body as *bifida* and *furcula*. Forewings grey-brown at base and in marginal area. The usual dots at base. The inner line black, vertical, the central line incurved to under the cell, converging with the outer line at inner margin, the intermediate space filled with black and white scales. At lower end of disco-cellular a black streak and another similar mark under the cell through the root of vein 2. The double outer line is normally formed, grey. Similarly the 3rd line behind same and the subapical spot. Hindwings white. Black marginal dots on both wings. As the species has no median band like the other *Cerura* species, its position appears rather doubtful. ♂ 46 mm. Ta-tsien-lu.
- ludovicae*. **C. ludovicae** Pglr. (14 c). We are now giving an illustration of this species which was described in Vol. 2, p. 287. In the type the marginal dots on hindwings are absent. It can be differentiated from the following species by the outer dentate line which extends only slightly obliquely outwardly from vein 5 to vein 4. Scarcely any traces are discernible of other anterior lines.
- ludovicior*. **C. ludovicior** sp. n. (14 c). A development beyond *ludovicae*. Ground colour of body and forewings still yellower. The median band with straighter outer edge, scarcely darker inwardly. Anterior to the outer dentate line, 2 other dentate lines can be observed. The subapical spot slightly dusted with black. Marginal dots of forewings minute, absent on hindwings in ♀, indicated in ♂ by brown scales. 38—44 mm. Maral-Bashi. Type in the PÜNGELER collection.
- syra*. **C. syra** Gr.-Grsh. (14 c). A pair in the PÜNGELER collection is not pale reddish grey, as originally described, but white with faint rose admixture, in the ♀ the margin is pale yellowish. The thorax, dark median band and subapical band are densely dusted with orange-yellow. The ♂ is illustrated under the original denomination. — **palaestinensis** Brtl. (14 c) from Jerusalem is a specimen in which the band is almost obsolete, the subapical spot is indistinctly outlined and of the 3 dentate lines, only the innermost one is distinct.
- kurilensis*. **C. bicuspis** Bkh. (Vol. 2, p. 286, pl. 44 b). The form **kurilensis** Mats. is similar to *japonica* Grünbg. (Vol. 2, pl. 44 c), but the outer double band (which may this be ?) is diffuse at costa; possibly the dentate lines anterior to the subapical spot are intended. Median band is wider. Kurile Islands.

### 5. Genus: **Dicranura** Bsd.

- vinula* L. (Vol. 2, p. 288, pl. 44 f). A number of aberrations are to be mentioned. A form in which the rows of dots at base of forewings are elongated to longitudinal streaks: **striata** Schultz. — In **fasciata** Schultz the outer half of the basal area is densely dusted with black from costa to inner margin. The normal form is only darker grey there, but not black. In Zermatt the ♀ especially is darker than in Germany and Russia, about as dark grey as *delavoyei* (Vol. 2, p. 288 as *delavoiei*, pl. 44 g, h as *delavaii*) is dark brown-grey. — *fennica* Schultz and *hyalina* Krul. are identical with *estonica* Huene. — In **tegelensis** Strd. (= *fasciata* Closs) there is still a submarginal band besides the dark subbasal one. — **tanaica** Toll resembles *estonica* in the pure white ground colour, but it is not hyaline and devoid of markings, but about as completely marked as a typical *vinula*. In the ♀ which is less boldly marked, the hindwings are grey, costa broadly white. From Rostow on the Don. I have a similar ♂ from Pamplona before me, whilst a ♂ from Albarracin is as grey as a typical ♂. — **zickerti** <sup>Frinav</sup> (the ♂ is unknown) resembles the ♀ of *tanaica* in its fainter marking, but the ground colour is grey, not white. Naples. — **simplex** ♀ Niep. only has the dark basal band, all the rest of the forewings is devoid of marking. Hindwings are paler than usual, the dark marginal spots are absent.

### Genus: **Zaranga** Mr.

Refer to Vol. 10, p. 635 where this Genus was fully discussed.

- citrinaria*. **Z. citrinaria** sp. n. (15 c). The species is very close to *pannosa* Mr. dealt with in Vol. 10, p. 635, but the dentations at outer margin of forewings is not so very irregular. Thorax black-brown, posteriorly orange-yellow, abdomen brown. Forewings dark brown, markings diffuse but nevertheless recognisable. At base an orange dot. The pale brown spot at inner margin resembles that of *pannosa*. The pale apical spot however only extends to the outer line. The inner line is approximately vertical to inner margin; with black spots at inner margin, below the cell and on costa; proximally with yellow scales. As an outer line one can take an orange-yellow spot on inner margin, that has a dark inner edge; above same and below vein 2 two black spots and then upwards towards the costa and near the apex a wide dark band with diffuse outline and enclosing a large orange-yellow spot between veins 7 and 8. The margin itself is then widely pale, only interrupted by the dark streaks along the veins. At the inner margin there are orange-yellow scales. On



hindwings veins 6 + 7 have longer stalks than indicated by HAMPSON, vein 5 is very weakly. Hindwings coloured like the pale patches of forewings, at anal angle there is a short white streak obliquely upwards. ♂ 72 mm. Tze-ku. Type in the British Museum.

## 6. Genus: **Stauiopus** Germ.

*St. fagi* L. (Vol. 2, p. 289, pl. 44 g). **illustris** Dhl. denotes a specimen of diffuse light yellow colouration *illustris*. with distinct markings and bold black spots before the outer margin. On hindwings the basal area is yellowish white at costa, similarly the short dentate line in middle of costa. The light curved line at the margin, which generally is scarcely observed, is very distinct in this form.

*St. mediolinea* Roths. Thorax mouse-grey, abdomen browner. Forewings pale mouse-grey with *mediolinea*. double rusty brown median band, of which the outer part extends to median nervure. Towards the base there are traces of brown zigzag lines and spots. Marginal line formed of black and white spots. Hindwings darker mouse-grey with triangular dark brown marginal spots. ♂ 58 mm. W. China. It is doubtful whether the classification of this species under *Stauiopus* is correct.

*St. obliterated* Wil. & South. Described as related to *grisescens* Stgr. Thorax grey-brown, abdomen *obliterated*. brownish. Forewings whitish with brown scales intermixed. A black streak at disco-cellular. A submarginal line is indicated by black dots in the interstices of the veins. Fringes white, marginal lines brown. The latter seems to be the only variation in the description as compared with *grisescens*. Hindwings brown in the inner 2/3rds, outwardly apparently white, which is quite unusual, marginal line brown. The ♀ has finely ciliated antennae, the inner transverse line on forewings is more distinct than in the ♂. 40—45 mm. Japan. The antennae of the ♂ agree, according to a black and white illustration, with those of *Stauiopus*, so that its classification here will be correct, in spite of the comparison with *Cneth. grisescens*. Unfortunately the illustration referred to is not suitable for reproduction.

## 7. Genus: **Desmeocraera** Wllgr. (Quadricalcarifera Strd.)

All that is necessary about this Genus is said in Vol. 10, p. 628 and Vol. 14, p. 410. The species dealt with here, were formerly mostly classified with *Stauiopus*.

*D. cyanea* Leech was placed under the Genus *Cnethodonta* in Vol. 2, p. 291, whilst according to the antennae it should be classified here. Illustration in Vol. 2, pl. 45 a.

*D. coreana* Mats. I have only a black and white illustration of this at my disposal. There is a ♂♀ *coreana*. in the PÜNGELER collection from Yokohama which is not denominated and which would seem to be identical with this species that is now described from Korea. Thorax dark green, anteriorly more densely with grey hairs. Forewings brownish green interspersed with white scales. The double inner line turns sharply outward at inner margin and is filled with lighter scales. The anterior basal area is darker, especially under the cell. The orbicular and reniform stigmata form equally large white rings. The small round claviform stigma is almost completely white. Behind the rather indistinct double outer line there are some dark green streaks along the veins. The marginal area is browner, the black submarginal line clear and distinct. Hindwings brown, grey-white at costa with dark streak in centre and a fairly large subapical spot. 42—50 mm.

*D. subgeneris* Strd. is described among the indo-australian species in Vol. 10, p. 628, pl. 83 c. It occurs *subgeneris*. in Formosa and Japan. According to the illustration *wilemani* Mats. appears to be identical.

*D. perdix* Mr. Also this species, that occurs in India, is described in Vol. 10, p. 630, pl. 83 h. According to MATSUMURA it also occurs in Japan. — Besides there is the form **nigroguttata** Mats. of which I do *nigroguttata*. not know the description. One may assume that it has black markings instead of brown. The closely related *viridimaculosa* Mats. is identical with *fasciatus* Mr.

## 8. Genus: **Exaereta** Hbn.

*E. ulmi* Schiff. (Vol. 2, p. 291, pl. 46 d). **modica** Dhl. is found among the species in the S. Tyrol *modica*. and southwards. Uniformly dull grey, the transverse lines, which are in any case only indicated by dots are entirely absent. Also the veins do not stand out from the ground colour.

## 9. Genus: **Fentonia** Btlr.

Most of the species dealt with here, probably do not belong in this Genus. Without having had an opportunity of examining the types it is impossible to say whether they belong to *Pseudofentonia* Strd. or to which other Genus they should belong. We are therefore meanwhile leaving them here.



*F. sordida* Wilem. This species is dealt with in Vol. 2, p. 292 and Vol. 10, p. 624 under *Pseudofentonia*, where it should be placed. The name *sordida* is quite correct in itself, but the rules of zoological nomenclature demand an alteration. For specimens from Formosa (Vol. 10, p. 624) the oldest name *variegata* Wilem. should prevail; it is a question of opinion, whether one separates *formosana* Wilem. from same and even whether a separate name is justified. For Japanese specimens, in place of *sordida* (Vol. 2, p. 292) the new Japanese name of var. **japonensis** Tams is introduced.

*fasciata.* **F. fasciata** Filipj. Forewings grey, basal half darker, marginal line (outer line) indistinct. Fringes grey and blackish. A spot at disco-cellular. Only traces of the scaly spot on inner margin, however the type is not a perfect specimen. Hindwings white with black scales at costa, a black spot at anal angle. The illustration of *Drym. mandschurica* in Vol. 2, pl. 49 b gives a fair impression of what this species looks like. ♂ 42 mm. Sutschan.

*abraama.* **F. abraama** Schaus. Forewing pale buff-grey at base with a fine pale brown line. Subbasal and inner line fine, undulate, parallel, olive-grey, excurved at inner margin, the intermediate space being paler olive-grey. Median area whitish with pale brown interspersions. These are especially dense below vein 2 and towards the anal angle. A small white spot at disco-cellular. A brown shade posterior to cell and from vein 4 to costa. Outer line double, fawn, only distinct at costa. An irregular smoky brown shade with outer grey edge from costa before the apex to vein 4, partially edged with black lines, extending narrowly to vein 1. Hindwings dark grey-brown. ♂ 50 mm. Szechuan.

*cantiana.* **F. cantiana** Schaus. Forewings brown with blue-white scales, except in outer area. Lines delicate, black-brown and indistinct. Traces of an inner line and a streak at disco-cellular. Two outer lines, widely separated at costa, converging under vein 4, thence parallel and undulate. The lunules of the outer line edged outwardly with white between veins 3 and 1. Hindwings a rich brown. Fringes of both wings white. ♂ 55 mm. Szechuan.

*cingana.* **F. cingana** Schaus. Forewings brown-grey at base with black basal line, which is curved outwards to over vein 1. Posterior to same a single fine dull brown parallel line and 2 inner lines, which are approximately vertical. The median area in the cell and below same to the inner margin and below vein 2 to the outer margin, pale smoky grey with dark striations. At disco-cellular there is a fawn line with paler edges, posterior to same an iron-grey spot between veins 4 and 6 which has an outer black edge. Conjoining to same the outer line, double, black, dentate, excurved from veins 4—2. Margin olive-grey with a separating line that is grey-brown and uniformly curved. Hindwings smoky grey with dark median shade and dark veins. Antennae well pectinated. Veins 6 + 7 of hindwings with long stalk. The species may therefore in consequence actually belong to the *Urodonta* Stgr. ♂ 29 mm. Omeishan in Szechuan.

### Genus: **Pseudofentonia** Strd.

This Genus has been fully dealt with in Vol. 10, p. 624.

*sigmata.* **P. sigmata** Btlr. This species was enumerated in Vol. 2, p. 313 under the Genus *Phalera*, but it should be transferred to this Genus. Eventually use can be made of the name *Mesophalera* Mats. on account of certain minor differences.

*deliana.* **P. deliana** sp. n. (15 c). The formation of the antennae and neuration agree quite well with *Pseudofentonia* (compare Vol. 10, p. 624, Group II). In the other species however the pronounced tuft at end of thorax is missing. The general impression is like that of *Drym. delia* (Vol. 2, p. 297, pl. 45 d). Thorax and forewings grey-brown. The tip of tuft on thorax blackish. A dark brown inner band is indicated, but only in its anterior part. At disco-cellular there is a short black streak. The outer line commences at  $\frac{2}{3}$  rds of costa and proceeds inward to vein 4. There it is more distinct and extends along vein 4 outwards and then continues rather more faintly. At vein 3 it again projects in a point as at vein 4. Thence obliquely inwards to under vein 2, forming a black point there and below same it diffuses outwardly. Posterior to the line from costa to vein 4 and at the point at vein 2 there is a dusky brown adumbration. Submarginal line interrupted. Posterior to same black marginal dots. Abdomen and hindwings pale reddish brown. ♂ 36 mm. Corea. Type in the PÜNGELER collection.

### 10. Genus: **Hoplitis** Hbn.

*albida.* *H. milhauseri* F. (Vol. 2, p. 292, pl. 45 a). **albida** Pfeiffer from Anatolia differs materially from European specimens. The ground colour of thorax and forewings is a much paler dove-grey. The dark markings on the other hand are deep black, not brown. Hindwings pure white, anal spot jet-black. — *umbrosa* Stgr. which was dealt with in Vol. 2, p. 292 as a form of *milhauseri*, is probably a separate species. This is especially noticeable in some very finely marked specimens, which I have before me from Sei-shin, Corea.

### Genus: **Megaceramis** Hmps.

Antennae of ♂ pectinated and fasciculate. Palpi short, almost hidden in the hairs of the thorax. Thorax with porrect double tuft or crest. Forewings boldly excurved on inner margin at base, similar to the



indian Genus *Cleapa* Wkr., but the costa is less arched, the outer margin slightly incurved. Vein 2 arises fairly far outwards, 3 and 4 almost from the same spot, vein 6 somewhat below the angle of cell, 7 from the angle, 10 + 8 + 9 stalked, 11 free or vein 7 and 10 conjoined by a bar, thus forming an accessory cell. On hindwings vein 3 and 4 with or without a stalk, 7 in a specimen before me, is indicated by only a short spur in centre of vein 6, 8 to  $\frac{2}{3}$  of the length of the cell in juxtaposition to same.

**M. lamprolepis** Hmps. (15 e). Thorax dark brown. Forewings slightly paler. Reniform stigma bold, *lamprolepis*. black with pale central streak. Behind same a dark patch between veins 2 and 4 to the outer line, extending thence to margin in a slightly paler shade. No inner line. The outer one is formed of black dots, bulging widely outwards behind the cell and then obliquely to centre of inner margin. Here a few black scales are all that indicate the "tooth" or lobe. In the anterior half, the dots are situate in a narrow yellow-grey stripe. Hindwings pale brown. ♂ 32 mm. Sikkim, Siao-lu.

#### 14. Genus: **Lophocosma** Stgr.

**L. curvatum** sp. n. (15 e). Very close to *L. geniculatum* Mats. (Vol. 10, p. 651) from Formosa. Thorax *curvatum*. and forewings grey-brown. Basal area before the inner line grey-white. Both inner and outer lines double. The inner one commences with a black spot on costa, proceeds sharply outwards to centre of cell, thence to over submedian nervure approximately parallel to outer line and from there obliquely inwards. The outer line curves slightly outwards below the costa, then undulate, slightly incurved to the inner margin. From centre of costa there is a wide black stripe obliquely outwards, extending downwards to where vein 4 arises. It proceeds along the vein, then curving slightly upwards, its upper edge keeping below vein 5. An angular mark, such as occurs in *geniculatum* is certainly absent. Abdomen and hindwings reddish brown. The thorax in the specimen before me is damaged, so that I cannot say anything definite in regard to the presence or absence of the crest of hairs as in typical *Lophocosma*. The outer margin of forewings is very oblique both in *curvatum* and in *geniculatum*. ♂ 54 mm. Moupin. Type in the British Museum.

#### 16. Genus: **Gluphisia** Bsd.

*G. crenata* Esp. (Vol. 2, p. 295, pl. 46 d). — **tartarus** Schaw., as the name indicates, has very dark *tartarus*. forewings, markings still just discernible. Also hindwings are darker than type. — **tristis** form. nov. Fore- *tristis*. wings brownish black mottled with lighter scales. On costa 2 black spots indicating the bands, which are as widely separated as in *crenata*, otherwise one would be inclined to place this form with *amurensis* (see below). Hindwings paler brown. No bands indicated on underside. East Thibet. Type in the British Museum.

*G. japonica* Wilem. is described as a species and dealt with as such in Vol. 2, p. 295. In *crenata* the subbasal band is straight, in *japonica* it is almost straight and the postdiscal line is also somewhat more undulate in *japonica*. According to this *amurensis* Grünbg. would better be classified with *japonica* and not with *crenata*, as was done in Vol. 2. — *amurensis infuscatata* Mats. from Shinano is certainly the same. In the description stress is laid on the fact that the subbasal line is the most prominent and the same can also be ascertained in *amurensis*.

#### 16 a. Genus: **Paragluphisia** Djakon.

Proboscis absent. Eyes only faintly ciliated. They are more definitely ciliate in *Gluphisia* and according to DJAKONOW previous opinions to the contrary are erroneous. Palpi do not vary. Antennae with long pectinations in ♂, shortly pectinated to extremity in ♀. Hind tibia with terminal spurs. Genitalia show a completely different type.

**P. oxiana** Djakon. Similar to a brightly marked and narrow-winged *Gl. crenata*. Forewings grey-white *oxiana*. bestrewn with grey-black. Basal and discal areas suffused with pale rosy brown. Basal line as in *crenata*. The prediscal line black, distinct, almost straight, faintly dentate in the ♀, angulated outwards on the submedian fold, with white inner edge. The postdiscal line somewhat undulate and less distinct. Discal area ashy grey, in place of the reniform stigma a pale rosy brown spot. Marginal area dark grey in which is situate a blackish subterminal line having a whitish grey inner edge. Hindwings white with dark margin and darker anal spot. 27—29 mm. Amu-Darja.

#### 17. Genus: **Drymonia** Hbn.

*D. querna* F. (Vol. 2, p. 296, pl. 45 e). **alphitochros** Zerny is paler than type. The inner line of fore- *alphitochros*. wings with delicate white edge, the outer half of discal area a purer white than usual. On hindwings also the costa and fringes are white in the ♂. Algeciras.



- vivida*. *D. chaonia* Hbn. (Vol. 2, p. 297, pl. 45 e). — *vivida* Zerny is a more extreme form of *lunula* Grünbg. In typical *vivida* also the inner part of the median area is white, but the dark central line penetrates right through. Further the margin is white from the pale subterminal line to the checked fringes. Hindwings white with indications of a dark band at anal angle and at apex. — *argentea* Closs is "pale grey-white and faintly marked". — *illunulata* Dhl. is described as "pale specimens that would otherwise be classified with *albisignata*, but with absent cell spot". — This *albisignata* Lenz is widely white on forewings before the outer dentate line. This occurs predominantly in the ♀ sex. Probably differs little from *lunula* Grünbg. (Vol. 2, p. 297, pl. 45 e), in such specimens as were mentioned by GRÜNBERG, where the dark intermediate marking is absent. — A pair in the PÜNGELER collection is white at base of forewings before the basal line and similarly between the white margins of the inner and outer lines. Both these usually dark lines are absent and also the central line, which is still present in *vivida*. On the other hand the marginal area remains dusky. We are illustrating the ♂ of the *vivida* aberration (14 f).
- powelli*. *D. powelli* Oberth. (15 e). I am including this species here, which was described as *Hypocampa* (*Hoplitis*), despite the fact that the antennae are not pectinated right to the tip. Its place is certainly not under *Hoplitis*, whilst it has certain resemblances to *chaonia*. Ground colour similar to same. The subbasal line is less oblique and the space before same yellowish grey. A clearly marked black central line, slightly incurved. From same to somewhat beyond the dentate postdiscal line again yellow-grey. There is no trace of a paler subterminal line. Hindwings are grey-brown and the subdivided dark mark at anal angle reminds one somewhat of that of *milhauseri*. ♂ 42 mm. Lambèse.
- intermedia*. *D. trimacula* Esp. (Vol. 2, p. 296, pl. 45 f). — *intermedia* Schaw. denotes a form with wide white central band, i. e. like the type form from Mostar, but having the margin and base pale grey. In typical specimens of *trimacula* these patches are a yellowish grey, in *dodonea* they are blackish.
- D. basalis* Wilem. & South (15 e). Similar to *trimacula* and with the brownish ground colour of same. The pale prediscal line consists of 3 curvatures, obliquely outwards and in a straight line. In *trimacula* it is somewhat excurved in the centre. The dark patch of the discal area is more indefinitely outlined against the paler patch. The width of the two patches presumably varies somewhat. The pale postdiscal line is narrower, clearer and more dentate. At vein 4 it is scarcely angulated but proceeds straightly to the submedian fold and is more definitely angulated below same. The veins are finely marked with black in conjunction with the outer line. The subapical spot is narrower and more clearly marked. The marginal area is somewhat paler than the ground colour. Fringes are just as dark as those of *dodonea* or darker. On the grey-brown hindwings the hairs at inner margin are slightly reddish brown. ♂ 38 mm. Gifu (Japan), Sedanka (Ussuri).
- D. mandschurica* Oberth. (Vol. 2, p. 297, pl. 49 b). This was classified in Vol. 2, p. 297 as the last species of the Genus *Drymonia*, but according to a specimen in the PÜNGELER collection, it certainly does not belong here. Antennae of the ♂ plumose, palpi short. In forewings vein 3 and 4 separate, 5 situate far in front, 6 from centre of accessory cell, 7 with short stalk and with 8 + 9 from tip of accessory cell, 10 arising shortly before same. In hindwings vein 3 to 5 as on forewings, 6 + 7 with short stalk. As the old illustration was inexact and also that of OBERTHÜR might be better, we are giving a fresh illustration (14 d).

### 18. Genus: **Pheosia** Hbn.

*Ph. tremula* Cl. (Vol. 2, p. 298, pl. 45 f). Specimens from Thian-shan have the ground colour of forewings a purer white and this is also more extensive. On costa the central one-third is quite a pale grey and this colour scarcely extends to vein 5. Also hindwings are pure white. Specimens from Uralsk form a transition to this form.

*Ph. buddhista* Pnglr. (Vol. 2, p. 298, pl. 49 e). The dark band on forewings is rather too dark in the illustration and the edges are a bit too clear-cut. — In a specimen from Ta-t sien-lu there are dark rays inwardly above vein 3—5, which conjoin with the lowest apical streak. On hindwings the dark anal patch is more prominent. The general impression reminds one somewhat of *tremula*. It is named *gelukpa* form. nov. Type in the British Museum.

### 20. Genus: **Microphalera** Btlr.

*styxana*. *M. styxana* Schs. Bodies and wings blackish brown and silky. At disco-cellular a finely marked jet-black line. Inner and outer lines dark grey. The latter excurved at costa, undulate. Before same on vein 1 a short white streak and behind same on veins 2—4 fine grey striations. Traces of a pale submarginal line near the costa. Hindwings brownish white with dark band before the pale margin. 38—44 mm. Omei-shan.

### 21. Genus: **Notodonta** O.

*tristis*. *N. ziczac* L. (Vol. 2, p. 300, pl. 45 g). *tristis* Masl. (= *lapponica* Dhl.) denominates small specimens. Centre of costa of forewings is not pale grey, but dark violet-grey. Outer area devoid of markings, dark grey-brown. Lapland, Poland. — *montion* Dhl. The form from the Tyrol mountains is uniformly reddish yellow in basal and discal areas. The discal lunule is distinct, band markings diffuse.



*N. anceps* Goeze (Vol. 2, p. 300, pl. 46 b). In *acerba* Schaw. forewings and costa of hindwings are grey, *acerba*. paler than type with distinct black lines. Reniform stigma with white edge instead of yellow. Elsewhere also the yellow tone is absent. Costa whitish to centre. Hindwings purer white. Bosnia. — *transversa* *transversa*. *Wagner* is a transition form to same with distinct dark inner line. Also the outer line, which is white in *acerba*, appears more prominent with its dark inner edge. — The form from Barcelona is more distinctly marked than type, ground colour of forewings is dark grey; hindwings somewhat whiter than type. It is probably like *baetica* Zerny from Albarracin. The latter is larger than type. Colouration of forewings with a *baetica*. light buff-grey hue and prominent markings; the oblique stripes are more extended, a bright russet (this does not apply in the specimen from Barcelona). On hindwings the veins are shaded at margin, in specimens from Barcelona only the marginal line is clear. — The brown-black aberration, that is frequent everywhere has not yet been denominated.

*N. phoebe* Sieb. (Vol. 2, p. 301, pl. 45 h). *grisea* Heinrich is fairly unicolourous pale grey. Bred from *grisea*. larvae. — *lemur* Frings is a melanic form, corresponding to *tritophus-melaena* Spuler. Forewings dusky black *lemur*. except for a deep brown shade at base and in discal area, the discal lunule and a pale grey stripe in centre of costa. The prediscal and subterminal lines are just discernible. Hindwings impure grey. — *terio-* *teriolensis*. *lensis* Dhl. from the South Tyrol denotes a pale yellowish specimen, which more or less constitutes a transition form to *tiefi* Brtl. The latter is illustrated as a species in Vol. 2, p. 301, pl. 45 h. PÜNGELER also held *tiefi* to be a *phoebe* form and DANNEHL has announced that all grades of transition from *phoebe-tritophus* to *teriolensis* exist, so that this would support this contention. The form can be called *tiefi* as a race and *teriolensis* as an aberration, but both names signify almost the same. — Should however *teriolensis* not be identical with *tiefi*, but only a transition form to same, then instead of *teriolensis*, we should have to adopt the name *ochracea* Vorbr., as same has rights of priority. The latter is described: ground colour paler. In *ochracea*. some specimens buff with rather darker pale ashy grey dusting. From the Valais and Tessin.

*N. cinerea* Btlr. (15 c) is briefly mentioned in Vol. 2, p. 302. We are now giving an illustration of *cinerea*. same. I hold same to be a slight variation of the Indian species *irrorata* Mr. (Vol. 10, p. 641). As is often the case in indistinctly marked species, specimens occur in which one or another of the markings is a trifle more, or less, distinct. Therefore in a short series *cinerea* and *irrorata* may accidentally appear to differ more than is actually the case. — *ussuriensis* Moltr. differs distinctly by its white, instead of ashy grey *ussuriensis*. ground colour, a wide submarginal band can also occasionally occur in *cinerea* and can be black right up to the costa and not merely between veins 5—6. The scaly tooth or lobe on inner margin is probably also present, as indicated by MOLTRECHT. Ussuri territory. MARUMO illustrates the species as *Ochrost. punctatella* Motsch., WILEMAN places *punctatella* to his *Stauropus oblitterata*; originally *punctatella* was described as a *Lymantriidae*.

*N. pacifica* Moltr. Forewings dark grey, pale grey at costa, the russet basal area does not extend as far as *pacifica*. the costa and inner margin; sometimes however it projects narrowly as far as the postdiscal line. The inner line is double, black, dentate and distinct. The outer line is pale, simple, faint or absent. Hindwings whitish from inner margin to vein 6, then grey towards the costa. The species is illustrated as *moltrechti* Oberth. in Vol. 2, pl. 49 b. *pacifica* is probably only a sub-form to *lativitta* Wilem., from which it differs by the darker thorax and less pronounced rusty yellow stripes.

*N. moltrechti* Oberth. (15 f). We are now giving a correct illustration of this species. *kotshubei* Schelj. is *moltrechti*. synonymous with same. Also *Mesodonta rotundata* Mats. which is only known to me by an illustration, will probably be the same.

*N. grahami* Schaus. Similar to *moltrechti* (15 f). Forewings black-brown in basal area except on costa. *grahami*. This area is outlined by a black line that is excurved below costa and slightly incurved at submedian nervure. Below the cell a small brown spot intersected by a black line. Costa whitish to disco-cellular, below same to under the cell whitish dusted with black-brown. Disco-cellular black with white edge. A black-brown outer shadowy band behind the cell excurved to centre of inner margin. Beyond same an undulate black line, vertical below vein 2, posterior to same brown. Black dots in front of the margin. Hindwings white, brown at inner margin, outer margin and outer line dark. 57—65 mm. Omei-shan (China).

*N. arnoldi* Oberth. (15 d). In Vol. 2, p. 300 it was stated "nearly related to *N. graeseri*". It is cer- *arnoldi*. tainly the same species. We are giving a life-like illustration of a specimen captured at Nikko in Japan on 10th August. — BANG-HAAS considers the illustration of *graeseri* ♂ on pl. 46 a as being poor, as the forewings should be browner. However the specimens in the PÜNGELER collection are as grey as the illustration, we admit however that a rather pale specimen was chosen for illustration. OBERTHÜR's illustration (*arnoldi* ♂) is much too dark.

*N. korbi* Rbl. Similar to *anceps*, but somewhat larger, wings wider, colouration purer grey, antennae *korbi*. of ♂ with longer pectinations. Forewings with similar arrangement of markings as *anceps*, but less distinct. Basal area darker. The scaly tooth or lobe on inner margin of forewing is shorter with a brown edge, the dark marginal line of wings is narrower with white dots at extremities of veins, fringes grey. Hindwings also like *anceps* except for the grey fringes. ♂ 54 mm. Aleppo.



*rothschildi*.

**N. rothschildi** Wilem. & South. Similar to *dembowskii* Oberth. (Vol. 2, p. 300, pl. 45 g). Forewings dark chocolate-brown with slight violet suffusion at base of costa. The inner and outer lines similarly as in *dembowskii*. The submarginal line formed of white incrassated scales at extremities of veins, no rusty brown submarginal spots. Scaly tooth or lobe black, fringes blackish. Hindwings similar to *dembowskii*, fringes whitish, black at tips of veins. ♂ 48 mm. Hokkaido.

*N. tritophus* Esp. (Vol. 2, p. 301, pl. 46 a). It should be added to the description of *uniformis* ♂ Oberth., that according to a pair in the PÜNGELER collection, the dark submarginal line with its pale edge in the ♂ can also be missing. In the ♀ the prediscal and postdiscal bands are very distinct and black with clear-cut white edges on averted sides; the postdiscal line extends from vein 6 to inner margin in an almost straight line without curvature and in regular dentations. On underside of hindwings the outer pale band with its dark edge is far further removed from central lunule than is the case in *tritophus*. — *sugitanii* ♀ Mats. is possibly identical with *uniformis* Oberth., it varies however in size, 52 mm (instead of 45 mm in *uniformis*). Further on underside of hindwing the outer darker line touches the lunular mark, as in *tritophus*.

*N. dromedarius* L. (Vol. 2, p. 299, pl. 46 a). The dark form analogous to *tritophus-uniformis* is named *hibernica*. **hibernica** Cavadja. Only the rusty brown marginal spots are retained. It can occur anywhere and not only in Ireland, as the name might indicate. — The ♀ of this species has produced 2 hybrids, with *tritophus* ♂ *dubia*, and *ziczac* ♂. **dubia** Tutt. = *tritophus* ♂ × *dromedarius* ♀, (14 d) denominated by TUTT without any description. Before me is a pair of *dubia* ex the PÜNGELER collection. The rusty brown ground colour is much suppressed and it corresponds more to a pale grey *tritophus*, whilst the markings are clearer than in *tritophus*. The submarginal brown spots, which are so pronounced in *dromedarius* are very small in *dubia* ♂ and almost absent in the ♀. The postdiscal line in *dubia* ♂ and ♀ begins and ends as pale as in *dromedarius*. *newmani*. **newmani** Tutt is the product of a cross of *ziczac* ♂ × *dromedarius* ♀. The form is relatively large. The striking apical mark of *ziczac* is present, but in slightly changed form, the transverse line of *dromedarius* is retained in same as a streak on costa. Hindwings of *newmani* are as dark as in *dromedarius*. — A 3rd *heinickei*. hybrid **heinickei** Hemmerling has resulted from a crossing of *ziczac* ♂ × *tritophus* ♀. It is also similar to *ziczac* with its red-brown colouration, the lunular mark and its submarginal extension. Besides this the transverse lines of *tritophus* are present. The basal and prediscal lines are dark and stand out clearly, costa is darker throughout its length. Besides there is a dark median band, which is not always distinct in *tritophus* and the outer dentate band, which is generally only faintly indicated in *ziczac*. Hindwings are pale with dark margin.

## 21 a. Genus: **Hiradonta** Mats.

Antennae of ♂ with long pectinations, the last one-third filiform. Palpi extending above frons. Thorax without crest of hair. On forewings vein 6 arises at upper angle of cell and 3 is closer to 2 than to 4. On hindwings veins 6 + 7 with short stalk. Abdomen extending one-third over hindwings.

*takaonis*.

**H. takaonis** Mats. Similar to *H. tenebrosa* Moore (Vol. 10, p. 642, pl. 80 g). Body reddish brown, forewings dark brown, inner margin and apex as in *tenebrosa*. Inner and outer lines black, undulate, the latter very heavily dentate. The space between the two lines black at inner margin. Paler at outer margin between veins 4 and 5. Hindwings dark grey-brown with paler median band. ♂ 46 mm. Tokio.

## 21 b. Genus: **Hyperaeschra** Btlr.

Full details in regard to this Genus are given in Vol. 10, p. 642.

*tusa*.

**H. tusa** Swh. Dark grey. On forewings the basal area is much darker than the outer half. The intermediate line is densely black, from two-thirds of costa to vein 4, then incurved to submedian nervure and obliquely inwards to the tooth or lobe on inner margin, where it becomes very thick. In front of same on inner margin there is a black spot, in centre of wing an indistinct grey median band. Hindwings grey and devoid of markings. ♂ 48 mm. Japan. — The species is compared by the author to *Hyper. basalis* Mr., which is classified in the Genus *Semidonta* in Vol. 10, p. 643. Therefore possibly *tusa* is an older name for *Sem. marumonis* (= *biloba* Marl.) also from Japan and described in Vol. 10, p. 643.

*chi*.

**H. chi** O. B.-Hags (14 e). Antennae of ♂ with very short pectinations, neuration more like that of the Genus *Hyperaeschra* than of *Allodonta* Stgr., which might otherwise be a possibility. Thorax and forewings dark reddish brown, paler in the last third at the costa. The two transverse lines distinct, dentate, with pale edges on averted sides. At disco-cellular a heavy black streak and a wide bar between the two transverse lines below median nervure. Hindwings much paler brown. ♂ 42 mm. Peking.



**H. nigricosta** Mats. Wings grey. Forewings with a wide band in centre consisting of black-brown *nigricosta* spots. Hindwings somewhat paler than forewings with indistinct paler band. Underside pale grey. Forewings narrowly black-brown along costa, except at apical end. No other markings. ♂ 38 mm. Corea.

### 21c. Genus: **Coreodonta** Mats.

Probably only a sub-group to *Hyperaeschra*. Thorax with long upright crest of hairs in centre. In forewings vein 6 and 7 widely separated from end of cell. Antennae of ♂ filiform.

**C. coreana** Mats. Forewings dark brown, the last third paler at costa. Inner line very sharply *coreana* dentate, before same and below the cell, a dark streak. Outer line formed of black dots. The apical area between veins 4—7 is paler, the veins themselves are dark and there are deep brown striations in the interstices. According to the original illustration the space below veins 2—4 seems somewhat darker and the anal angle is then again paler. The tooth or lobe is dark. Hindwings dark grey and devoid of markings. ♂ 50 mm. Corea.

### 24. Genus: **Spatalia** Hbn.

**Sp. argyropeza** Oberth. (15 f). Closely related to the Indian *sikkima* Mr. (Vol. 10, pl. 79 d), which is *argyropeza*. a dark form of *argentifera* Wkr. (Vol. 2, p. 304, pl. 46 f). However *argyropeza* is still darker, also at outer margin and at base of costa, so that the entire surface is uniformly deep brown, except for the pale apical patch. ♂ 44 mm. Ta-tsien-lu.

**Sp. jezoensis** Wilem. & South. Similar to *doerriesi* Graes. (Vol. 2, p. 303, pl. 46 e). Forewings pale *jezoensis* brown and rusty red with cloudy violet-brown in marginal area, veins there being creamy white. Below the cell a triangular silver-spot with another spot nearer margin. The outer line is black, dentate and interrupted. Median nervure and discal lunule black. A white spot on margin between veins 5 and 6. Hindwings dark brown. 38—48 mm. Hokkaido.

### 22. Genus: **Semidonta** Stgr.

*S. biloba* Oberth. This form of the Indian *basalis* Mr. (Vol. 10, pl. 80 c), dealt with in Vol. 2, p. 302, pl. 45 d, differs only very little from same. *bidens* Oberth. is exactly identical with it. Described from Ta-tsien-lu.

### 25. Genus: **Leucodonta** Stgr.

*L. bicoloria* Schiff. (Vol. 2, p. 304, pl. 46 f). **xanthocephala** Closs has a deep orange head, collar and long streaks over the "dorsal centre". — In **galactina** Dhl. the golden yellow spots are much reduced, similarly the black spots, forming thereby a transition form to *albida* Bsd. and *unicolora* Mén. It differs however from them by the grey reddish sheen of the ground colour. It occurs rarely in Central and South Germany. *xanthocephala* *galactina*.

### 26. Genus: **Ochrostigma** Hbn.

*O. velitaris* Hufn. (Vol. 2, p. 305, pl. 45 c). **pontica** Rbl. is a much darker grey. The transverse lines *pontica* are filled with white and apparently they are more vertical to the inner margin. Trebizond. — **cinerea** ♂ *cinerea*. Schille has normal markings. Colour of forewings is slate-grey. The lines instead of being with white are filled with grey and also the large angular mark is grey. Hindwings dark grey-brown.

*O. melagona* Bkh. (Vol. 2, p. 305, pl. 45 c). **melanochroa** Schultz is a dark form, which occurs in the *melanochroa* West German industrial region and also in Silesia. Forewings of ♂ are grey-black to black with reddish sheen. The pale transverse lines are darker. In the ♀ forewings are densely dusted with grey-black.

*O. japonica* Wilem. (Vol. 2, p. 305). We are now giving an illustration of this species (14 e).

### 26a. Genus: **Shirona** Mats.

Antennae of ♂ pectinate and ciliate. Palpi short. Forewings with oblique outer margins. Vein 5 nearer to 6; 4 widely separated from 3, vein 6 from centre of accessory cell, 7 + 8 + 9 + 10 from apex of same, the sequence of their branching off is not indicated. Vein 11 free. On hindwings vein 6 + 7 with long stalk, 3 + 4 well separated.



*nivea*. **S. nivea Mats.** Forewings white with a few brown scales, veins yellowish. Near base of costa a row of blackish streaks and above the centre of inner margin a few black scales. Hindwings white, yellowish at margin and on veins. Antennae and body yellowish, ochreous on upperside of abdomen near base. ♂ 30 mm. South Saghalin.

### 26b. Genus: **Wilemanus Mats.**

Thorax like in *Ochrostigma*. Palpi short, densely haired. Antennae of ♂ pectinated almost to their extremities, shorter pectinations in ♀. On forewings veins 3 and 4 arise separately, 6 laterally from the accessory cell; 7, 8 + 9 and 10 separated from apex of same, vein 11 free. On hindwings veins 3 and 4 arise from same spot, 5 is more weakly, 6 + 7 with short stalk.

*W. bidentatus Wilem.* (14 f). The main form was erroneously described by the author as *Stauropus* and therefore enumerated in Vol. 2, p. 290 as such. On the other hand the form *ussuriensis Pnglr.* was dealt with as *Ochrostigma* in Vol. 2, p. 305, pl. 49 b. It differs from *bidentatus* by the absence of the bold black streak in the submedian fold, whilst on the other hand the black lunule at disco-cellular stands out more prominently. Ground colour of both forms is white-grey. *coreanus Mats.* is identical with *ussuriensis*. In Nanking the form *bidentatus* occurs and not *ussuriensis*, according to specimens in the collection of HOENE. We are illustrating one of these specimens.

### 26c. Genus: **Melagonina gen. nov.**

Similar to *Wilemanus*. Thorax as in *Ochrostigma*. At base of abdomen 2 small tufts. Palpi densely haired, somewhat longer than in *Wilemanus*. Antennae of ♂ pectinated somewhat nearer to extremity. On forewings veins 3 and 4 arise separately, 6 closely below upper angle of cell, 7 just below apex of accessory cell, 10 + 8 + 9 from apex of same. On hindwings vein 3 is somewhat separated from 4, 5 is weakly, 6 + 7 with short stalk.

*hoenei*. **M. hoenei sp. n.** (14 f). Somewhat like *Ochrostigma melagona* (Vol. 2, p. 305, pl. 45 c). Thorax and forewings greenish brown. The inner band with black edge and dusted with black. Its inner edge projects far below the cell, its outer edge about vertically at 1/3rd of costa, with small interruption above submedian nervure. At disco-cellular a faint light streak. The finely drawn outer line is white, dentate and only distinct at its commencement and extremity. Behind same on costa there is a triangular mark of dark dusting and a similar but quadratic mark on inner margin. The latter is outlined on upperside by a black line. Besides the inner band is intersected by a black line. Hindwings grey-brown. ♂ 40 mm. Nanking (Kiangsu). Type in the collection of HOENE.

### 27. Genus: **Odontosia Hbn.**

*O. carmelita Esp.* (Vol. 2, p. 305, pl. 46 g). *nocturnalis Stich.* is much darker than type. On forewings the otherwise extensive white dusting is only present as a faint grey hue at inner angle. As it is also described from Lapland, it will probably scarcely differ from the older *nordlandica Strd.* form (pl. 14 e) mentioned in Vol. 2, p. 306. An illustration of the latter is now being given here. — *sauermanni O. Bang-Haas* (14 f) is as uniformly dark as *nordlandica*, but as reddish brown as is otherwise only the costa. The pale grey colour is also concentrated at the anal angle, from below lower median nervure. Hindwings are fairly typical without the grey sheen. This form was bred.

*O. sieversi Mén.* (Vol. 2, p. 306, pl. 46 g). Around Königsberg and probably also throughout the Baltic Provinces a form is found that is dark in both sexes. In the ♂ forewings are black-brown, only the two transverse lines and a few spots near the margin are pale. In the ♀ marginal area is paler: *stringei Stich.* — In contrast to this there is the pale form *grotei Stich.* which is found everywhere among this species. It has more profuse white dusting with reduced markings. In the ♂ the outer transverse line is completely or almost obsolete, marginal area very pale. In the ♀ only the costa and inner margin are pale brownish, all the rest is whitish, markings being very faint. *schellenbergi Skala* "♀ with indistinct and diffuse markings" is probably the same. — The indication in Vol. 2, p. 306 that the type form occurred in the Amur and *patricia*. Ussuri districts must be cancelled. There *patricia Stich.* (= *arnoldiana Kard.*) (15 e) occurs. According to 3 specimens before me, it is larger than *sieversi*. The colour of forewings of ♂ is a dark reddish brown from costa to median nervure, as well as in the discal band. The yellowish lunular line at the outer edge of the discal area is more distinct. On hindwings the pale central line is longer than is generally the case in *sieversi*. The ♀ also has obscurer markings and is similarly a darker brown than type. Vladivostok, Sedanka. — *japonibia Mats.* will not vary much from same and a denomination appears scarcely justified.

### 27a. Genus: **Odontosina gen. nov.**

Closely related to *Od. sieversi* according to the venation. In forewings veins 3 and 4 are closer together than in same and vein 10 is free. 6 on a short stalk with 7 + 8 + 9. In hindwings also veins 3 and 4 are approximated. Vein 6 + 7 on a stalk of about half the length. Antennae of ♂ about the same as those of *Lophontosia*.



**O. nigronevata** *sp. n.* (15 f). Thorax deep red-brown. Forewings somewhat paler. Below the cell *nigronevata* and on lower median nervure to the outer line, darker, almost black on inner margin. Outer line black and dentate. Veins beyond same black. Below each of veins 4 and 6 a black spot. Abdomen of same shade as forewings. Hindwings somewhat paler brown. ♂ 40 mm. Tze-ku. Type in the British-Museum.

## 28. Genus: **Lophontosia** *Stgr.*

*L. pryeri* *Btlr.* (Vol. 2, p. 307) should be classified here and not with the *Lophopteryx*. It is very similar to *cuculus* *Stgr.* (Vol. 2, p. 306, pl. 46 d, 49 b), but differs in the shape of the prediscal line, which forms 3 arcs; only the sinus below submedian nervure is identical in both species. The species is not similar to *Od. sieversi* as seemed to be implied in Vol. 2, owing to the insufficient original description. It varies quite considerably. — **japonica** *O. B.-Haas* denotes specimens having a pale basal area on forewings, the marginal area beyond the postdiscal line is dark whilst the margin itself is pale and distinct, similar to *Loph. cuculla* (Vol. 2, p. 307, pl. 46 h).

**L. draesekei** *O. B.-Haas*. Similar to *cuculus* (Vol. 2, pl. 49 b), but the colouration is grey. The inner line projects very far forward in the submedian fold, the central area is not paler. The postdiscal line is faintly angulated on vein 6 and in the submedian fold; it is white with a black inner edge. The discal and outer areas are dark and clouded. Tooth or lobe large, rounded and dark grey. Hindwings grey, paler at base. ♂ 30 mm. Peking. The species should almost certainly not be classified here.

## 29. Genus: **Lophopteryx** *Steph.*

*L. camelina* *L.* (Vol. 2, p. 306, pl. 46 g). — **pallida** (*Gillmer i. l.*) *Heydemann* denotes pale ochreous *pallida*. ♀ specimens. *pallida* *Marechal* will probably be the same. — **fasciata** *Dhl.* denominates specimens having a *fasciata*. uniformly wide black marginal band on hindwings, which extends to the spot at anal angle.

**L. robusta** *Mats.* ♂ yellowish brown. Forewings with a few blue-black scales near inner margin *robusta*. and at base. The wide black-brown discal band excurved on vein 4 and terminating before the tooth or lobe on inner margin. In front of same widely dusky. The black-brown inner line is sharply dentate and only distinct on inner margin. Hindwings marked like the other species. ♂ 42 mm. Hokkaido.

**L. sounkeana** *Mats.* Similar to *robusta*. Forewings of ♂ dark brown. The inner and outer lines are *sounkeana*. wider, the radial streaks behind the cell are more numerous and prominent. Hindwings dark grey with usual markings, the black anal spot is wide. ♂ 44 mm. Hokkaido.

**L. nikkoensis** *Mats.* ♂ yellowish brown, ♀ dark brown. Forewings of ♂ with wide black-brown band *nikkoensis*. from centre of inner margin to near the apex on costa. Towards the base from this band, a few short black-brown radial streaks. Forewings of ♀ have a violet sheen. Anterior to the tooth or lobe there is a dentate black-brown inner line, which is only distinct on the widely dark inner margin. Thorax of ♂ with ashy grey triangle, which is whitish in the ♀. 44 mm. Nikko.

## 32. Genus: **Pterostoma** *Germ.*

*P. palpina* *L.* (Vol. 2, p. 308, pl. 47 a). — **grisea** *Kitt* varies from the otherwise more brownish spring *grisea*. form by its striking grey colouration, also the body being grey. The name is not happily selected, as there is already a "species" *grisea* *Brem.* which only differs from European specimens, as so often happens in East Asia, by its size. — In the grey-brown *lapponica* *Teich* (14 e) it is stated in Vol. 2 that the pale "median band of hindwings is absent". In the numerous ♂ and ♀ of the PÜNGELER collection from Gellivare, the hindwings are almost white. We are giving an illustration of a ♂. — **obscura** *Hoffm.* denotes very *obscura*. dark specimens from cold localities. Also hindwings are grey-brown with grey-black margins. Except for the hindwing therefore it seems to be identical with *lapponica*.

## 33. Genus: **Ptilophora** *Steph.*

*P. plumigera* *Esp.* (Vol. 2, p. 309, pl. 47 g). The pale and dark forms of this species have been denominated many times. **pallida** *Hoffm.* denotes pale buff specimens with reduced markings. — A pale *pallida* form with very faint markings has been named *extincta* *Galv.*, *berolinensis* *Strd.* and *pallida* *Closs.* It is doubtful whether the latter two are distinct from the first named form. — The counterpart **obscura** *Schwing.* *obscura*. is a fairly uniformly blackish dusted form. — **schaffgotschi** *Marschner* is described as dark grey, only the *schaffgotschi*. abdomen retaining the normal colour and besides there are a few sparse yellow scales on both wings. Intermediate forms are as follows: **saturator** *Rbl.* (*obscura* *Closs*, *plumigerella* *Strd.*) is a striking reddish, *saturator*. very clearly marked form. — **fulva** *Lenz* is unicoloured pale yellow-brown and **brunnea** *Lenz* is monotonous *fulva*. brown. — **variegata** *Lenz* is brightly marked with dark brown markings on a light ground, according to an *brunnea*. *variegata*.



*virgata*. illustration however the ♀ does not differ from *fulva*. — *virgata* Dhl. has a dark discal area. — A dark brown pair in the collection of PÜNGELER with fairly distinct yellow transverse lines, the ♂ from Sicily, the ♀ from Vienna have not yet been denominated.

*sutschana*. **P. sutschana** O. B.-Haas. (14 f). This has much wider wings. The tooth or lobe on inner margin seems to be absent. Antennae and neurulation are typical. At base of antennae there are striking yellow tufts of hair. Forewings reddish brown. The outer line is distinctly marked and yellow, the inner line much less clear. Hindwings grey with indistinct pale line. Fringes however are brownish. ♂ 32—34 mm. Sutschan.

### 37. Genus: **Gangarides** Mr.

*G. dharma* Mr. (Vol. 10, p. 609). The form *puerariae* Mell (Vol. 10, pl. 80 a) has, as was indicated in Vol. 10, a somewhat rosy hue on hindwings and a white spot at inner margin of the postdiscal line of forewings. — *coreanus* Mats. is a sub-form that does not vary materially. It has a yellow hindwing, the white spot appears to be absent. In *rubens* Mats. the hindwings are pale red, so that this form can scarcely be differentiated from *puerariae*. Both are from Corea.

### 38. Genus: **Phalera** Hbn.

*nigrofasciata*. *P. bucephala* L. (Vol. 2, p. 312, pl. 47 d). *nigrofasciata* Kieffer (= *fasciata* Kais.) denotes specimens in which the dark brown band on hindwings, which normally is only faintly marked on underside, is boldly marked on upperside. — *paupercula* Steph. on the other hand has also not got this band on underside. On forewings the yellow-white central spot is very small and in the large apical patch the ochreous brown dentate stripe is very faint. — *stephani* Ernst has exceptionally large yellow oval apical patches that extend inwards, the two double transverse lines are absent, except for minute traces. — *nanula* Steph. denotes small specimens of 20—22 mm wing length. — *defecta* Std. is another name for dwarf forms. The defective markings mentioned for the latter, will probably not be better in *nanula*. — *philonica* Std. from Istria is a sub-form to *bucephalina* Stgr. The pale inner margin of forewings does not appear to extend as far as the base. On hindwings the discal band is present on upperside, but in the original drawing it is not visible. On underside the hindwings also have a fairly definite band. — *velata* Dhl. from the South Tyrol has a dark band on underside of forewings, but the basal area before same is dusky brown. On upperside the form resembles *tenebrata-demaculata* Strd., only it is much larger than same, as is customary with southern forms. — *tenebricosa* Stertz is about the same as *demaculata*, it is described from Petrograd. A ♀ specimen in the PÜNGELER collection from the Alexander Mountains has a pale olive-brown forewing, somewhat of the same shade as the costa of *doerriesi* (Vol. 2, pl. 46 e), but markings are normal. Hindwings very yellowish, about like the inner margin of *bucephala* as illustrated on pl. 47 d.

*efflorescens*. *Ph. bucephaloides* O. (Vol. 2, p. 312, pl. 47 d). — *efflorescens* Dhl. is an abnormal specimen in which the yellow central spot in forewings extends to and merges with the costa. Also the pale spot at anal angle is more extensive.

*ordgara*. **Ph. ordgara** Schaus. Thorax of normal colouration, abdomen brown with white segmental edges. Forewings mouse-grey, darker in cell and along costa to the postdiscal line. At base a black oblique streak to the inner margin and another short line. Inner line delicately marked, black, vertical and undulate. Outer line also fine, double the two sections being widely separated, from behind the cell at vein 4 to the centre of the inner margin. Beyond same between vein 3 and costa dark grey striations to the submarginal line. The latter is fairly wide, white, from costa vertically to vein 4, beyond same there are small dentate black spots. Between veins 4 and 3 it is incurved and merges with an undulate white line from the apex; below vein 3 it changes to a narrow dark grey line. Marginal line cinnamon brown and black, enclosing white spots. Hindwings dark brown and also with white marginal dots. ♂ 60 mm. Ta-tsien-lu.

### 39. Genus: **Pygaera** O.

As the wing contour is completely different in *timonides*, *argentata* and *denticulata*, these should be placed in the Genus *Gonoclostera* Btlr., more especially as the larva of *timonides* is also not a *Pygaera* larva. Perhaps *Plusiogramma* Hmps. is identical with *Gonoclostera*.

*P. timonides* Brem. (Vol. 2, p. 313, pl. 47 f.). A ♂ from North Corea has forewings as dusky in the usually pale patches, as normally the dark patches are and these latter are then almost black. It corresponds approximately to the illustration of *denticulata* in Vol. 2, pl. 56 d. Also the hindwing is darker than normal. As only the one specimen is known to me, I am not giving a denomination.

*argentata*. **P. argentata** Oberth. (15 e) resembles the previous species in its wing contour, but the outer margin is still somewhat dentate. Thorax and forewings are dark chocolate-brown from base to beyond the centre.



Outer line dentate, black, regularly curved. It extends vertically from its termination at inner margin to costa; paler to the outer margin, a dark spot only from costa to vein 5. Besides a silvery spot near base, a small spot at lower angle of cell and obliquely inwards anteriorly two larger spots. ♂ 36 mm. Ta-tsien-lu. *Plusiogramma transsecta* Gaede (Vol. 10, p. 609, pl. 79 b) is possibly the same species.

**P. powelli** Oberth. (15 f) is perhaps only a pale form of *pigra* Hfn. Forewings grey-brown. The inner *powelli*. collateral of the inner line less widely cleft, the outer one already excurved in the cell and not only below same. The central line heavily incurved in middle and as pale as the inner line. Dark patches posterior to same at costa and inner margin. Beyond the outer line more or less rusty red. 28—34 mm. Lambèse.

**P. kononis** Mats. Similar to *cupreata* Btlr. dealt with in Vol. 10, p. 647. Forewings with 4 white lines, *kononis*. of which the first 2 have dark outer edges and they are not angulated on submedian nervure. The 3rd and 4th conjoin near anal angle and are interfilled there with black-brown. The 2nd and 3rd incline towards one another and almost form a junction on median nervure, the 4th is oblique, straight with dark edges on both sides. ♂ 24 mm. Honsho.

The hybrid **pigranocheta** Klemann has recently been bred from a crossing of *pigra* ♂ × *anachoreta* ♀ *pigranocheta*. forming an addition to the hybrids of this Genus. It corresponds in dusky colouration to *anachoreta* and the sharply contrasting markings of *pigra* have not been transmitted. — Numerous secondary hybrids have been bred, which naturally differ very little from the corresponding progenitors. We mention the following: *curtula* ♂ × *inversa* ♀ (*pigra* ♂ × *curtula* ♀) = *curtinervis* Federl. — *raeschkei* ♂ (*curtula* ♂ × *anachoreta* ♀) × *anachoreta* ♀ = *facilis* Tutt. — *inversa* ♂ (*pigra* ♂ × *curtula* ♀) × *curtula* ♀ = *inversula* Federl. — *prima* ♂ (*curtula* ♂ × *pigra* ♀) × *curtula* ♀ = *proavula* Federl. — *raeschkei* ♂ (*curtula* ♂ × *anachoreta* ♀) × *curtula* ♀ = *raeschkula* Federl. — *difficilis* ♂ (*anachoreta* ♂ × *curtula* ♀) × *curtula* ♀ = *similis* Tutt. — Besides there is a hybrid of the 3rd degree: *facilis* ♂ × *anachoreta* ♀ = *approximata* Tutt, which naturally can no longer be distinguished from *anachoreta*. FEDERLEY has dealt with his breeding experiments fully in the "Archiv fuer Rassen und Gesellschaftsbiologie", Vol. 8 (1911).

#### 42. Genus: **Pydna** Wkr.

**P. goddricka** Schaus. Antennae of ♂ fascicular. Thorax grey-brown, abdomen olive brown with dark *goddricka*. transverse lines. Forewings pale rosy brown; dark olive brown on inner margin as far as the outer line, transverse lines similarly. A line on the median nervure and vein 4 to the margin with fine white lower edge. The outer line excurved behind the cell, thence to centre of inner margin. From centre of costa an incurved dark shade to median nervure and a similar line from submedian fold to base on inner margin. Beyond the outer line a double row of dots and marginal dots. An oblique shade from apex. Hindwings black-brown. ♂ 46 mm. Omei-shan.

#### 43. Genus: **Norraca** Mr.

*N. longipennis* Mr. (Vol. 2, p. 317, pl. 47 g). Actually **retrofusca** Joann., which was given under this *retrofusca*. species as a synonym, is in all probability a separate species. On forewings there is a small spot close to end of cell and another one below same. Behind the cell there is a large double spot between veins 4—6 and a row of small spots to the apex. Hindwings brownish. The ♀ that possibly belongs hereto has darker forewings, orange-yellow with two dark spots before and again behind the disco-cellular nervure. 50—70 mm. Described from Tonkin, I have a specimen before me from Chekiang.

### Alphabetical List

with references to the original descriptions of the forms of palaearctic Notodontidae in Supplementary Volume 2.

\* signifies that the form is also illustrated in the place cited.

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- variegata Phil. *Osth.* Schmiett. S.-Bayern 2 (1), p. 195. \*  
velata Phal. *Dhl.* Ent. Zeitschr. 39, p. 104.  
vivida Drym. *Zerny* Iris 41, p. 100. \*
- xanthocephala Leuc. *Closs* Int. Ent. Zeitschr. 13, p. 23.  
zickerti Dier. *Frings* Ent. Zeitschr. 18, p. 58.

Note: To be added to the *interrupta* Group, at foot of p. 173, as newly described: *Cerura sureyae* *Rbl.* Wings large, elongate, ground colour pure white without any admixture of ochreous yellow. The short grey subapical band on forewings is very oblique and pointed outwards. Underside of forewings without any grey darkening. ♀ 47 mm. Angora.



## 18. Family: **Cymatophoridae.**

Since the publication in June 1912 of Vol. 2 dealing with the palaearctic *Cymatophoridae*, numerous new forms have been described, but no fresh progress appears to have been made in regard to our knowledge as to their position in systematic classification. At all events nothing seems to have been published. The only distinguishing characteristic continues to be the neuration of the hindwings, the approximation of the costalis and subcostalis, which occasionally become closely contiguous. This however is no longer sufficient for a definition and thus the *Axia* (*Cimelia*) and *Epicimelia* are separated from the other *Cymatophoridae*; whilst however they are removed from the family, they are nevertheless left in the same position in the classificatory system. Meanwhile a peruvian moth has been discovered — *Oiozona geometrica* Draudt (Vol. 6, p. 1010, pl. 154 b) — which has the main characteristic in, to a certain measure, a more marked degree: the costal nervure fuses along quite a considerable stretch with the middle part of the subcostal. On the other hand this Genus shows in other ways so little agreement with the *Cymatophoridae*, that its inclusion does not appear justified. This discovery therefore does not help to throw much light on to the position of this family in the classificatory system. According to the larvae it would seem best to place same next to the *Notodontidae*. — As mentioned in Vol. 2, p. 321—332, the position of the Genus *Diloba* was left open to doubt. Meanwhile the larva of the *Axia* has been discovered. It is comparable to the *Diloba* larva, but not to any known *Cymatophoridae* larva; one assumes today that the *Diloba* larva would most naturally connect with certain *Cucullia* larvae; accordingly it would best be classified with the *Noctuidae*, even though its earlier interpolation among the *Valeria* or *Apamea* cannot be maintained.

As in the case of the *Notodontidae*, most of the *Cymatophoridae* newly described in the last 20 years emanate from the eastern regions of the palaearctic zone.

### Genus: **Lithochares** Warr.

This Genus is dealt with in Vol. 2, p. 321. It is based on the species *maxima* Leech; HOULBERT enlarged same further by grouping *albibasis* Hmps. (Vol. 10, p. 661) to same, which had formerly been placed under *Palimpsestis*. — Besides in 1921 the following new species was described:

**L. cinereofusca** Houlb. Size and shape about like *maxima* (Vol. 2, p. 321, pl. 49 h), but the wings *cinereofusca* are not so pointed. Colouration similar, forewings dull olive brown, distinguishable by a white costal stripe, that is abt. 2 mm wide and which commences immediately at the base and terminates before the apex. Hindwing darker at margin. Wing expanse 58 mm. Found in Yunnan, but in its northern part, from the tibetan frontier and hence included in the palaearctic Part, although it certainly also occurs in the Indian regions of China. It is to be mentioned that the original description of HOULBERT does not quite agree with the photographic picture. He mentions black transverse lines and small crescents, of which nothing can be detected on the photograph which is excellently clear and good. Form and general colouration especially of the hindwings seem to closely approach *Sar. albicosta* Mr. illustrated in Vol. 10, pl. 85 a, but the regular white costal streak on forewings seems to differentiate same sufficiently.

### 2. Genus: **Saronaga** Mr.

**S. oberthüri** Houlb. Very close to *Sar. albicosta* (Vol. 10, pl. 85 a), so that it may be deemed to be *oberthüri* an allied species or even a subspecies. It also resembles *S. consimilis* Warr. (Vol. 2, p. 321, pl. 49 f), differing however by the more leadish white costal part of forewings and the lobulate central spot which is separated into two parts. It occurs in Yunnan, close to the palaearctic boundary and also in the Himalayas. Probably



it represents there the japanese *consimilis* Warr., in a similar way as in northern Central China where same is replaced by *commifera* Warr. (Vol. 2, p. 322, pl. 55 m).

### 3. Genus: **Habrosyne** Hbn.

A description of this Genus is given in Vol. 2, p. 322 and Vol. 10, p. 658 to which reference should be made. HOULBERT divides same into two groups, of which the one (*Habrosyne*) represents the european form, whilst the other (*Goniloba*) groups the asiatic forms together. Besides these there are a few american species.

*derasa*. **H. derasa** L. (Vol. 2, p. 322, pl. 49 d). According to HOULBERT's investigations, this species is identical with *Phalaena pyritoides* Hfn., which was published a year before LINNÉ's *derasa*. As a re-denomination would lead to an immense amount of confusion, we are retaining the name as a "nomen conservandum".

*derasoides*. **H. derasoides** Btlr. (Vol. 2, p. 323). In Vol. 2 three illustrations were given to represent this species. On pl. 55 m two smallish specimens were shown. The third picture (49 d) is correct as regards size, but according to HOULBERT it does not show a genuine *derasoides*, but rather an aberrative *derasa*. Meanwhile although there is a good deal to be said on the subject, there may be some doubts as to whether *derasa* and *derasoides* are genuinely separate species. Compare in this regard GAEDE's remarks in Vol. 10, p. 685. Contrary to the opinion of WARREN, DALLA-TORRE and GAEDE, HOULBERT considers the Indian *fraterna* to be not identical with *derasoides* and in fact he deems them to belong to different Genera.

*thibetana*. **H. thibetana** Houlb. Differs from our illustration of *derasoides* (Vol. 2, pl. 55 m) by its considerably larger size and the reduction of the costal streak on forewings which is only prominent in its outer part. The pale oblique stripe, which outlines the basal area is more irregular and a clearer white. In spite of these differences we consider *thibetana* to be only the representative of the european *derasa* in certain districts of Central Asia.

*petrographa*. **H. petrographa** Pouj. This form, the name of which was erroneously misprinted as *pterographa* in Vol. 2, p. 323, is according to recent researches a separate species from *indica* Mr. (Vol. 2, p. 323, pl. 55 n).

*H. dieckmanni* Graes. (Vol. 2, p. 323, pl. 49 d). HOULBERT creates the new Genus *Cymatochrocis* for this species, but indicates no structural differences between the two Genera, but only those of the markings.

*roseola*. **H. roseola** Mats. is unknown to me. The japanese manuscript in which the species is described was not available to me.

### 4. Genus: **Thyatira** Hbn.

Here also HOULBERT separates various species into different Genera. For instance *Th. opalescens* Alph. and *ornata* Leech (Vol. 2, p. 325, pl. 55 n) are placed in a new Genus *Psidopala* Houlb. In this Genus the costalis (vein 8) of hindwings approaches and for a stretch extends alongside of the subcostalis (vein 7), though they do not actually anastomose as in the peruvian Genus *Oiozona* Drt. (Vol. 6, p. 1010, pl. 154 b), which creates a connecting link between the *Notodontidae* and *Cymatophoridae*. The creation of this Genus has certain justification. For the next two nearest related species, *Th. apicalis* Leech and *tenuis* Hmps. (Vol. 2, p. 325, pl. 56 f) which differ from the others by their very delicate bodies, HOULBERT proposes the generic name *Psidopaloides*.

*batis*. **Th. batis** L. (Vol. 2, p. 323, pl. 49 e). Further forms have been denominated: **conflua** Rbl. (= conflua *fluens* Marschner nee Reuter, *variabilis* Trnr.) is a form, in which the costal spots conjoin with the large spot at anal angle and there are often also connections with the other spots of forewings. — **albipunctata** Sphr. has a few white dots along the dark irregular line between the two outer eyespots. These can be held to indicate the white line that occurs in other *Cymatophoridae*, for instance in *Gonophora grisescens* (Vol. 2, p. 326, pl. 49 e) or *Thyatira apicalis* (Vol. 2, p. 325, pl. 56 f). — **indecorata** Trnr. denotes specimens from South Wales and North Ireland in which the rose colour of the eyespots is replaced by dull ochre. — ab. **derosea** phaea. *Maur.* has ivory yellow eyespots and darker ground colour. — **phaea** Dhl. has the rose shade of eyespots replaced by a dull olive brown; these are described from the South Tyrol, Meran (Lana, Terlan), but also occur elsewhere and probably are scarcely distinguishable from *indecorata*.

*Th. cognata* Mr. (Vol. 2, p. 323, pl. 49 e). British authors consider this a geographic form of the european *batis*, HOULBERT however deems same to be actually a separate species. It is limited to Kashmir and the adjoining Himalayan regions; a similar form — *vicina* Gn. — occurs in Java.

*diminuta*. **Th. diminuta** Houlb. (14 a). This somewhat resembles *batis* (Vol. 2, p. 323, pl. 49 e) and *cognata* (ibid.), but the beautiful peach red eyespots are situated further from one another; an oval spot occurs in centre of costa and a similar one in the middle of the inner margin; ground colour between the spots is a purer brown. Otherwise it most closely resembles *decorata* Mr. (Vol. 10, pl. 85 a) from North India and Formosa. — It



should however be remarked here that specimens also occur in the indian and formosan *decorata* Mr., in which the rosy spots on costa more or less conjoin, as is shown by the specimen illustrated in Vol. 10, pl. 85 a. In the illustration given by HOULBERT, all the spots are separated. — MATSUMURA creates a separate Genus, *Hamya*, for *Th. violacea* Fixs. (Vol. 2, p. 324, pl. 49 e), whilst HOULBERT designates same as a quite typical *Thyatira*.

### Genus: **Haplothyatira** Houlb.

This Genus based on 2 species and created in 1912, is said not to differ structurally from *Thyatira*, but only in the markings and colouration. The species have less than 5 eyespots on forewings. They are rather large in size and their general appearance approaches that of the *Cymatophora*.

**H. transitans** Houlb. (11 d). Of the eyespots of *batis* one can only discern indications in the form of *transitans*. slightly paler, rosy tinged patches. There is a small spot of such a nature of irregular form, rather violet grey, at base of forewings; a second one in centre of costa and a further smaller and whiter one just before the apex. Hindwings reddish grey-brown. From Tze-ku i. e. from the boundary of palaearctic territory. It is fairly close to the indian *Th. labiata* Gd. (Vol. 10, pl. 85 b).

**H. unipunctata** Houlb. (15 e). Size, shape and colouration of hindwings as in *transitans*; on fore- *unipunctata*. wings however the rosy eyespots are completely absent except for a faint patch before apex; forewings are traversed by undulate, angulated transverse bands, such as occur in *Cymatophora*. From Sikkim; we are enumerating this species here as it is not mentioned in the Indian part of the work and as it is a boundary species of quite eastern palaearctic character and despite the fact that it has not yet actually been discovered on palaearctic territory.

### Genus: **Melanocraspes** Houlb.

HOULBERT places in this Genus, which he created for a group hitherto placed in the *Thyatira*, species having a subterminal band on hindwings; he includes 8 species which are distributed on about the 30° latitude from Thibet to Japan.

*M. (Th.) stramineata* Warr. (Vol. 2, p. 324, pl. 55 n). It should be mentioned here that the denomination on pl. 55 n of Vol. 2 was erroneously given as "*straminea*" instead of *stramineata*.

*M. (Th.) conspicua* Leech (Vol. 2, p. 324, pl. 56 e). This species also occurs in Thibet and Mandchuria.

**M. fasciata** Houlb. from Thibet and West China (Ta-t sien-lu) is as large as *stramineata* Warr. and *conspicua* Leech (vide Vol. 2, p. 324) which it also resembles, but the forewings are duskier, the pale eyespots less prominent. On hindwings the black outer band is nearer the base and narrower than in *conspicua*. Wing expanse 55 mm.

**M. simplificata** Houlb. (11 e). Forewings without eyespots, deeper grey, paler slate-grey with chalky *simplificata*. white in basal area and beyond the centre, the discal area dark brown-grey, traversed by blackish dentate lines, outer area cloudy violet-grey, fringes paler and spotted with darker grey. Hindwings with dull brown outer band intersected by the pale veins. The band is about 2 mm from margin. From one ♀ from East Thibet, illustrated from a figure of CULOT in OBERTHÜR's "Études Lépid. compar."

Besides the above species HOULBERT classifies here still *flavida* Btlr., *oblonga* Pouj., *flavimargo* Leech and *pryeri* Btlr., all of which are illustrated in Vol. 2, pl. 56 e and f.

### 5. Genus: **Gaurena** Wkr.

In regard to this Genus in which today a dozen species are classified, compare Vol. 2, p. 326 and Vol. 10, p. 659. — HOULBERT subdivides the Genus into various Subgenera (*Chlorogaurena* with *florens* Wkr., *sinuata* Warr., *olivacea* Houlb.; *Griseogaurena* with *grisescens* Oberth., *argentsparsa* Hmps. and *Cyclogaurena* with *florescens* Wkr. and *gemella* Leech.)

**G. olivacea** Houlb. (14 b). This is placed next to *florens* Wkr. (Vol. 2, p. 326, pl. 49 e), but the *olivacea*. yellowish spots on forewings are so enlarged that several of them become confluent. Ta-t sien-lu, West China.

*G. florescens* Wkr. (Vol. 2, p. 326, pl. 55 n). Besides occurring in West China and Northern India, this species is also found in Thibet.



6. Genus: **Palimpsestis** Hbn.

This Genus was fully dealt with in Vol. 2, p. 326 and Vol. 10, p. 661 and we refer to what was said there. It was formerly named *Cymatophora* and the family name is derived from same. About 30 forms are known today, of which  $\frac{2}{3}$  are palaearctic,  $\frac{1}{3}$  Indian. Australian forms which are described as "*Cymatophora*" probably do not belong here.

*unipunctata*. *P. fluctuosa* Hbn. (Vol. 2, p. 327, pl. 49 h). ab. **unipunctata** Splr. are specimens, in which only the anterior spot is retained on forewings.

*unipunctata*. *P. duplaris* L. (Vol. 2, p. 327, pl. 49 h). As the presence of the two spots in the pale post median band had given the name to the species (as well as to the synonym: *bipuncta*), the denomination ab. **unipunctata** Splr. that applies to specimens with but one dark spot, is justified. This aberration is however relatively rare. — The name **brabantia** Der. denotes a specimen with leaden grey forewings with central area of wings a pale impure white. Therein are situated the 2 black dots that are characteristic for this species. Hindwings somewhat paler than forewings. — In connection with this description it must be pointed out that the ground colour of forewings in normal German specimens is brownish with grey dusting, whilst French specimens have a greyish violet ground colour. Generally however the differences are minute and scarcely constant. — On the other hand **kamtschadalis** Shelj. appears to be a separate race, as various quite identical specimens of same have been obtained from Petropavlovsk, captured in June. Hindwings are pure white and there is a connecting bar between the 2 characteristic spots on forewings. A second name for the specimens from Kamchatka is **malaisii** Nordstr., which denotes specimens with quite unicolourous forewings on which no markings are visible. Here also the 2 discal dots are conjoined by a bar. Hindwings with dark grey outer margin.

*pectinata*. **P. pectinata** Houlb. (16 c). Distinguishable by the long pectinate ♂ antennae and the grey-brown forewings. These are traversed by two whitish grey dentate lines which are sharply edged by black on averted sides. Hindwings with 3 very faint shadowy stripes, which pass through the centre and between same and the margin. We are copying CULOT's illustration of the only known specimen from Ta-tsien-lu. — According to the illustration it is fairly close to *tancrei* (Vol. 2, p. 327, pl. 49 g).

*punctorenalis*. **P. punctorenalis** Houlb. (11 e as *punctorenalis*). A very large species with wide wings. Forewings impure brown ground colour through which 3 somewhat diffuse, irregularly outlined, dull whitish grey transverse bands extend. The cell end spot is shaped like an "8", filled with dark scales in its lower part. Hindwings earthy brown with a faint pale band behind the centre. Ta-tsien-lu.

*askoldensis*. *P. ampliata* Oberth. (Vol. 2, p. 328, pl. 49 g). Of this species, which has frequently been held to be a large form of *or*, a somewhat browner form with violet tinge to the ground colour has been described from the Isle of Askold. It is named **askoldensis** Houlb. Quite similar specimens are mentioned as having been captured at Sidemi and Tze-ku.

*intermedia*. **P. intermedia** Houlb. This species is described from 4 specimens in the collection of OBERTHÜR, but they have never been illustrated. In general it has the colouration of *ampliata* (Vol. 2, p. 328, pl. 49 g), but the marking of forewings is like *subampliata* (15 g), in size it is half-way between the two. From Ussuri (captured by MOLTRECHT) and East Turkestan.

*subampliata*. **P. subampliata** Oberth. (15 g). Forewing like a very pale *ocularis*, hindwings as in *ampliata* (Vol. 2, p. 328, pl. 49 g), but also paler. A boundary insect for our territory. From Tze-ku.

*marginata*. *P. or F.* (Vol. 2, p. 327, pl. 49 f). As many authors have assumed, the synonymy of this species has become confused owing to a conjecture of HAWORTH. Also the fanatics in the question of priority have not been able to lodge any definite claim, in spite of most painstaking endeavours. What seems to us most important, is that the moth illustrated by us in Vol. 2, pl. 49 f is generally known under the name of *or* and we therefore consider this name should be a "nomen conservandum". — As the most remarkable variation, the form illustrated in Vol. 2, pl. 49 f as ab. *albingensis* Warr. is to be mentioned. Its distribution is gradually extending and it appears to be an example of the transition from a form, at first narrowly localised spreading latterly to become in part the dominating geographical form. The numerous transition forms have in large part been denominated: specimens with a row of submarginal pale spots are named ab. **marginata** Warn. — In ab. **permarginata** Warn. these become confluent on upper and undersides forming a marginal band. — ab. **albingoradiata** Bunge has a row of whitish radial streaks in outer area of forewings. — In contrast hereto in ab. **albingocaeca** Bunge also the white stigmata of *albingensis* are extinct; ab. *albingosubcaeca* and ab. *roberti* Ruhm. will probably be the same. — Sometimes also the pale stigmata of the central area are not pure white but of yellowish brown colouration (= **albingoflavimaculata** Hasebr.). — The stigmata of forewings, which are generally very constant, can be changed although the other colouration and markings of forewings are as type. In ab. **confluens** Closs (= *unimaculata* Marschner) there is only a uniformly pale greenish diagonally oval spot in centre of the forewing; this aberration is also notified from the neighbour-



hood of Berlin and has also been bred at Leipa in Bohemia. — In **clausa** *Wrli.* (15 h) of which we are illustrating the type the reniform stigma is almost exactly of the same colouration as the transverse band in which it is enclosed, so that it is almost extinct, as its outline can scarcely be discerned. — In **unifasciata** *Splr.* only the inner transverse band is distinct, the outer one being obsolete; — in **obscura** *Splr.* the forewings are darkened, the bands suffused with brownish, the reniform stigma scarcely discernible, only a trace being visible, the orbicular stigma quite extinct. — In **fasciata** *Teich* the ground colour is normal, but the transverse bands are darker and more distinct. — In ab. **juncta** *Kauzki* the anterior and posterior transverse bands of forewings become confluent at inner margin. — ab. **fuscostigmata** *Strd.* has the reniform and orbicular stigmata of rusty colouration instead of greenish and these are further often with dark centre. — ab. **tangens** *Strd.* is STRAND's denomination for a specimen illustrated by NORDSTRÖM, showing a bred specimen from S. W. Norway, in which the two transverse bands of lines are conjoined below the stigmata by a dark shade. Possibly this is more an effect of the breeding rather than of the geographical origin (Ekerö). — ab. **costaenigrata** *Kuj.* are specimens in which the veins are densely darkly dusted in the outer area of forewings, so that light interstices occur, reminding one of the *albingoradiata* form of *albingensis*.

**P. candida** *Houlb.* Forewings like those of *or*, but hindwings which are faintly yellowish white in disc, have a dark arched band before the margin. It differs hereby from all other species of the Genus. From Pedong, a locality of which I do not know the geographic position. — Some irish specimens were considered to be a separate race. They have a pearly white ground colour with almost completely submerged stigmata and dense black transverse lines which are confluent with the two transverse bands. The form has been named **gaelica** *Kane* although a similar specimen has been found in Scotland. — On the other hand the irish specimens are said to be of duller colouration without any rose or violet sheen, so that the stigmata are less prominent. This form is said to be a separate race and is named **hibernica** *Trnr.* I should like to stress however that carefully preserved *or*, in darkened cabinets, lose their colour a little and fade in the course of time. Freshly caught specimens on the Continent are deep earthy grey, sometimes with a faintly olive greenish sheen. These however soon become more yellowish brown and after a few years in the collection they are often of an ochreous brownish tone. — A further number of *or* forms have been described from N. America. (Vide Vol. 6.)

*P. ocularis* *L.* (Vol. 2, p. 327, pl. 49 g). Of this widely distributed species TUTT has named specimens with a rosy hue ab. **rosea**. — **sareptensis** *Splr.* is a form from S. Russia of paler grey ground colour with a lesser admixture of brownish. In it the two stigmata are rather widely separated. — As **caucasica** *Krnl.* probably a normal *terrosa* *Graes.* (Vol. 2, p. 327) has been described. — **interrupta** *Splr.* In this form the stigmata interrupt the transverse stripes of forewings. — ab. **frankii** *Boegl.* is a melanic form of *ocularis*, which almost exactly corresponds to the *albingensis* form of *or*, only the ground colour of forewings is not so unicoloured black, so that one can still discern the dark transverse lines. This excludes mistaking the form for that of *or*. The type specimen was captured near Valenciennes in N. France (this is an industrial town in the coal region). It is to be remarked that the markings of forewings in the type specimen are not quite symmetrical (the pale stigmata on right and left wing being differently shaped) and the specimen was captured in July, so that it may belong to a 2nd generation, such as does not seem to occur everywhere. A number of specimens of this type have been observed in the same locality.

*P. ocularis* ♂ × *or* ♀ has produced specimens which TUTT has named **fletcheri**. They resemble typical *or*, but the stigmata have dark surrounds.

### Genus: **Spilobasis** *Houlb.*

HOULBERT creates his Genus *Spilobasis* on (*Palimpsestis*) *basalis* *Wil.* dealt with in Vol. 2, p. 328 and a number of newer forms. This is however not based on any special structural characteristics, but on the presence of a large brown spot that embraces the inner 3rd of the forewing and is bounded outwardly by a more or less wide black line.

**S. basalis** *Wil.* (Vol. 2, p. 328) (15 e). This species is described in Vol. 2, p. 328, but was not illustrated. We are now giving an illustration.

**S. circumdata** *Houlb.* (11 e). Forewings with a whitish apical spot edged with blackish. The outer edge of the dark basal spot is rounded and has first a pale and then a dark outline. Hindwings with marginal shade and in front of same a narrow premarginal band. Expanse 48 mm. The largest species of the Genus. W. China.

**S. flammifera** *Houlb.* has the same shape exactly as *circumdata* (11 e) and also similarly wide forewings, but the basal spot has not such a dark outer edge, the marginal area is not distinctly darker than the impurely grey discal area. Orbicular and reniform stigmata are faintly indicated and the blackish dots that indicate the disco-cellular in *circumdata* are entirely absent. Ta-tsien-lu.



*pseudomaculata*. **S. pseudomaculata** Houlb. (15 g). The outer  $\frac{2}{3}$ rd of forewing, which are a milky pale colour, contrast sharply from the dark brown of the basal  $\frac{1}{3}$ rd, which has a somewhat irregular outer outline. Besides the forewing has a dark marginal band, which is bounded on the upperside by the dark apical stripe. W. China.

### 8. Genus: **Parapsestis** Warr.

For this Genus, which was established in Vol. 2, p. 329, a further form has now become known:

*meleagris*. **Ps. meleagris** Houlb. (15 g). In this the wide white bands that in *argenteopicta* Oberth. (Vol. 2, p. 329, pl. 49 g) traverse the forewings, are replaced by chains of small white dots. From Ta-tsien-lu in W. China.

*Ps. plumbea* Btlr. which in Vol. 2, p. 329, pl. 56 b, was enumerated as an aberration of *argenteopicta* (ibid. pl. 49 g) is held by HOULBERT to be a genuine species; however in the Tring Museum there are transition forms.

### 9. Genus: **Polyploca** Hbn.

*asema*. *P. diluta* F. (Vol. 2, p. 329, pl. 49 f). DANNEHL describes from the S. Tyrol an ab. **asema** Dhl. which *variegata*. has unicoloured dark grey forewings on upperside, devoid of markings. — **variegata** Splr. has narrow transverse bands, edged with brown and yellow-white, near the base an ivory coloured patch. — **hartwiegi** Reisser (= *diluta* Hbn. nec F.) has on forewings a very prominent dark antemedian transverse band of abt. 2 mm width and a somewhat narrower similar postmedian band. Between these bands the pale ground colour contrasts very clearly. According to REISSER this is the north german form, whilst the typical *diluta* F. is the southern, especially austrian form. There are however innumerable transition forms. — *bipuncta* Dup. should not have been stated as synonymous of *diluta*, but of *duplaris* (TURNER).

*anglica*. *P. flavicornis* L. (Vol. 2, p. 330, pl. 49 h). To the subforms enumerated in Vol. 2, p. 330 we have to add ab. *rosea* Tutt with reddish or violet suffused forewings and the subspecies **anglica** Houlb. with yellow-grey or greenish tone to the ground colour of forewings; from England. To these is to be added the ab. *interrupta*. **interrupta** Houlb. in which the oval discoidal spot is somewhat elongated, so that it touches the two first lines of the inner group of lines. The aberration is found in an english collection, there being one such *nigrescens*. aberration among 8 specimens. It is only labelled "Perth". — **nigrescens** Houlb. (15 g) refers to a single specimen from Perthshire (Scotland) in which on forewing dark and light transverse bands alternate. This is probably an accidental variation. The value of denominating such colour variations is illuminated by a remark of ENGRAMELLE, who says, that in this species no two specimens are identically alike. — ab. *haverkampfi*. **haverkampfi** Lamb. has unicoloured silvery grey forewings, only the discoidal spot and an undulate line *fi*. are retained as markings. — In the form **unimaculata** Splr., which is mentioned as having been found *unimaculata*. on the Amur, the orbicular stigma is absent. — **obscura** Splr. are specimens of dark shade, in which *obscura*. this duskiess especially spreads on to the hindwings. — **fasciata** Teich are also dark specimens, but here *fasciata*. in the basal area inwardly of the central band there are 3 and outwardly of same 2 remarkably wide *unifasciata*. blackish transverse lines. — ab. **unifasciata** Splr. in contrast hereto are pale specimens in which the inner transverse band area is darkened, whilst the outer transverse lines have become obscure. — *terrosa* Graes. (Vol. 2, pl. 49 f) appears to be a constant Amur form, in which the stigmata are almost completely *flavistigmata*. extinct. — On the other hand **flavistigmata** Tutt, originating from England, appears to be an accidental *mata*. variation. In it the stigmata stand out prominently and are dark yellowish.

*serenoides*. *P. ridens* F. (Vol. 2, p. 330, pl. 49 i and 56 c). For this and the following species HOULBERT establishes the Genus *Parmelina*. — The form **serenoides** Gn. (16 c) seems rather to be a form of the british *xanthoceros* Hbn. (Vol. 2, p. 330, pl. 56 c), than of the nominotype. It more closely resembles the form *concinna* Warr. (Vol. 2, p. 330, pl. 56 c), however not the whole outer area is white, but the forewing is widely dark grey *nigricans*. anteriorly to an extent of 2—2½ mm. From Great Britain. — ab. **nigricans** Splr. is a melanic form, confined to no particular locality, in which the ground colour of forewings is very dusky and even the whitish markings *variegata*. are obscured. — ab. **variegata** Splr. has also darker forewings, but the whitish markings are inclined to be more extensive. — Also in this species there is an *interrupta* Tutt (Vol. 2, p. 330) of which the author creates the following further combinations of names to accord with rather more whitish or yellowish colour tones: *interrupta-alba* Tutt and *interrupta-ochrea* Tutt. — The illustration that ESPER gave of this species about 150 years *erythrocephala*. ago, has been designated as an illustration of a "variety" and the name given at that time of **erythrocephala** Esp. has been revived for similar specimens, which have a warm dark tone and thorax of somewhat reddish brown colour. — The name *ridens* (latin for "the laugher") has nothing to do with the bright colouration, which some continental authors seem to indicate, but with the markings of the head of the larvae, which have a "deriding look".

*korbi*. **P. korbi** Rbl. from Asia Minor varies considerably, can however certainly be distinguished from *ridens* by the smoother scaling of the forewings on which the outer transverse streak does not bend inwards on



costa, but outwards, also the veins are not darkened when traversing the outer transverse band, which in *ridens* is generally pale leaden grey. The white subterminal line is more distinct, the lunules are less curved.

**P. singularis** Houlb. (14 b). Build & size like *ridens* F. (Vol. 2, p. 330, pl. 56 c), but the forewings *singularis*. almost unicolourous iron-grey, all transverse lines indistinct, nearly completely dissolved into single dots and dashes. Hindwings dull whitish, darker in apical and marginal areas. From the neighbourhood of Digne in S. France. — According to HOULBERT, this is a genuine species, but possibly it is only a local form that has become adapted to chalky, rocky surroundings.

*P. nigrofasciata* Graes. The name given in Vol. 2, p. 331 as *nigrofascicula* Graes. should be corrected as above.

It is also intended to further subdivide this Genus; MATSUMURA proposes the generic name *Neoploca* Mats. for *P. arctipennis* Butl. (Vol. 2, p. 330, pl. 49 i) and *Demopsestis* Mats. for *punctigera* Butl. (Vol. 2, p. 331, pl. 56 d).

### Genus: **Gaurenopsis** Houlb.

This Genus is only temporarily classified here; it would seem to be more naturally placed among the *Noctuae*. It has in common with the *Cymatophoridae* the approximation of vein 8 with vein 7 on hindwings, but this takes place in quite a different stretch (much closer to base) than in any of the *Cymatophoridae*. In other respects such as in the palpi, eyes, antennae and general appearance it however agrees with same. In outward aspect the two species grouped together here resemble the Genus *Gaurena*, especially *G. florens* Walk. (Vol. 2, p. 326, pl. 49 e).

**G. velutina** Houlb. (14 b). A velvety dark brown, forewings with a number of white spots with very *velutina*. faint rosy hue, the size and arrangement of which can be seen from our illustration. Underside of all wings dark brown, glossy, hindwings with dark discal spot. From the eastern boundary territory of Thibet and Ta-tsien-lu. — A somewhat similar species *insularis* Houlb. occurs in Formosa; spots whitish, similarly arranged to those of *gemella* Leech. (Vol. 2, p. 326, pl. 56 a), but in the centre of inner margin the large white and blackish marking is absent except for minute traces. On the other hand there is a large pale spot in centre of outer margin. This form has not yet been discovered on palaearctic territory.

### Genus: **Trispila** Houlb.

This Genus has been created for the form *Thyatira trimaculata* Brem. (Vol. 2, p. 324, pl. 49 e) and a few further forms, which are very similar. The difference in the neurulation of the hindwings consists, as already mentioned, in that vein 8 approaches vein 7 near base, than in genuine *Cymatophoridae*. The 3 forms described are all very similar, but as far as we know do not occur concomitantly, so that in all probability they are geographical forms of one species. This is a question that cannot be decided here.

In regard to *T. trimaculata* Brem., the specimen illustrated (Vol. 2, p. 324, pl. 49 e) was captured flying around a lamp by a missionary and was personally handed to me by the captor out in China; it was caught at Yen-chou-fu and is now in the SEITZ Collection in the Senckenberg Museum in Frankfurt on the Maine. HOULBERT has named it *unca*, as it is said to vary in the shape of the eyespot at anal angle of forewings. We are giving for comparison's sake a copy of the original illustration of the genuine *trimaculata* according to BREMER (14 b).

**T. expansa** Houlb. (14 a) is a very large species with large eyespots having only a slightly darker *expansa*. shading in their orbit. From Siao-lu and Da-loo in Central China.

**T. dubernardi** Houlb. (14 a) is probably a boundary species, from Tze-ku; it resembles the typical *dubernardi*. *trimaculata* Brem., but the eyespots are less ellipsoidal.

**T. tripunctata** O. B.-H. is very close to the genuine *trimaculata* Brem., differing from same by the *tripunctata*. larger, more circular shape of the eyespots. Especially the accessory spot over the anal spot on the margin is very well developed. From Kansu.

### Genus: **Axia** Hbn. (= *Cimelia* Led.)

The group which now comprises the two Genera *Axia* and *Epicimelia*, was formerly classified, as in Vol. 2, p. 331, under the *Cymatophoridae*, although as was mentioned in the introductory remarks (vide Vol. 2, p. 321) at that time nothing was known of their larval stage. As in regard to the diagnosis of the family of *Cymatophoridae*, the only invariable characteristic is the course of veins 7 and 8 of hindwings (these approximate and run concurrently for a stretch, diverging again further on) the classification of this group at the end of the *Cymatophoridae* is more or less justified. Most recent researches seem to uphold the separation of this *Axia* group and this would appear to be quite natural (REBEL creates a special family „*Axiidae*“)



but it should be remarked that these alterations do not transpose the *Axia* from their position in the general classificatory system; they remain where they are at the end of the other *Cymatophoridae*, only now they are separated by a deeper cleft. — The larva has no similarity with any other *Cymatophoridae* larva. The former assertion that it moved forward like a *Geometridae*, must have been due to some misconception. The larva of *A. margarita* more closely resembles certain microlepidopteral larvae. It is a smooth greenish yellow, turning to a rosy hue anteriorly and posteriorly and has a green dorsal longitudinal streak. It feeds on Euphorbiaceae. Pupa is fairly shortish, very tough skinned, stoutest in centre, at posterior end of segments a slightly raised, narrow ridge. Cremaster is short, blunt and conical with a curved pointed tip inclining anteriorly. The dark red-brown colour turns to deep black-brown about 5 days before emergence. — The imago when at rest, sits on stalks of grass and has an attitude like that of *Rhodometra sacraria*. The wings are placed together like a steep roof in such a way that the outer margins of forewings touch along their entire expanse. The moth only uses the two first pairs of legs when at rest, the 3rd pair is pulled up alongside the abdomen. When disturbed it promptly flies away, taking cover at short stretches. It readily comes to light, so that the main flight will probably be at night. It seems to have two generations everywhere.

*margarita.* **A. margarita** Hbn. (Vol. 2, p. 331, pl. 56 h) is distributed over the entire southern Europe, from Spain to the Balkan peninsular. It varies fairly considerably. The illustration on pl. 56 h in Vol. 2, was from an old carinthian ♂. Fresh specimens have a more lively rosy colouration. — In the disc of spanish specimens *soledad.* the rose is suffused with deeper crimson and the central area with olive brown. These are named var. "**soledad**" (15 f) by SCHAWERDA, but they vary considerably, even in series of the same brood. Generally the ♂♂ have dull white hindwings, whilst those of the ♀♀ are dull black. Among normal ♂♂ however some have a greyish marginal shade on hindwings. Andalusian specimens, such as we have illustrated on pl. 15 f, from freshly emerged specimens, have a narrower, but very golden lustrous cuneiform submarginal stripe. Fringes of hindwings are sometimes white (twice among 12 specimens before me), but they are generally crimson red (= ab. *rubrociliata* Schaw.). Also the silvery streak before the marginal area varies in width and length. — In regard to the larvae and pupa see remarks above under "*Axia*".

*napoleona.* **A. vaulogerii napoleona** Schaw. (Vol. 2, p. 332) is much smaller than name type form, but this may be a peculiarity of the type. Forewings are almost monotonous golden yellow, with only faint suffusion of rose; darker colouration is only found at base of forewings. Hindwings suffused with dull dark grey. From Corsica.

## 12. Genus: **Epicimelia** Korb.

*tischendorffi.* **E. theresiae** Korb. (Vol. 2, p. 332, pl. 56 e). Specimens from Aleppo are quite especially large and with intensive colouration; the body and all the wings are suffused with deep crimson, instead of rose. The form has been named **tischendorffi** O. B.-H.

## Genus: **Diloba** Bsd.

Also in this genus the stretch in which veins 7 and 8 approximate is close to base of hindwings, so that, whilst in Vol. 2, p. 332, it was classified with reserve to the *Cymatophoridae* it may one day be separated and classified with the *Noctuidae*; possibly with the *Cucullianae*. So far the relationship of the only species of this Genus with the other Heterocera families has remained so uncertain, that it has repeatedly been proposed (CLOSS and HANNEMANN) to create a new family — *Dilobidae* — for this single species.

*coalita.* **D. caeruleocephala** L. (Vol. 2, p. 332, pl. 49 l). In contrast to forms with separated stigmata on forewings (*separata* Schtz.), others occur where these are confluent. Such specimens have been denominated ab. **coalita** Mewes. *confluens* Daumer is identical. — ab. *capnodes* Dhl. from the South Tyrol denotes duskily suffused specimens. — Generally speaking *caeruleocephala* varies very little; the aberration already mentioned by TREITSCHKE, in which the two stigmata of forewings are displaced and separated from one another, is named *bipartita.* by STRAND as ab. **bipartita**; it is said to occur more frequently near Oslo (Norway) than in central Europe. — *orbimaculata.* **orbimaculata** Strd. is a further aberration from Norway, in which a small ring-shaped spot occurs inside of the usual large stigmata.



## Alphabetical List

with references to the original descriptions of the forms of palaearctic Cymatophoridae.

\* signifies that the form is also illustrated in the place cited.

- albingoflavimaculata Pal. *Has. Int. Ent. Ztschr.* 10, p. 97.  
albingoradiata Pal. *Bunge Int. Ent. Ztschr.* 5, p. 287.  
albingosubcaeca Pal. *Bunge Int. Ent. Ztschr.* 7, p. 87.  
albomaculata Thy. *Lecch Entomologist* 23, p. 114.  
albomarginalis Par. *Mats. Journ. Coll. Agr. Hokk.* 19, p. 14. \*  
albopunctata Thy. *Splr. Schmett. Eur.* 1, p. 333.  
anglica Pol. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 214. \*  
angstola Pal. *Stgr. Romanoff Mém. Lép.* 3, p. 231. \*  
asema Pol. *Dhl. Entomol. Ztschr.* 39, p. 12.  
askoldensis Pol. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 176.  
  
basalis Pal. *Wil. Trans. Ent. Soc. Lond.* 1911, p. 282.  
brabantia Pal. *Der. Rev. Mens. Namur* 24, p. 56.  
bipartita Dil. *Strd. Arch. Math. Nat.* 25 (9), p. 12.  
brunnea Pal. *Lecch Trans. Ent. Soc. Lond.* 1900, p. 18.  
  
candida Pal. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 169. \*  
capnodes Dil. *Dhl. Entomol. Ztschr.* 1926, p. 152.  
caucasica Pal. *Krulik. Rev. Russ. Ent.* 1, p. 173.  
chinensis Th. *Lecch Entomologist* 23, p. 113.  
cinereofusca Lith. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 52. \*  
circumdata Spil. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 153. \*  
clausa Pal. *Wrli. Verh. Ent. Ges. Basel* 28, p. 242.  
coalita Dil. *Mew. Entom. Tidskr.* 1914, p. 41.  
conflua Thy. *Rbl. Berge's B'fly Book* p. 303.  
confluens Dil. *Damm. Entom. Ztschr.* 35, p. 100.  
confluens Pal. *Closs Int. Ent. Ztschr.* 11, p. 84.  
confluens Pol. *Hnr. D. Ent. Ztschr.* 1916, p. 524.  
confluens Pol. *Masl. Polsk. Pismo* 2, p. 128. \*  
costaenigrata Pal. *Kujau Int. Ent. Ztschr.* 10, p. 141.  
  
daisetzusana Pal. *Mats. Ins. Matsumur.* 1, p. 112.  
decorata Thy. *Mr. Proc. Zool. Soc. Lond.* 1881, p. 328. \*  
derasoides Habr. *Btlr. Ann. Mag. Nat. Hist.* 1878 (1), p. 77.  
derosea Thy. *Maur. Jahrb. Wien. Ent. Ver.* 20 (1910), p. 41.  
diminuta Thy. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 107.  
dubernardi Trisp. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 240. \*  
  
erythrocephala Pol. *Esp. Schmett. Abb. Nat.* 4, p. 309. \*  
expansa Trisp. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 238. \*  
  
fasciata Mel. *Houlb. Oberth. Ét. Lép. Comp.* 28, p. 120. \*  
fasciata Pal. *Br. & Mc. D. Journ. New York Ent. Soc.* 18, p. 160.  
fasciata Pal. *Teich, Splr. Schmett. Eur.* 1, p. 334.  
fasciata Pal. *Stöckl. Polsk. Pismo* 1, p. 59.  
flannifera Spil. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 154. \*  
fletcheri Pal. *Tutt Entom. Record* 4 (1893), p. 304.  
franki Pal. *Boegl. Mitt. Münch. Ent. Ges.* 10, p. 21. \*  
fuseomaculata Pal. *Int. Ent. Ztschr.* 11, p. 84.  
fuseostigmata Pal. *Strd. Arch. Math. Nat.* 25 (9), p. 22.  
  
graelica Pal. *Kanc Entomologist* 27, p. 125.  
  
hartwiegi Pol. *Rssr. Ztschr. Oesterr. Ent. Ver.* 12, p. 14. \*  
haverkampfi Pal. *Lamb. Rev. Nam. Mens.* 1903, p. 31.  
hibernica Pal. *Trnr. Ent. Record* 38, Suppl. p. 20.  
hoerbuergeri Pol. *Schaw. Verh. Zool.-Bot. Ges. Wien* 73, p. (90).  
  
indecorata Thy. *Trnr. Entom. Record* 38, Suppl. p. 12.  
infumata Dil. *Schwing. Verh. Zool.-Bot. Ges. Wien* 68, p. (150).  
insularis Gaur. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 234. \*  
intensa Pal. *Btlr. Ann. Mag. Nat. Hist.* (5) 7, p. 234.  
intermedia Pal. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 178.  
interrupta Pol. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 215.  
interrupta Pal. *Splr. Schmett. Eur.* 1, p. 334.  
interrupta-alba Pol. *Tutt Brit. Noct.* 1, p. 7.  
  
interrupta-ochrea Pol. *Tutt Brit. Noct.* 1, p. 7.  
  
juneta Pal. *Kaucki Polsk. Pismo* 1, p. 40.  
juneta Thy. *Tutt Brit. Noct.* 1, p. 2.  
  
kamtschadalis Pal. *Shelj. Iris* 40 (1926), p. 61.  
korbi Pol. *Rbl. Annal. Wien. Hofm.* 16, p. 167.  
kurilensis Pal. *Mats. Ins. Matsumur.* 3, p. 166.  
  
latipennis Pol. *Mats. Thous. Ins. Suppl.* 1, p. 76. \*  
lineofracta Pal. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 189. \*  
  
malaisei Pal. *Nordstr. Ark. Zool.* 20 a (Nr. 12), p. 5.  
marginata Pal. *Warn. Int. Ent. Ztschr.* 5, p. 241. \*  
medinalis Pal. *Mats. Thous. Ins. Suppl.* 1, p. 72. \*  
medionigra Pol. *Höf. Verh. Zool. Bot. Ges. Wien* 73, p. (193).  
mcleagris Par. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 141. \*  
  
napoleona Ax. *Schaw. Iris* 40 (1926), p. 205.  
nigrescens Pol. *Houlb. Oberth. Ét. Lép. Comp.* 28, p. 215.  
nigricans Pol. *Splr. Schmett. Eur.* 1, p. 336.  
norvegica Pal. *Strd. Arch. Math. Nat.* 25 (9), p. 23.  
  
oberthüri Sar. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 194. \*  
obscure Pal. *Splr. Schmett. Eur.* 1, p. 334.  
obsoleta Pol. *Masl. Polsk. Pismo* 2, p. 131.  
oetimaculata Dil. *Strd. Arch. Math. Nat.* 25 (9), p. 12.  
olivacea Gaur. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 233. \*  
  
pectinata Pal. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 149. \*  
permarginata Pal. *Has. Int. Ent. Ztschr.* 8, p. 52. \*  
petrographa Habr. *Pouj. Bull. Soc. Ent. Fr.* 1887, p. CXXXV.  
phaea Thy. *Dhl. Entom. Ztschr.* 40, p. 400.  
pinivora Kon. *Mats. Ins. Matsumur.* 1, p. 112. \*  
pseudomaculata Spil. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 155.  
punctoreniaia Pal. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 183. \*  
  
roberti Pal. *Ruhm. Entom. Ztschr.* 27 (1913), p. 89.  
rosea Pal. *Tutt Brit. Noct.* 1, p. 3.  
rosea Pol. *Tutt Brit. Noct.* 1, p. 6.  
roseola Habr. *Mats. Thous. Ins. Suppl.* 1, p. 79. \*  
rubrociliata Ax. *Schaw. Ztschr. Österr. Ent. Ver.* 12, p. 37.  
rufa Pal. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 148.  
  
sareptensis Pal. *Splr. Schmett. Eur.* 1, p. 334.  
serenoides Pol. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 204. \*  
simplificata Mel. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 122. \*  
singularis Pol. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 206. \*  
soledad Ax. *Schaw. Ztschr. Österr. Ent. Ver.* 12, p. 36.  
subampliata Pal. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 179. \*  
  
tangens Pal. *Strd. Entomol. Tidskr.* 1927, p. 56.  
thibetana Thy. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 81. \*  
tischendorffi Ax. *O. B.-H. Horae Macrolep.* 1, p. 82. \*  
transitans Hapl. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 114. \*  
tripunctata Trisp. *O. B.-H. Horae Macrolep.* 1, p. 82. \*  
tristis Pol. *Lecch Proc. Zool. Soc. Lond.* 1888, p. 652. \*  
  
uncea Trisp. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 237. \*  
unifasciata Pal. *Splr. Schmett. Eur.* 1, p. 334.  
unimaculata Pol. *Masl. Polski Pismo* 8, p. 50. \*  
unipunctata Pol. *Splr. Schmett. Eur.* 1, p. 335.  
  
variabilis Thy. *Trnr. Entom. Record* 38, Suppl. p. 15.  
variegata Pol. (dil.) *Splr. Schmett. Eur.* 1, p. 335.  
variegata Pol. (rid.) *Splr. Schmett. Eur.* 1, p. 336.  
velutina Gaur. *Houlb. Oberth. Ét. Lép. Comp.* 18, p. 232. \*







## 19. Family: **Megalopygidae.**

By Prof. Dr. M. HERING.

### 1. Genus: **Somabrachys** *Ky.*

According to latest researches this is the only *Megalopygidae* Genus of the Old World. DR. JORDAN demonstrated in 1916, that the numerous species described in this Genus, should be grouped under only 3 species, which are easily distinguishable through structural characteristics of the imagines, as well as through the larvae. Later on POWELL in 1919, based on observations extending over several years, particularly of the early stages, dealt with the Genus in a monograph, retaining the various species. DR. JORDAN considers all the other species that have been described as synonyms of the 3 species he has defined and presumes that the varying outer appearance of the species described, is due to the general conditions of life and natural surroundings. As the larvae are exceedingly polyphagous and live varyingly on succulent or dry herbage, sometimes feeding on leaves, elsewhere on flowers etc, this might produce a differing appearance of the imagines. It would however appear, as if these many described species, were not merely synonyms, but as if they were at least tribes or colonies, if not actually subspecies. In many cases the various forms of the same territory occur partly in the mountains and partly in the plains, or again they seem to have developed into colonies due to particular food plants or other conditions of life. If now, contrary to DR. JORDAN's opinions, the forms that he held to be synonyms, are classified as subspecies, this is chiefly because, in spite of POWELL's observations of the natural conditions, he has been unable to convince himself definitely of the identity of the various forms; he has also found various differences in the larvae of several of the forms. There is always the possibility that these subspecies are merely tribes or colonies; future investigations must be carried out over a wide area and by means of copious breeding, so as to establish the facts by means of differences in the larvae. — HOPP (1927), when comparing the *Somabrachys* with its nearest related Genera of the New World *Trosiinae*, holds same to be a highly specialised order, as is indicated by the wingless ♀, the transformation of the foretibiae and tarsi into "climbing legs", as well as the irregular uncus of the ♂. On the other hand he finds an ancient inherited characteristic in the forking of the median nervure in the cell of forewings. He presumes that the 3 species have all evolved from a single species, since their isolation from the New World. The species are most readily distinguished by the origin of vein 6 (median nervure) in forewings.

**S. aegrota** *Klug.* (Vol. 2, p. 336, pl. 50 d). Frons in profile with a truncate chitinous process that projects pronouncedly. Abdomen on underside with dense spikes below the hairs. Femur slender, no prong at end. In forewings vein 6 (median nervure) arises from the cell above the angle of disco-cellular. The pectinations of antennae are somewhat longer than in the subsequent species. End of the 10th segment (uncus) of ♂ somewhat clavate, truncate at end and hollowed out. The forms of this group are of medium size and show only slightly pronounced dark neuration. The larva has only 7 of the transverse subdorsal glandular clefts. From Palestine to Morocco. The subspecies can be divided into two groups, of which the first is small and frail, the other however is of medium size with a more robust body, bolder thorax and more fasciculate hairs. — I. Group: — **zion** *Hopp* (15 l) is dark grey-brown without distinctly obvious veins. Margin of forewings below the apex is very straight, the glossy fringes are paler than the wings. Wing expanse 21 mm. Palestine. — **aegrota** *Klug.* (16 a) is smaller, wings paler, more yellowish, hindwings paler, veins do not stand out at all, costa of forewings markedly concave. Wing expanse 17 mm. Egypt. (Type is illustrated). — **massiva** *Oberth.* (16 a) is larger, darker grey-brown than *zion*, veins do not stand out. Wing expanse 20 mm. Tunis. — **unicolor** *Oberth.* is from Algeria, no more definite locality is given. It is larger than *adherbal* (15 l), the hairs are less golden brown, wings more densely scaled. — **hiempsal** *Oberth.* is similarly like *adherbal*, but the costa of forewings is straighter and apex more rounded. Khenchela, Province Constantine, Algeria. — **gulussa** *Oberth.* (15 l) shows hindwings distinctly paler than forewings. Wings thinly scaled. ♀ similar to that of *holli*, but the



- hairs are buff, antennae with longer pectinations. Lambèse, Province Constantine. (Cotype illustrated.) — *nisseni*. **nisseni** Pow. placed by POWELL as a form to *adherbal*, differing from same by narrower and smaller forewings. *dubar*. The veins are rather browner than the rest of the wing. Province Algiers. — **dubar** Pow. is a very small form, wings relatively short. Forewings 9 mm long. Wings are transparent, the forewings inclined to brownish, *adherbal*. veins not very prominent. Province Algiers, occurring in the same locality as antecedent form. — **adherbal** Oberth. (15 l) is very small, antennae are very pale golden brown. Hairs of body darker, wings transparent, veins not darker. ♀ pale brown, less densely haired, differing thereby from following form. South East of *manastabal*. the Province Oran. (Cotype illustrated.) — **manastabal** Oberth. (15 l). Somewhat larger than preceding form, more densely and darker grey, the dark costal area of forewings less extended at apex, veins more definitely darker. ♀ with shorter antennae than previous form, abdominal hairs brown. Aflou, S.E. Oran. (Cotype *klugi*. illustrated). — **klugi** Oberth. close to the preceding form, costa rather more widely brown at apex, otherwise the brown of the forewings is somewhat paler. The ♀ that is classified here, about which a doubt exists, has very short pectinations to its antennae, abdominal hairs are partially very long and whitish. Sebdu, N.W. *maroccana*. Oran. — **maroccana** Oberth. Forewings very narrow, costa only slightly curved, hairs yellow-brown. Mogador, *ragmata*. West Morocco. — II. Group: — **ragmata** Chrét. (= *capsitana* Seitz). Wings monotonous grey, very narrow. *arcanaria*. Towards apex of costa and at inner margin a slightly more yellowish tone. Gafsa, Tunis. — **arcanaria** Mill. is very similar to the following form. Veins however less distinctly prominent, fringes somewhat shorter, antennae less densely scaled. ♀ also like that of the following form, but antennae longer, more densely scaled, *holli*. hairs of abdomen more reddish brown. From Tunis, Province Constantine to Province Algiers. — **holli** Oberth. Fringes of forewings longer, of paler colour than the wings, veins distinctly prominent. ♀ with shorter antennae, hairs of the posterior edges of the abdominal transverse bands are less long, hairs less reddish. Only *powelli*. found in the immediate neighbourhood of Algiers. — **powelli** Oberth. is a more robust form, wings less fragile, costa of forewings faintly concave. Apex more acute than in the other subspecies. Wings densely scaled and unicolourous black-brown, costa even blackish, hairs of body contrasting sharply, being yellow-orange. Sebdu, *codeti*. N.W. Oran. — **codeti** Aust. Wings pale buff, forewing with distinct dark veins, also costa duskier. Body pale *guillaumei*. brown. Daya, Province Oran. — **guillaumei** Oberth. Antennae of ♂ very long, body with buff hairs, wings inclined to greyish, ♀ large, body brown. Abdomen with whitish yellow hairs. Larvae strikingly whitish *mogadorensis*. yellow. Zehroun, Middle Atlas, Morocco. — **mogadorensis** Oberth. Wings wider than in the preceding form, costa concave, pectinations of antennae especially short. Wings only slightly transparent. Mogador, west coast of Morocco.
- infusata*. **S. infusata** Klug. (Vol. 2, p. 336). Frons of irregular, scarred and warty grain, which is not visible without removing the hairs and which in profile barely projects over the eyes. Abdomen with less dense spikes below the hairs. Fore femora stouter with no apical prongs. Vein 6 (median nervure) arises in forewing below the angle at close of cell. The dark streaks along the veins are usually quite prominent. The 10th tergite (uncus) of the ♂ pointed at tip. Larvae with glandular clefts on 8 segments, dorsal warts of abdomen scarcely oblique, slightly elongate, each (with the exception of the last three) with 4—5 long hairs. Egypt to Algeria. — *infusata*. **infusata** Klug. (15 l) has relatively narrow forewings of 11 mm length. Colour pale buff, veins brown and very prominent. Costa of forewings slightly concave. Egypt. (Type illustrated.) — The specimens classified here *robusta*. by POWELL and emanating from Oran represent a separate subspecies: **robusta** subsp. nov. (16 a); they are larger, the margin of forewings is less inclined, costa more concave. Géryville. (Types in the PÜNGELER Collection.) — **micipsa** Pow. (16 a) has much darker grey forewings, the base of which is slightly paler yellowish *micipsa*. white. Fringes and hindwings are also paler. Veins do not stand out much. Province Constantine. (Cotype *atrinervis*. illustrated.) — **atrinervis** Oberth. (16 a) is larger, with wider wings than the preceding form, veins generally almost blackish. Forewings buff, hindwings paler. ♀ similar to that of *albinervis*, hairs paler, antennae bolder, the pectinations robust. In the mountainous regions of Algeria and Oran. (Cotype illustrated.)
- chrétienii*. **S. chrétienii** Oberth. (Vol. 2, p. 337, pl. 50 d). Frons with raised lines and scars, abdomen with only sparse spikes. Fore femora with a prong at termination on inner side. Vein 6 (median nervure) arises from vertex of angle at close of cell. End of the 10th tergite (uncus) pointed in ♂. Large and robust moths with unicoloured wings without distinctly darker veins. Larvae with glandular clefts on 8 segments, dorsal warts of abdomen oblique, very elongate, each one (excepting the last three) with 9—12 long hairs. Only found in *kroumira*. Tunis and Algeria. — **kroumira** Oberth. (15 l) is a very robust form, wings shorter and wider than in the following form, their colouration is a warmer brown, hindwings paler than forewings, both scarcely transparent. Tunis *khenchelae*. and Province Constantine. — **khenchelae** Oberth. is like the subsequent form, but has distinctly outstanding veins, hairs of thorax greyer. ♀ robust, hairs buff, those on abdominal bands very short, antennae thick. *albinervis*. Algeria, Province Constantine. — **albinervis** Oberth. Costa of forewings always concave. Wings transparent with somewhat reddish colouration, hindwings paler. Veins do not stand out and they are occasionally paler. ♀ large, antennae finer than in preceding form. Algeria and Oran, occurs in certain localities simultaneously *fumosa*. with the previous form. — f. **fumosa** Oberth. has chocolate coloured forewings with outstanding veins. Géryville. — **chrétienii** Oberth. has a straight costa to forewings and veins stand out slightly more prominently; there is not the slightest trace of any reddish hue. Sebdu, N.W. Oran.



## Alphabetical List

with references to the original descriptions of the forms of palaearctic Megalopygidae.

\* signifies that the form is also illustrated in the place cited.

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| <p>adherbal Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 272 (1911). *</p> <p>aegrota Som. <i>Klug</i>, Symb. Phys. Taf. 20 f. 5 (1830). *</p> <p>albinervis Som. <i>Oberth.</i> Ét. Lép. Comp. 3, t. 21 f. 98 (1909). *</p> <p>arcanaria Som. <i>Mill.</i> Rev. Entomol. 3, p. 6. *</p> <p>atrinervis Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 299 (1911). *</p> <p>capsitana Som. <i>Seitz</i>, Seitz Macrolep. 2, p. 336 (1912). *</p> <p>chrétieni Som. <i>Oberth.</i> Bull. Soc. Ent. Fr. 1908, p. 48.</p> <p>eodeti Som. <i>Aust.</i> Le Naturaliste 1880, p. 284.</p> <p>dubar Som. <i>Pow.</i> Ét. Lép. Comp. 12, p. 395 (1916).</p> <p>fumosa Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 299. *</p> <p>guillaumei Som. <i>Oberth.</i> Ét. Lép. Comp. 19, p. 143 (1922). *</p> <p>gulussa Som. <i>Pow.</i> Ét. Lép. Comp. 12, p. 397 (1916).</p> <p>hiempsal Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 297 (1911). *</p> <p>holli Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 298 (1911). *</p> <p>infuseata Som. <i>Klug</i>, Symb. Phys. t. 20 f. 6 (1830). *</p> | <p>kheuehelae Som. <i>Oberth.</i> Ét. Lép. Comp. 3, t. 21 f. 92 (1909). *</p> <p>klugi Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 297 (1911). *</p> <p>kroumira Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 300. *</p> <p>mauastabal Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 276 (1911). *</p> <p>maroceana Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 297 (1911). *</p> <p>massiva Som. <i>Oberth.</i> Ét. Lép. Comp. 5, I, p. 299 (1911). *</p> <p>micipsa Som. <i>Pow.</i> Ét. Lép. Comp. 12, p. 423 (1916).</p> <p>mogadorensis Som. <i>Oberth.</i> Ét. Lép. Comp. 3, t. 21 f. 85 (1909). *</p> <p>nisseni Som. <i>Pow.</i> Ét. Lép. Comp. 12, p. 389 (1916).</p> <p>powelli Som. <i>Oberth.</i> Bull. Soc. Ent. France 1908, p. 48.</p> <p>ragmata Som. <i>Chrét.</i> Le Natural. 32, p. 78 (1910).</p> <p>robusta Som. <i>Her.</i> Seitz Macrolep. Suppl. 2, p. 198. *</p> <p>unicolor Som. <i>Oberth.</i> Ét. Lép. Comp. 3, t. 21 f. 100 (1909). *</p> <p>zion Som. <i>Hopp</i>, Deutsch. Ent. Ztschr. 1922, p. 430.</p> |
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## 20. Family: **Limacodidae** (Cochliopodidae).

By Dr. M. HERING (Berlin).

### 1. Subfamily: **Limacodinae**.

In the forewing the radius sector is absent in the cell; there is therefore no vein proceeding from costal edge of middle cell into the cell and same is only dissected by a simple intracellular vein or one that is forked at the end. Tibiae of hind legs, at all events in the palaearctic species, always with terminal spurs. In regard to the structural generic distinctions refer to the remarks in Vol. 10, p. 668. Larvae feed, as far as is known, on vegetation.

#### 1. Genus: **Scopelodes** Ww.

*S. venosa* Wkr. (Vol. 2, p. 340). Whilst the indian subspecies has a black fascicular tip to palpi and brown forewings, the south Chinese subspecies **kwangtungensis** Her., described in Vol. 10, p. 689, pl. 87 e, has greyer forewings, hindwings with paler veins and pure white fascicular palpi. It penetrates into palaearctic territory at Ta-tsien-lu. *kwangtungensis*.

*S. ursina* Btlr. described in Vol. 10, p. 690, pl. 87 h, is a separate species, which is close to *contracta* Walk. (Vol. 2, p. 340, pl. 50 b); the ♀ has paler brown forewings, the ♂ has wider wings and is larger. In forewings it has a blackish longitudinal streak that extends almost to apex. I have a specimen captured north of Peiping. The species is common in southern China and India.

#### 2. Genus: **Hyphorma** Hbn.

*H. minax* Wkr. (Vol. 2, p. 340, pl. 50 b). The smaller southern Chinese — **minor** de Joann, differs from *minor*, the indian nomino subspecies in that the inner oblique line does not extend to inner margin, but terminates at hind wall of cell. It crosses into palaearctic territory at Ta-tsien-lu.

**H. sericea** Leech was described in Vol. 10, p. 691, pl. 87 i and in the ♂ has antennae pectinated right to the tip (in the former species pectinations only extend  $\frac{2}{3}$  rds of length). Further in the former the submarginal line converges with the margin, whilst in this species it is parallel, both are edged outwardly by leaden grey. It occurs in South China, but various specimens have been captured at Ta-tsien-lu. *sericea*.

#### 2a. Genus: **Matsumurides** Her. (*Hyphormoides* Mats.)

Differing from *Hyphorma* by the antennae of the ♂ which are bipectinated to their extremity. Palpi protrude twice the length of the head, their last segment being much shorter than the 2nd. In forewings 7—9 are stalked, 10 from angle of cell, on hindwings 6 + 7 with long stalk.

**H. okinawanus** Mats. Forewings buff with blackish oblique parallel postmedian and submarginal bands, the former being wider. Margin slightly dusky shaded. Hindwings of ground colour of forewings. Okinawa. (I have not seen a specimen yet and so far it does not appear to have been captured on palaearctic territory. Compare Vol. 10, p. 723.) *okinawanus*.

#### 3. Genus: **Microleon** Btlr.

*M. longipalpus* Btlr. (Vol. 2, p. 341, pl. 50 a). I have a specimen captured in the Ussuri region.

**M. rubicundula** Wil. (15 g). Head and thorax dark brown, abdomen grey. Forewings brown with large black spot at base and a smaller one at close of cell. A black undulate line both before and beyond the centre of wing and a further less distinct but similar line before the margin. Marginal fringes with black *rubicundula*.



dots. Hindwings whitish grey with rosy hue. Underside of forewings rose, whitish towards inner margin. Hindwings whitish, rose at costa and margin. Wing expanse 30 mm. Hondo, Japan in July. (I have no specimen before me, the generic classification has not been checked.)

#### 4. Genus: **Phrixolepia** Btlr.

*P. nobilis* Stgr. (Vol. 2, p. 341, pl. 49 k) has been removed by MATSUMURA from this Genus and placed in the following.

#### 4a. Genus: **Iragaoles** Mats.

Palpi upcurved, 3rd segment half as long as the 2nd, touching the vertex. Antennae merely ciliate. Forewings more truncate than preceding Genus, vein 6 arises below the upper angle of cell, 7 from a point with 8 + 9 from a small accessory cell. In hindwings 8 anastomoses with the upper edge of cell to abt.  $\frac{1}{3}$ rd of cell, 3 and 4 are separate. Although I have not a specimen of the species before me, I feel inclined to agree with KAWADA, that the Genus belongs to the *Noctuidae* and this especially as in the related Genera, there never is an accessory cell. Genero-type: *I. nobilis* Stgr. A further species is described from Formosa.

#### 4b. Genus: **Oxyplax** Hmps.

Antennae of ♂ bipectinated to the tip. Palpi of medium length, porrect, hind tibiae with 2 long pairs of spurs. In forewings 10 is stalked with 8 + 9, 7 is separate, in hindwings 6 + 7 are stalked, 8 conjoined with upper edge of cell at  $\frac{1}{3}$ rd of its length.

*ochracea*. **O. ochracea** Mr. Described in Vol. 10, p. 719, pl. 89 i. The pale ochreous brown forewing has an oblique black central and white discal line, marginal area blackish grey. It is widely distributed over the indomalayan territory and penetrates into the palaearctic zone at Shanghai.

#### 5. Genus: **Cochlidion** Hbn.

*C. codeti* Oberth. (Vol. 2, p. 341, pl. 50 a) is not confined to north Africa. I have before me 3 specimens from Lusitania.

*creticum*. **C. creticum** Rbl. (15 h). Comes between *limacodes* and *codeti*, forewings generally devoid of markings, differing from *limacodes* by its paler colouration and ochreous fringes which are brownish at the tips. It differs from *codeti* by its grey hindwings. Wing expanse 24 mm. Crete in June.

#### 6. Genus: **Heterogenea** Knoch.

*obliqua*. **H. obliqua** Leech. Forewings dull buff bestrewn with brown scales. A straight dark brown line extends from apex to near the base of inner margin, a more narrow dark brown submarginal line is present. Hindwings dark grey with silky gloss. Head and thorax dull buff, abdomen darker. Underside yellowish with darker mottlings. Wing expanse 30 mm. Chang-yang, Central China. (I have not seen a specimen and the generic classification has not been checked.)

*H. uncula* Stgr. (Vol. 2, p. 342, pl. 49 k) is placed by KAWADA to the following Genus.

#### 6a. Genus: **Microcampa** Kawada.

In contrast to the previous Genus, hind tibiae with 2 pairs of spurs; on forewings 7—10 in the sequence 10, 7, 8 + 9 on a stalk, 11 fairly straight; on hindwings 6 and 7 widely separate, 8 further removed from cell than in former Genus. Genero-type: *M. uncula* Stgr. (Vol. 2, p. 342, pl. 49 k).

*M. uncula* Stgr. (Vol. 2, p. 342, pl. 49 k). I have specimens before me from the Ussuri region.

*M. fulgens* Leech (Vol. 2, p. 342, pl. 50 a). This is held by KAWADA to be a genuine species.

*suzukii*. **M. suzukii** Mats. Body whitish, forewings white clouded with dark yellow, base, antemedian, median and postmedian lines remain paler, all slightly undulate above the inner margin, in centre of wings two large black spots in place of the band of *uncula*. Hindwings unicoloured dark grey, fringes of both wings yellowish. Underside of forewings grey, margins of the entire hindwing pale yellowish. Wing expanse 20 mm. Japan.

*coreana*. **M. coreana** Mats. Differing from the previous species in that the forewings are suffused with blackish on outer side of close of cell. There are various darker black patches in and below same. The antemedian and median lines are wider, only traces of the postmedian lines retained. A smaller species of 15 mm expanse. Corea.



7. Genus: **Susica** Wkr.

*S. sinensis* Wkr. (15 g) can be distinguished from the genuine *pallida* Wkr. (Vol. 2, p. 342, pl. 49 k) which occurs in India (Vol. 10, p. 706), by the more acute apex of forewings. These also are less glossy. We are illustrating a specimen from South China, as the illustration in Vol. 2, pl. 49 k is indistinct. The species was described from the North of China.

8b. Genus: **Narosa** Wkr.

Differing from *Altha* by the simple antennae of both sexes and also by veins 6 and 7 of hindwings, which are widely separated.

**N. culta** Btlr. Forewings pale rosy brown on upperside; an irregular olive coloured line near base. *culta*. Beyond same is a wide irregular olive oblique discal band and parallel with same nearer the margin a similarly coloured transverse line. An oblique black spot just after the close of cell and above same 1—2 small brown streaks. A wide olive transverse band in discal area which becomes indistinct towards the inner margin. At margin there is a row of diffusing black dots. Hindwings pale silky brown, marginal line darker. Body pale brown. Underside glossy grey-brown, hindwings glossy whitish, a dark crescent at disco-cellular and there is an indistinct darker discal and marginal line. Underside of body whitish. Wing expanse 27 mm. Japan. (I have not seen a specimen, nor has the generic classification been checked.)

**N. edoensis** Kawada. I have not been able to obtain a description of this species. Japan, China. *edoensis*.

**N. pseudochracea** sp. n. (15 h). Is very similar to *ochracea* Her. (Vol. 10, p. 675, pl. 86 b) but is decidedly larger, forewings not ochreous brownish, but inclined to be a golden ochreous, the inner transverse line projects in a white dentation towards the margin on vein 4 and at the tip of same there is a rusty coloured dot. The outer transverse line is regularly curved outwards, whilst in *ochracea* it bends inwards under the costa. Hindwings similarly a paler golden yellow. Head paler than the ochreous body, inclined to pale yellowish. Underside brownish golden yellow, hindwings paler. Wing expanse 18 mm. Chung-kiang, West China in August. ♂ type in the Museum at Tring. *pseudochracea*.

8c. Genus: **Arbelarosa** Her.

In the ♂ the antennae are pectinated at base. In hindwings veins 6 and 7 are separate. General appearance reminds one of *Arbelidae*.

**A. rufotesselata** Mr. (Vol. 10, p. 677, pl. 86 c). Forewings ochreous with red transverse bands, which are more or less dissolved into spots. At close of cell a bold brown spot. Hindwings and underside red. This species which is widely distributed in India and South China penetrates into the palaearctic region at Ta-tsien-lu. *rufotesselata*.

9. Genus: **Natada** Wkr.

This Genus has no representative in the palaearctic region. The species classified in same in Vol. 2, p. 343 are now placed with the following 3 Genera.

9a. Genus: **Phocodorma** Btlr.

Antennae of ♂ shortly bipectinated. Palpi large, laterally impressed, central segment anteriorly with tuft of hairs. Hind tibiae with 2 pairs of spurs. In forewings vein 7 on short stalk with 8 + 9, 10 widely separated, 11 straight. In hindwings 6 + 7 on a stalk, 8 fusing near base with upper edge of cell and with a small nervule to costa.

*P. velutinum* Koll. (Vol. 2, p. 343, pl. 50 a and Vol. 10, p. 720, pl. 90 a).

9b. Genus: **Macroplectra** Hmps.

Palpi long and porrect, not laterally compressed. Antennae of ♂ with long bipectinations; in forewings vein 10 generally on a stalk with 8 + 9, 7 separated and free.

*M. nararia* Mr. (Vol. 2, p. 343, pl. 50 a and Vol. 10, p. 716, pl. 89 f).

9c. Genus: **Iragoides** Her.

Antennae of ♂ with a single row of short pectinations, the 2nd being rudimentary. Palpi short and porrect. In forewings vein 7 on a stalk with 8 + 9, 10 with the stalk from one point. On hindwings 6 + 7 on a stalk, 8 anastomosing with the upper edge of cell near the base.



*crispa.* **I. crispa** Swk. (Vol. 10, p. 709, pl. 88 h). Compare Vol. 10 for description. Body brown with orange-red dorsal line. Forewings brown, coarse grained with violet-grey transverse band from apex to  $\frac{1}{3}$ rd of inner margin and a similar band at margin. Hindwings grey. India, also occurring in palaearctic regions.

*I. conjuncta* Wkr. (Vol. 2, p. 343, pl. 50 b and Vol. 10, p. 709, pl. 88 i). Also occurs in Corea and Japan.

*fasciata.* **I. fasciata** Mr. (15 h). Described in Vol. 10, p. 709. Forewings bluish grey with reddish brown basal area, disco-cellular spot and submarginal line. Hindwings grey. Occurs in India, but also in the palaearctic regions of China. (Similar to several *Thosea* species, which however have bipectinated antennae in ♂.)

*thaumasta.* **I. thaumasta** sp. n. (15 i) differing from the other species of this Genus by the shorter more truncate forewings. Forewings violet-brown with violet blackish transverse line from  $\frac{3}{4}$ ths of costa, over the disco-cellular to  $\frac{1}{3}$ rd of inner margin. On disco-cellular a jet black transverse streak with white interspersions on inner side. It consists of white scales inwardly and black ones outwardly. Parallel with the margin is a more distinct transverse line which is somewhat dentate outwardly and converges with the margin at anal angle. Hindwings brown-grey. All fringes paler at termination of veins. Underside grey. End of thorax and base of abdomen each have an upright tuft of hair. Wing expanse 20 mm. Nanking, Province Kiang-su. ♂ type in the State Museum at Berlin.

### 10. Genus: **Thosea** Wkr.

*T. cana* Wkr. has right of priority over *T. transversata* Wkr., (Vol. 2, p. 343, pl. 50 b).

*T. tripartita* Wkr. (Vol. 2, p. 343) is illustrated in Vol. 10, pl. 89 c.

*T. fasciata* Mr. (Vol. 2, p. 343) is classified with the previous Genus.

*T. sinensis* Wkr. (Vol. 2, p. 343, pl. 50 c and Vol. 10, p. 712, pl. 88 k) differs from *loesa* (Vol. 10, pl. 88 k). The latter is smaller, forewings with a brown tone. It is limited to the indo-malayan region.

*rara.* **T. rara** Swk. Described in Vol. 10, p. 712, pl. 88 k and illustrated there. It differs from the preceding species by the rounder forewings, somewhat curved postmedian line and always absent central spot on forewings. China.

*aperiens.* **T. aperiens** Wkr. Described in Vol. 10, p. 711, pl. 88 k and illustrated there. Forewings olive with 2 paler transverse lines that diverge considerably posteriorly. Occurs in India and Ceylon, but also at Tze-ku.

*imitabilis.* **T. imitabilis** Her. Described and illustrated in Vol. 10, p. 713, pl. 89 c. It is similar to *cana*, inner transverse stripe of forewings is much more oblique, the outer one is quite straight. Extends into palaearctic territory.

*plethoneura.* **T. plethoneura** sp. n. (15 h). Closely resembles the preceding species, but is larger, the submarginal line of forewings is not straight but curved with dark shadow on inner side. Forewings brown with slight reddish tinge, basal area obliquely defined, dark brown, a dark spot at disco-cellular, which is absent in the previous species. Above the centre of inner margin a dark shaded patch, which forms an equilateral triangle to the hind margin of the cell. Postmedian line curved, pale, expanding at the centre and with dark shade on inner side. Marginal area somewhat darker. Hindwings grey. Thorax brown, abdomen grey-black. Underside grey. Wing expanse 28 mm. In a ♂ specimen vein 2 of hindwings is forked on both wings. Kiao-chui in N. W. China. ♂ Type in the State Museum at Berlin.

*nitobeana.* **T. nitobeana** Mats. Similar to the preceding species, forewings greyish with 2 blackish transverse lines, the inner one interrupted and not extending to the costa, the outer one narrower, angulated between veins 2—5, near the margin a blackish semicircle. Wing expanse 20 mm. Honsho, Japan. (I have not seen a specimen of this.)

*suigensis.* **T. suigensis** Mats. Forewings dark grey with 3 darker transverse bands, the basal one triangular forming a dark basal area. The central one is narrower, pointed towards the margins, very oblique. The subterminal is straight terminating at anal angle. Hindwings dark grey. Abdomen with a slightly reddish yellow tinge. Wing expanse 25 mm. Corea. (I have not seen a specimen of this.)

*T. sericea* Btlr. (Vol. 2, p. 344). This species is classified by KAWADA as *C. butleri* Kaw. in the Genus *Ceratoneura*.

### 10a. Genus: **Praesetora** Her.

Differing from the preceding and subsequent Genera in that on the forewing vein 10 arises separately from the stalk of 7—9. The antennae of ♂ are only pectinated in basal half. Compare Vol. 10, p. 711.

*monogramma.* **P. monogramma** sp. n. (15 h). Differs from other species of the Genus by having only the outer transverse line present. Body and forewings are brown, the latter sparsely peppered with a few black scales,



a quite straight black transverse line from  $\frac{2}{3}$  rds of costa to anal angle. Hindwings dark grey. Underside more brownish than forewings. Wing expanse 33 mm. Ta-tsien-lu. ♀ type in the State Museum at Berlin.

#### 10b. Genus: **Setora** Wkr.

Vein 10 on forewings on a stalk with 7—9. Antennae of ♂ only pectinated at base.

**S. postornata** Hmps. described and illustrated in Vol. 10, p. 710, pl. 88 i; forewings grey with dark *postornata*. curved transverse line with light outer edge and which extends from  $\frac{2}{3}$  rds of costa to  $\frac{1}{3}$  rd of inner margin. A straight dark line extends from  $\frac{2}{3}$  rds of costa to anal angle. At its outer edge at anal angle a triangular glossy coppery spot. In the form **hampsoni** Strd., the forewings are brown instead of grey. India, also occurring *hampsoni*. in Western China.

**S. mongolica** sp. n. (15 h) is distinguishable by the glossy coppery edge of the outer transverse line *mongolica*. extending almost to costa and projecting in a hook outwardly of close of cell and towards outer margin. It differs from the similar southern Chinese *suberecta* Her. (Vol. 10, p. 710, pl. 90 f, g) by the purer grey ground colour of the forewings, the coppery band being narrower in centre and the distinct white outer edge of the inner transverse line. Hindwings are grey without reddish tone. Wing expanse 23 mm. Ta-tsien-lu. ♀ type in the State Museum at Berlin.

#### 10c. Genus: **Angelus** gen. nov.

Generally speaking like *Thosea* in appearance, hind tibiae however without central spur. In the classification of the Genera in Vol. 10 there is the Genus *Dinawides* from which the present Genus differs by vein 8 of hindwings which only anastomoses for a short stretch. Palpi straightly porrect and of about the size of the diameter of the eyes. Antennae of ♂ with long bipectinations right to the tip, terminal pectinations being shorter. Hind tibiae with long terminal spurs. In forewings veins 2—5 at regular intervals, 7 on a stalk with 8 + 9, 10 from a spot with the stalk, 11 opposite 2, intracellular vein simple. In hindwings hind angle of cell only slightly projecting, 2—5 at regular intervals, 6 + 7 on a stalk, 8 fusing with upper wall of cell near base. Genero-type: *A. obscura* Her.

**A. obscura** sp. n. (15 h). Body pale buff, underside darker, forewings silky ochreous yellow with dark *obscura*. disco-cellular spot and immediately beyond same a brown oblique stripe that is concave inwardly. Hindwings grey. All fringes dark grey with yellowish basal line and white tips. Underside of forewings dark grey with ochreous costa. Hindwings pale buff. Wing expanse 24 mm. ♂ type from Tze-ku in the State Museum at Berlin.

#### 11. Genus: **Cania** Wkr.

*C. bilinea* Wkr. (Vol. 2, p. 344, pl. 50 c). Of this species, which was dealt with in Vol. 10, p. 678, the following two subspecies occur in palaearctic territory: **robusta** Her. (15 i) with a wing expanse of 30—38 mm. *robusta*. The transverse lines of forewings do not converge on costa. From Siao-lu. — **pallida** Her. is a small pale form *pallida*. with wider pale yellowish forewings and less rounded anal angle. From Tze-ku. In regard to the differences in the genitalia see Vol. 10, p. 679.

**C. hatita** Drc. Forewings pale buff, darker along costa. Two narrow brown transverse lines about in *hatita*. the centre from costa to inner margin. Hindwings pale buff, body slightly darker. Wing expanse 38 mm. China, Province Hunan.

#### 11a. Genus: **Rhamnosa** Fixs.

Differing from preceding Genus by having the antennae of ♂ pectinated right to the extremity. Forewings in perfect specimens with a scaly projection in centre of inner margin. Fringes of hindwings elongated at inner angle and darker.

*R. angulata* Fixs. (15 i). Placed in Vol. 2, p. 342 to the *Cochlidion*, differing from the southern Chinese *kwangtungensis* Her. (Vol. 10, p. 679, pl. 86 f) by the paler yellow colour.

**R. dentifera** Her. & Hopp. (15 i). Similar to the preceding species, but greyer, the two transverse *dentifera*. lines converging at costa, the outer one terminating on costa further from apex. Hindwings pale buff. Tsingtao.

#### 12. Genus: **Miresa** Wkr.

*M. flavidorsalis* Stgr. (Vol. 2, p. 344, pl. 49 k) is now classified under *Narosoideus* Mats.

*M. flavescens* Wkr. (Vol. 2, p. 344, pl. 50 c) distinguishable by its long palpi, is now classified under *Monema*.

**M. fulgida** Wil. Described and illustrated in Vol. 10, p. 682, pl. 90 b, distinguishable by the central *fulgida*. cell of forewings, which is filled with silvery scales, besides the silvery postmedian line and silvery triangular spot. It is now also reported to occur in Japan besides in Formosa and S. China.



*M. muramatsui* Kawada. Description of this Japanese species was not available to me.

*urga.*

**M. urga** sp. n. (15 d). Is closest to the Indian *argenteifera* (Vol. 10, p. 683, pl. 90 c), but forewings are more elongate, apex more acute, anal angle more rounded; the postmedian silvery transverse line does not terminate before the apex, but actually at the apex; it is indistinctly double and not undulate, only faintly curved outwards. The silvery marginal line is irregular, only widely silvery in centre of margin, otherwise only discernible on costa before the apex. Ground colour generally somewhat paler brown, hind margin of cell contrastingly darker, the outer  $\frac{1}{3}$ rd pale yellowish grey. Body brown, head and thorax sulphur-yellow on upperside. Wing expanse 32—38 mm. Siao-lu, ♂ and ♀ types in the State Museum at Berlin.

#### 12a. Genus: **Miresina** gen. nov.

Hind tibiae with terminal spurs. Palpi short, straightly correct. Antennae of the ♂ bipectinated to  $\frac{2}{3}$ rd of their length, thence with short pectinations to tip. All veins present, in forewings 4 and 5 arise close together, 7 on a stalk with 8 + 9, 10 arising with same from a point or with short stalk, 11 straight. In hindwings rear angle of cell only projects slightly, 2—5 at regular intervals, 6 + 7 on a stalk, 8 conjoined with upper wall of cell before the centre of same by an oblique cross vein. Genero-type: *M. bang-haasi* Her. & Hopp.

*bang-haasi.*

**M. bang-haasi** Her. & Hopp (15 i). Body reddish brown. Thorax at posterior end and abdomen at base with upright tufts of hair. Hind tibiae with long fascicular scales. Forewings reddish brown with an undulate whitish transverse line. It is rather indistinct, extends vertically from inner margin at  $\frac{1}{3}$ rd of the wing. Towards the base it has a wide jet black edge and there is a round jet black spot above the inner margin. A black dot at close of cell. Postmedian line is violet blackish, antemedian is about parallel but curves suddenly outwards convexly and extends to anal angle. The margin itself is pale dull yellowish, slightly darker along its edge and again at anal angle. Hindwings dark grey, also the underside, that of forewings turning to yellowish in its outer areas. Ussuri territory and Manchuria.

#### 12b. Genus: **Monema** Wkr. (*Cnidocampa* Mats).

*M. flavescens* Wkr. (Vol. 2, p. 344, pl. 50 c). Of this very common species, specimens occur rarely which *nigrans*. are quite black. Only the extreme base remains yellow. They are denominated as f. *nigrans* de Joann. (15 i).

#### 12c. Genus: **Narosoides** Mats.

Differs from *Miresa* by the ♂ antennae, which are pectinated to the tip and by the boldly curved vein 11 of forewings which converges on 12.

*N. flavidorsalis* Stgr. (Vol. 2, p. 344, pl. 49 k) (15 k). We are giving a fresh illustration of this species. It also occurs at Ta-tsien-lu and in Japan.

*N. fuscicostalis* Fx. (15 i). This is definitely a genuine species, which is distinguishable by the sulphur yellow ground colour of forewings. — f. *flavissima* form. nov. (15 k) varies strikingly from same. It may even be a subspecies. Forewings pale yellow, only darker rusty brown at costa. The markings, which are otherwise blackish, are here only a richer yellow. Shantung in July. ♂ type in the British Museum.

#### 13. Genus: **Parasa** Mr.

*P. pastoralis* Btlr. (Vol. 2, p. 346, pl. 50 c) (Vol. 10, pl. 86 l). This Indian species penetrates into palaearctic territory at Ta-tsien-lu.

*P. lepida* Cr. (Vol. 2, p. 346) (Vol. 10, p. 86 h). The Indian subspecies extends as far as Japan. In *lepida*. N. W. China it is represented by — **lepida** subsp. n. (15 k). It differs from the *nomino* subspecies by having the inner edge of the brown marginal area of forewings very much more reduced towards the costa from inner margin. It therefore converges anteriorly much more closely with the marginal line. The inner edge of the marginal area is thus much more oblique. The dark basal spot of forewings is distinctly angulated on the hind wall of cell and not rounded. Forewings are more elongate. Wing expanse 28—32 mm. ♂ type from Tze-ku in the State Museum at Berlin.

*P. sinica* Mr. (*hilarata* Stgr.) (Vol. 2, p. 346, pl. 50 c) (15 k). In regard to this and the subsequent species considerable confusion has prevailed and this has been cleared by the researches of Moore and his examination of the types. Both species are therefore again being illustrated here. *sinica* is distinguishable by the two dentations, that project towards the base in the inner edge of the brown margin of forewings. Hindwings yellow or grey.

*P. hilarula* Stgr. (15 k). Marginal band of forewings more deeply concave in its inner edge than in the preceding species and with only one projecting dentation above the inner margin. Hindwings yellowish or grey.



**P. pseudorepanda** *sp. n.* (15 k). Very similar to the indian *repanda* (Vol. 10, p. 696, pl. 90 e), differing by the violet-brown basal spot of forewings, which does not decrease in size towards margin, but is widely truncate and incurved above vein 12. The subterminal silvery line is parallel to the margin whilst in *repanda* it converges with the margin towards the inner angle. Therefore in this new species the marginal area is uniformly wide and also uniformly dusted with silvery scales. In the centre it is divided into two equal parts by a darker transverse line. Thorax with a wide violet brown longitudinal band on upperside. On underside of forewings the green area is extinct. Wing expanse 40—45 mm. ♂ and ♀ types from Siao-lu in the State Museum at Berlin, paratype from N. W. of Cheng-tu in the Museum at Tring.

**P. bicolor** *Wkr.* This species which is common in S. China is described in Vol. 10, p. 696, pl. 87 a. *bicolor*. It has unicoloured green forewings and thorax, which are sometimes peppered with brown whilst hindwings and abdomen are brown. It penetrates into palaearctic territory at Ta-tsien-lu.

**P. prasina** *Alph.* (15 k). This differs from the preceding species by a small brown basal spot on forewings, green abdomen and hindwings. Ta-tsien-lu.

**P. canangae** *Her.* Described and illustrated in Vol. 10, p. 695, pl. 86 k. Body brown, collar and tegulae green. Forewings green, costa finely brown, basal spot violet-brown covering half the cell on costa. Marginal area very widely violet-brown, edged towards the base by darker lines which are indented twice. Hindwings brown. Wings of ♂ shorter and less rounded. Wing expanse 18 to 30 mm. India extending to Ta-tsien-lu in palaearctic region. — In India the larvae feed on *Cananga odorata*.

*P. inexpectata* *Stgr.* (Vol. 2, p. 346) (15 k). We are giving an illustration of this species which is dealt with in Vol. 2, p. 346. The specimen is from Syria.

### 13a. Genus: **Limacolasia** *Her.*

Distinguished by the reduction of the bristle of the clasp. Antennae of the ♂ with long bipectinations in basal half. Palpi hairy, short, concealed, hind tibiae with stunted terminal spurs. In forewings vein 2 arises somewhat before centre of cell, 7 and 8 + 9 on a common stalk, anterior part of cell pressed to the costa. In hindwings vein 8 bent forward at the extreme base, then anastomosing with the upper edge of cell.

**L. dubiosa** *Her.* Described and illustrated in Vol. 10, p. 698, pl. 87 c. Dull red-brown, wings thinly scaled, veins darker. Rarely there is an indistinct transverse band over the close of cell. Wing expanse 18 mm. In South China in some localities it is very common, occurring on palaearctic territory at Ta-tsien-lu.

### 14a. Genus: **Contheyloides** *Mats.*

Structurally resembling *Contheyla* (Vol. 10, p. 708), forewings more elongate, margin from apex to vein 6 almost vertical to costa. In hindwings veins 6 and 7 widely separate.

**C. boninensis** *Mats.* Forewings reddish yellow to brown, darkened with blackish at costa. In marginal area rather more greyish with a blackish transverse line that is forked on inner margin. Similar lines in centre, also post and antemedian. Costa with a few black dots at apex. A yellow-brown spot at close of cell. Hindwings buff with blackish marginal dots. Wing expanse 34 mm. Bonin Islands. (I have not seen a specimen of this species.).

### 14b. Genus: **Trichogyia** *Hmps.*

Compare Vol. 10, p. 700. Antennae of ♂ simple. In forewing veins 8—10 on a stalk, 7 separated therefrom. In hindwings 3 + 4 on a stalk, 6 and 7 separate.

**T. brunnescens** *sp. n.* (15 l). In hindwings vein 3 + 4 arise from a single point. Forewings dull brown, a grey-brown spot at  $\frac{1}{3}$ rd of inner margin. Disco-cellular outlined by a delicate dark crescent. Beyond same a dark brown transverse band that is curved outwards; it is interrupted below vein 2 and extends from there only as a wide line to inner margin. Fringes with ochreous basal line and dark spots. Hindwings somewhat paler. Fringes as in forewings, darker at anal angle. Underside of forewings grey-brown, of hindwings dull pale buff. Body grey-brown. Wing expanse 17 mm. ♂ type from Omei-shan in June/July at an altitude of 1200 m. Type in the British Museum.

**T. circulifera** *sp. n.* (15 i). Body and forewings brownish buff. Forewings with a brown crescent mark on disco-cellular, which mark extends in 2 arcs to  $\frac{1}{5}$ th of inner margin, where it expands to a heavy spot. In discal area before the apex there is an almost circular olive-grey spot from which a dark zigzag line with light edge extends to the inner margin. Traces of a paler and darker line are sometimes visible proceeding from the marginal edge of the circular spot to anal angle. Hindwings somewhat angulated at 1 c, dark grey with yellowish buff fringes. Underside brownish buff, costa of forewings duskily greyish, hindwings pale ochreous. Wing expanse 23 mm. ♂ type from Kwansien, China in August. Type in the British Museum.



14 c. Genus: **Ceratonema** Hmps.

Compare Vol. 10, p. 698. Close to the preceding Genus, but on hindwings veins 3 and 4 arising separately from the cell.

*sericeum*. **C. sericeum** Bllr. (Vol. 2, p. 344). KAWADA introduces the name *C. butleri* Kaw. for this species, which seems to be superfluous. The species appears to be very near to the indian *C. retractatum* Wkr. (Vol. 10, p. 698, pl. 87 d).

*imitatrix*. **C. imitatrix** Her. Described and illustrated in Vol. 10, p. 699, pl. 87 d. Forewings olive brown, basal area grey-black. A dark patch from centre of inner margin obliquely to close of cell and above same a smaller inner and a larger outer dark patch. A pale subterminal line that curves outwards, from  $\frac{3}{4}$ ths of costa to anal angle. At base a silvery white dot. Hindwings blackish. — Reminds one strongly of *Heterogenea dentata* Oberth. (Vol. 2, p. 342, pl. 49 k), especially on account of the silvery spot at base. In the latter however vein 7 arises towards the base in the forewing, in this species however it arises towards the base from 10. An indian species that however also occurs in China.

14 d. Genus: **Bietia** Oberth.

Hind tibiae with long terminal spurs, all legs with long hairs. Palpi short, closely pressed to body. Antennae of ♂ bipectinated to centre, then serrate. In forewings vein 6 arises from centre of disco-cellular, 7 with 8 + 9 on a short stalk, 10 with a stalk from a point, 11 straight. In hindwings the hind angle of cell projects strongly, 6 + 7 with long stalk, 8 conjoined with costa by a cross vein. Only differing from *Belippa* and *Cheromettia* by a pair of tibial spurs.

*xanthopus*. **B. xanthopus** Oberth. (151). Blackish, legs with pale sulphur-yellow coloured hairs, anal tuft ochreous. Wings hyaline, only costa and marginal fringes black, inner margin black to 1 c. Ta-tsien-lu. Very rare. We are illustrating the type, the only specimen so far known, in the State Museum at Berlin.

2. Subfamily: **Epipyropinae**.

Tibial spurs are absent, in forewing from upper edge of central cell, a branch arises that separates an anterior portion of same. The larvae live, as far as is known on Homoptera and feed on their waxy secretions.

1. Genus: **Epipyrops** Ww.

In hindwings veins 7—8 are present, in forewings veins 7 and 8 separate, in hindwings vein 8 free.

*anomala*. **E. anomala** Ww. Of brown colouration, dusted with white in places, a row of whitish spots on costa of forewings, that at apex being the largest. Similarly a row of whitish spots on margin. Hindwings blackish, fringes whitish. Wing expanse 30 mm. — Larvae on the Cicade *Pyrops candelaria*. China.

*schawerdai*. **E. schawerdai** Zerny. The first *Epipyropine* found in Europe! Forewings with acute apex, faintly glossy, coarsely scaled, grey-black, a few of the scales larger and darker. Underside of all wings, as the upperside, less coarsely scaled. Antennae with short bipectinations. 11 pairs of pectinations. In forewings 10 veins arising separately from cell, hindwings with 5 free veins from the cell, vein 8 free. Wing expanse 11 mm. It occurs at Albarracin in Aragon in August and was captured at light.

2. Genus: **Epipomponia** Dyar.

Like the previous Genus, in hindwings vein 8 conjoined with the anterior wall of cell by a connecting vein.

*nawai*. **E. nawai** Dyar. Unicoloured black, forewings with irregular rows of metallic blue scales. Wing expanse 22 mm. Japan.



## Alphabetical List

with references to the original descriptions of palaearctic Limacodidae enumerated in Supplementary Volume 2.

\* denotes that the form is also illustrated in the place cited.

*anomala* Epip. *Ww.* Trans. Ent. Soc. Lond. 1876, p. 176. \*  
*aperiens* Thos. *Wkr. List Lep. Het.* B. M. 32 (1865), p. 476.

*bang-haasi* Miresin. *Her. & Hopp*, *Horae Macrolep.* 1 (1927), p. 83. \*

*bicolor* Par. *Wkr. List Lep. Het.* B. M. 5 (1855), p. 1142.  
*boninensis* Conth. *Mats. Ins. Matsumur.* 5 (1931), p. 104. \*  
*brunneseus* Trich. *Her. Seitz Macrolep. Suppl.* 2, p. 207. \*

*canangae* Par. *Her. Seitz Macrolep.* 10, p. 695. \*  
*circulifera* Trich. *Her. Seitz Macrolep. Suppl.* 2, p. 207. \*  
*coreana* Microc. *Mats. Ins. Matsumur.* 5 (1931), p. 108. \*  
*eretium* Cochl. *Rbl. Verh. Zool.-Bot. Ges. Wien* 1906, p. 236.  
*erispa* Iragoid. *Swh. Proc. Zool. Soc. Lond.* 1889, p. 409. \*  
*eulta* Naros. *Btlr. Ann. Mag. Nat. Hist.* (5) 4 (1879), p. 356.

*dentifera* Rhamn. *Her. & Hopp* *Hor. Macrolep.* 1 (1927), p. 82. \*

*dubiosa* Limacol. *Her. Seitz Macrolep.* 10, p. 698.

*edoensis* Naros. *Kaw. Journ. Imp. Agric. Exp. Sta. Nishigahara* 1 (1930), p. 252. \*

*fasciata* Iragoid. *Mr. Proc. Zool. Soc. Lond.* 1888, p. 403.  
*flavissima* Narosoid. *Her. Seitz Macrolep. Suppl.* 2, p. 206. \*  
*fulgida* Mires. *Wil. Entomologist* 43 (1910), p. 192.

*hampsoni* Set. *Strd. Arch. Naturg.* 82 A. 2 (1922), p. 89.  
*hatita* Can. *Dre. Ann. Mag. Nat. Hist.* (6) 18 (1896), p. 236.

*imitabilis* Thos. *Her. Seitz Macrolep.* 10, p. 713. \*  
*imitatrix* Cerat. *Her. Seitz Macrolep.* 10, p. 699. \*

*kwangtungensis* Scop. *Her. Seitz Macrolep.* 10, p. 689. \*

*lepidula* Par. *Her. Seitz Macrolep. Suppl.* 2, p. 206. \*

*minor* Hyph. *de Joann. Ann. Soc. Ent. Fr.* 99 (1930), p. 569.  
*mongoliea* Set. *Her. Seitz Macrolep. Suppl.* 2, p. 205. \*

*monogramma* Praeset. *Her. Seitz Macrolep. Suppl.* 2, p. 204. \*  
*muramatsui* Mires. *Kaw. Journ. Imp. Agr. Exp. St. Nishigahara* 1 (1930), p. 246. \*

*nawai* Epipom. *Dyar. Proc. Ent. Soc. Wash.* 6 (1904), p. 19.  
*nigrans* Monem. *Joann. Bull. Soc. Ent. Fr.* 1901, p. 251.  
*nitobeana* Thos. *Mats. Ins. Matsumur.* 5 (1931), p. 107. \*

*obliqua* Heter. *Leech, Entomologist* 23 (1890), p. 83.  
*obscura* Ang. *Her. Seitz Macrolep. Suppl.* 2, p. 205. \*  
*oehraea* Oxyp. *Mr. Lep. Ceylon* 2 (1883), p. 129. \*  
*okinawanus* Mats. *Mats. Ins. Matsumur.* 5 (1931), p. 104. \*

*pallida* Can. *Her. Seitz Macrolep.* 10, p. 679.  
*plethoneura* Thos. *Her. Seitz Macrolep. Suppl.* 2, p. 204. \*  
*postornata* Set. *Hmps. Journ. Bomb. Nat. Hist. Soc.* 13 (1900), p. 231.

*prasina* Par. *Alph. Ent. Z. Iris* 8 (1895), p. 186.  
*pseudoehraea* Naros. *Her. Seitz Macrolep. Suppl.* 2, p. 203. \*  
*pseudorepanda* Par. *Her. Seitz Macrolep. Suppl.* 2, p. 207. \*

*rara* Thos. *Swh. Proc. Zool. Soc. Lond.* 1889, p. 408. \*  
*robusta* Can. *Her. Seitz Macrolep.* 10, p. 679.  
*rubieundula* Microl. *Wil. Trans. Ent. Soc. Lond.* 1911, p. 349. \*  
*rufotesselata* Arbelar. *Mr. New Ind. Lep.* 1 (1879), p. 73. \*

*schawerdai* Epip. *Zerny Verh. Zool.-Bot. Ges. Wien* 79 (1929), p. (36). \*  
*sericea* Hyph. *Leech, Trans. Ent. Soc. Lond.* 1899, p. 100.  
*sinensis* Sus. *Wkr. List Lep. Het.* B. M. 7 (1856), p. 1759.  
*suigensis* Thos. *Mats. Ins. Matsumur.* 5 (1931), p. 107. \*  
*suzukii* Microc. *Mats. Ins. Matsumur.* 5 (1931), p. 108. \*

*thaumasta* Iragoid. *Her. Seitz Macrolep. Suppl.* 2, p. 204. \*

*urga* Mires. *Her. Seitz Macrolep. Suppl.* 2, p. 206. \*

*xanthopus* Biet. *Oberth. Ét. Lép. Comp.* 3 (1909), p. 408. \*







## 22. Family: Psychidae.

Not much is to be added to the exhaustive descriptions of this family given by Prof. Dr. SEITZ in Vol. 2, p. 351 etc. and Vol. 14, p. 481 etc.

BURROWS has sought to solve the question of the inter-relationship of the *Psychidae* and the other lepidopteral families (and *Phryganidae*) chiefly by means of anatomical examinations and comparisons of the ♂ genitalia. His researches covered *Phryganidae*, *Lymantriidae*, *Tineidae*, *Hepialidae*, *Limacodidae*, *Heterogynidae*, *Drepanidae* and *Zygaenidae*. (The Entomologist's Record, Vol. XXXVI, No. 6, 7 and 8.) He was not successful in establishing any closer relationship with the families named on anatomical grounds, but he assumes that, should a link be discovered, this will probably be with the nearest *Tineidae*.

As already indicated in Vol. 14, according to recent observations also the larvae of the ♀ of most of the *Psychidae* turn round in the sac shortly before changing to a pupa. Thus the head would face the free aperture in a similar way to that described of the ♂ larva. In others however, as for instance in the Genus *Cochliotheca*, such an inversion of the larva does not as yet appear to have been observed. The imago emerges from the pupa case through an opening in the centre of the 2nd spiral of its sac, which is shaped like a spiral snail shell. The ♂ pupal integument has often been found protruding from such opening after the emergence so that half the empty pupa is hanging out at the side of the sac and not from the extremity of same. From the position of such an integument of a ♂ pupa, the caudal extremity of which is directed in the sac towards the adhering end, it seems highly likely that the larva had turned round in the sac before pupation. In this Genus also therefore an inversion of the larva before pupation seems to occur.

JONES has proved most convincingly by means of his very instructive illustrations and specimens, which he had prepared by a special method, that in an *Acanthopsychidae*, *Thyridopteryx ephemeraeformis* Haw. (Transact. Amer. Entomol. Soc. Vol. LIII, p. 293) and also in other species where the ♀♀ remain in the sac with their head towards the free end, with the pupal integument also in this position, that copulation actually thus takes place with the ♂. Its accordion-like abdomen penetrates deeply into the sac and into the pupal integument until it reaches the Ductus bursae. According to his observations a ♀ can pair with several ♂♂, a ♂ with 2 ♀♀; the ♀ then lays the eggs in the integument of the pupa by means of its ovipositor, a procedure, which some authors seem to dispute. This would appear however to be without justification. Only after the pupal integument has burst open (before pairing), the ♀ exercises attractive powers for the ♂.

Of the greatest possible interest in this family of the *Psychidae*, is the question of parthenogenesis. Since the publication of the 2nd Volume some important researches have been carried through and of these we must mention particularly the fundamentally thorough experiments and observations of Dr. SEILER. Unfortunately his premature death brought an abrupt end to his work. His labours were chiefly devoted to the so-called *Micropsychidae*, but they show remarkable analogies with species of the *Psychidae* group with which we are dealing here and they especially enable us to understand better and realise the parthenogenetical biology of such species as *Cochliotheca crenulella* Brd v. *helix* Sieb.

SEILER's line of research started from his discovery of the fact that in *Talaeporia tubulosa* Rtzs. \*) the proportion in the numbers of ♂♂ as compared with those of the ♀♀, varied very considerably in localities that were widely separated. He found for instance in Liegnitz a considerable preponderance of ♂♂, 100 ♀ : 254 ♂; at Wannsee the ♀♀ outnumbered the ♂♂, 100 ♀ : 72 ♂. According to this, even allowing for an uneven infestation by parasites etc, the unequal proportion of the sexes cannot be due to mere chance and one can assume that in the embryo state certain factors have exercised a deciding influence on the determination of

\*) Archive for Cell Research 1920, Vol. XV, 3. Part, p. 249.



the sexes. His experiments and investigations led him to examine the following factors: overripeness of the ova, which produced a large preponderance of ♂♂; influences of temperature, raising same to 37°, which had the same influence as overripeness; lowering the temperature to 5° which produced a preponderance of ♀♀.

SEILER then turned his attention to 2 *Solenobia* species, *triquetrella* Fisch.-Rös. and *pineti* Z. Of the former of these HOFFMANN (compare Dissert. Erlangen 1859, p. 42 etc.) had already ascertained bisexual, as well as parthenogenetical propagation. In regard to the latter, bisexual homogenousness had been suspected with the parthenogenetical *lichenella* L. The parthenogenetical form of *triquetrella* is found widely distributed and not rarely in central Europe, whilst the bisexual form is only known from a few isolated localities such as, for instance, Reichswald near Erlangen, where HOFFMANN had already discovered it. SEILER was able to confirm this isolated and sporadic appearance of the bisexual form reminding one of the case of the bisexual *Cochliotheca crenulella* Brd. It has proved impossible to discover any anatomical differences in the ♀♀ of the two sex forms of the same species, nor is there apparently any difference in their sacs. On the other hand HOFFMANN was able to observe very interesting differences in their biological conduct. Whilst the freshly emerged parthenogenetic ♀ begins almost immediately with ovipositing without waiting for the pairing, showing meanwhile no inclination whatever towards the ♂♂, the bisexual ♀ on the contrary reposes in expectancy of the ♂ with ovipositor extended on the sac. Should no copula take place, it dies after abt. 8 days and only very rarely and quite exceptionally deposits a few eggs, which have however proved infertile. The parthenogenetic ♀ only enters into a pairing with a ♂ quite immediately on emergence and before the commencement of ovipositing (HOFFMANN) or if same is artificially prevented (SEILER).

In *Solenobia pineti* Z. conditions are somewhat different than in the preceding, as this fairly common species occurs for instance in north Germany about in an equal proportion of 1 ♂: 1 ♀; in localities further south where it occurs, the proportions in the sexes change to the disadvantage of the ♂♂. For instance in Nuremberg it is said to be 2—3 ♀♀: 1 ♂, however in Munich it is as disproportionate as 23 ♀♀: 1 ♂. According to SEILER \*) a condition here arises in which the number of ♂♂ cannot possibly suffice to fertilise all the ♀♀ and to this he ascribes the commencement of parthenogenesis. Such influences as for instance the decimation of the ♂♂ by parasites etc. do not seem to be a decisive factor. SEILER there discovered also a parthenogenetic race of *S. pineti* Z. which was propagating and identically as with *S. lichenella* L., which O. HOFFMANN had already suspected to be a parthenogenetical form of *pineti*. It conducts itself biologically just like the parthenogenetical ♀♀ of *S. triquetrella*. HARTMANN succeeded in bringing through 8 generations and exclusively bred ♀♀. SEILER assumes that these *Solenobiae* are about to evolve from the more ancient bisexual propagation to the more recent parthenogenetical.

It would certainly not be permissible to generalise from the particular and assume that what was happening in the propagatory biology of the *Solenobiae* would apply to other species of the *Psychidae* Genera. Nevertheless one would be justified in thinking it possible that analogous circumstances prevail in regard to our *Cochliotheca crenulella* Brd. and its var. *helix* Sieb. By this we mean that the parthenogenetical form *S. lichenella* L. of the parthenogenetical race *helix*, would correspond to the bisexual *pineti* of the bisexual *C. crenulella*, so that *helix* would not, as has so often been done, be considered a separate species, but only a parthenogenetical tribe (or race) of *crenulella*. It is of the very greatest importance that the propagatory biology of *crenulella* and *helix* be also subjected to most thorough and exacting experiments and research in the same painstaking and careful way as with the *Solenobiae*. Possibly similar results would be achieved as SEILER had with *T. tubulosa* Rtzs. At all events the influence of temperature should be experimented with in regard to the determination of the sexes and their proportion to one another.

In regard to the systematic classification, as this is a Supplementary Volume, only few changes have been made. Of the Genus *Epichnopteryx* only the small reticulate species have been separated as a Section: *Whittleia* Tutt. The discovery that in the whitish species of the Genus *Rebelia* with their whitish fringes, the most important characteristic, the tibial spine of the forelegs, is absent, has made their separation into a Subgenus *Leucanacanthia* necessary.

Similarly only very few alterations have been made in the nomenclature. The author himself withdrew the Genus *Apterona* Mill., as it was proved to be unjustified and had only been introduced into literature owing to a misconception. The species are now embodied under the Genus *Cochliotheca* Rmb., which is generally held to be correct. In the first instance RAMBUR had demonstrated ad oculos to MILLIÈRE and convinced him that his arguments for the creation of a new Genus were untenable and later v. SIEBOLD in his Parthenogenesis had also entirely refuted same and exposed the erroneousness of the alleged generic characteristics. Subsequently PÜNGELER and the present editor had refused to recognise same in various publications. On the other hand I could not bring myself to replace names that have been current in literature for over 50 years and which are known to every entomologist, such as *Scioptera* Rmb., *Hyalina* Rmb., *R. plumella* H.-Schäff., by new denominations merely for purely pedantical nomenclatural reasons.

\*) Zeitschr. f. induct. Abstammungs- und Vererbungslehre, Bd. XXXI, 1923.



I have made a point of trying to collect as much biological matter as possible for my task and will seek to transmit same. Unfortunately really useful observations and details of these small and unfortunately so insignificant creatures are only to be sparsely found in entomological literature. May I take this opportunity to appeal to our expert professional and amateur breeders to pay greater attention to this "entomological step-child". It is an unusually interesting family and many problems of its biology still have to be solved and this can only be done by thorough and painstaking observation and careful and extensive breeding, for which unfortunately at the present moment, I have not the available time.

b. Subfamily: **Psychinae** (Vol. 2, p. 354).

### 3. Genus: **Acanthopsyche** Heyl.

**A. atra** L. (Vol. 2, p. 354, pl. 55 a). This species flies at midday in the sunshine on sunny slopes in *atra*. the mountains and in woods on hillsides. According to VORBRÖDT it occurs up to 1800 m altitude. Time of emergence is given as the morning and afternoon. The ♂ casing is found spun up nearer the ground than that of ♀. It is often found on grasses, scrub and rocks, whilst the ♀ casing is met with on tree-stems, fences, hedges etc. from the end of April. It occurs at lower altitudes from April onwards, in the mountains however up to July. — We are now giving an illustration of *senex* Stgr. (Vol. 2, p. 354) (14 g).

**A. zelleri** Mn. (Vol. 2, p. 355, pl. 55 a). This species occurs at Granada and on the west coast of the *zelleri*. Continent. I have 3 ♂♂ specimens in my collection ex coll. TRAUTMANN. VORBRÖDT says it occurs at Locarno in southern Switzerland. MILLIÈRE's indication that it occurs at Plaisia, Jura, France will therefore in all probability be correct.

**A. orophila** Wrli. (14 g [♂ type]). ♂. In general shape and appearance like *A. atra* L. (Vol. 2, p. 354, *orophila*. pl. 55 a) but larger. Wing expanse 20—21 mm against 17 mm. Antennae as in *atra*, pectinations longer towards the tip, cilia also longer. Thorax and abdomen more frail, thinner, hairiness similar. Forewings more elongate, semitransparent like the hindwings, blackish with distinct neuration. In contrast to *atra*, veins 4 and 5 of both wings on a short stalk, length of which is variable, neuration otherwise like *atra*. Fore-tibiae with very long spine. ♀ sac and early stages unknown. Kutscha mountains in the eastern Thien-shan at an altitude of 3500 m in July. — *A. himalayana* Moore (Vol. 2, p. 355) differs by the forked intracellular nervule of the cell of both wings, as well as by the presence of vein 6. — *A. inquinata* Led. (Vol. 2, p. 355, pl. 55 a) is smaller, more densely scaled and according to LEDERER's illustration, veins 4 and 5 are not stalked, although this is mentioned in Vol. 2 in connection with the hindwing.

**A. iliensis** Wrli. (14 g [♂ type]). This is a smaller species of barely 14.5 mm expanse from the Ili *iliensis*. territory. Head and body with moderately long hairs, dark black-brown. Wings grey, transparent, heavily black at base, opaque area reaching on forewings to 1/3rd with oblique fairly straight line of demarkation, on hindwings to 2/3rds to the anal angle. A fairly large dark lunule on forewing. Costa and fringes darker, blackish. Can easily be distinguished from *Oeceticoides nigraplaga* Wil. and *bipars* Wkr. by the neuration and the differently outlined dark areas. Compare illustrations in Vol. 2, pl. 56 g. Whilst veins 4 and 5 in *iliensis* are widely separated from the cell, in the other species these veins are stalked on both wings.

### 5. Genus: **Pachythelia** Ww.

**P. villosella** O. (Vol. 2, p. 356, pl. 55 a). This species is found in the west, far into the spanish penin- *villosella*. sular, southwards to Sicily. From the latter locality I have 5 somewhat darker ♂♂ from Taormina, Monte Venere, captured 5—7 June. It also occurs at Leghorn and is mentioned from Corsica. According to VORBRÖDT it occurs on sunny slopes in mountainous territory to an altitude of 1900 m, flying about in the morning sun up to the middle of July. It is said however to emerge in the afternoon and evening of the day preceding the flight. According to KLIMESCH (Linz) the ♂♂ casings are found on trees, posts etc. and fixed higher up than those of the ♀♀. — The grey form *cinerella* Dup. (Vol. 2, p. 356), occurs according to VORBRÖDT *cinerella*. (5th Supplement), at Maroggia. He also has a remarkably large, similarly grey ♂ captured on 12th July 1923 at Gampel in the Loetschental in the Valais. This should probably also be classified here.

**P. unicolor** Hbn. (Vol. 2, p. 356, pl. 55 a). This has been observed westwards to Aragon, but probably *unicolor*. penetrates as far southwards as the preceding species. CURÒ mentions that it occurs in Corsica. In the warm southerly valleys and the Valais, it occurs up to an altitude of 2000 m. It flies in warm sunny places in open forest land, chiefly towards the evening, but also in the early morning in June/July. According to the observations of RATZOW (Lübeck), the moths emerge at any time of the day or night, but the flight takes place only towards the evening and in the morning. At Bellinzona in the Tessin, where the species is common, I found a casing which was covered with tiny pieces of paper on a fence near a house.



*asiatica*.

**C. asiatica** Stgr. (Vol. 2, p. 356, pl. 55 a). This species occurs on Saghalin and I have a small specimen measuring only 18 mm from there. It is coloured like a ♂ *unicolor*. STÖTZNER brought back specimens of this species from Wassekou and Kwanhsien (China).

### 7. Genus: **Amicta** Heyl.

*quadrangularis*.

**A. quadrangularis** Christ. (Vol. 2, p. 357) (14 g). This is certainly a separate species from *A. murina* Klug (Vol. 2, p. 357). The wing contour is entirely different: hindwings have a much more acute apex and the outer margin is almost straight, whilst in *murina* it is regularly rounded and the apex is much more truncate. *quadrangularis* has almost transparent wings with black scales dispersed over the upper surface of forewings and appressed on costa and along the veins. *murina* has almost opaque wings with brownish scales. In the former the posterior  $\frac{2}{3}$  of the abdomen are black to black-brown, whilst in the latter same are completely buff with pale grey-yellow to whitish hairs. What is generally classified in collections as *quadrangularis* from Palestine = *murina*, the former not yet having been ascertained there. — **nigrescens** Stgr. (Vol. 2, p. 357, pl. 55 a), which ROTHSCILD, as with *quadrangularis*, classifies to *murina* (Nov. Zool. XX, p. 134), should also be classified with *quadrangularis*, in spite of the similarity in the sac. It is certainly a form of the latter with completely black abdomen and blackish transparent wings having the same wing contour, as can be seen from the illustration in Vol. 2 (pl. 55 a) which is quite good and a comparison will show the differences from *murina albescens* (pl. 55 b).

*albescens*.

*A. murina* Klug, **albescens** Stgr. (Vol. 2, p. 357, pl. 55 a) (14 g). This is a somewhat paler form of *murina*. It is a genuine species and separate from *quadrangularis* (compare what was written there as to the differences). — **mauretunica** Rothschild. (14 g) described from Bou-Saada, Algeria. It has almost opaque wings, which are coloured a uniform bluish grey, as are also the head, antennae and body. The larva feeds on "Retama raetam" and has a yellowish grey head with minute black lines, yellow-grey spotted legs. The 1st segment has no markings, the 2nd to 6th narrow black bands, the 7th to 11th wide black bands. On the 5th and 6th these are followed by black spots. It has been captured on 10th September at Hassi-baaba, in August/September in Algeria, in October at Guelt-es-Stel. The race seems to be somewhat smaller than *murina*, wing expanse 18—20 mm. — **lefevrei** Oberth. (15 a) appears to be a somewhat larger moroccan race of *mauretunica*. Captured at light in August at Timhadit. ♀ sac and early stages unknown.

*caucasica*.

**A. caucasica** B.-H. (14 h [Cotype]) from Elisabethpol in the Caucasus, ♂ has a considerable expanse of 28—29 mm. Ground colour a reddish grey-black, similar to that of *Pachytelia villosella* O. Otherwise similar to *A. lutea* (Vol. 2, p. 357, pl. 55 b), forewings wider, inner angle rounder. The veins are whitish but fringes are darker than ground colour, the apices faintly paler. Head, antennae and pectinations, thorax and very elongate abdomen are all of the same shade as the wings. The penis protrudes prominently. ♀ sac and early stages unknown. The neuration in my 2 paratypes varies in that in the one ♂ on both forewings veins 7 + 8 + 9 are stalked, in the other ♂ 7 on a long stalk, whilst 8 + 9 arise from a point. In both on all wings 4 + 5 are stalked.

*taurica*.

**A. taurica** Wrli. (14 g [♂ type]) reminds one in general appearance most of *A. febretha* Boyer (Vol. 2, p. 358; pl. 55 b gives quite a wrong impression); it is somewhat smaller and more compact than same; wing expanse 19—21 mm, as compared with 23—25 mm. Head pale yellowish white, vertex, collar, thorax laterally and the very long hairs at base of wing, all pale buff, the posterior part of thorax and anterior part of abdomen pale grey, everything else grey-brown. Body paler than *febretha*. Antennae similar to those of same but darker, shaft yellow-grey, the long pectinations grey-black, not light brownish as in the former. The long spine on the fore tibiae only extends slightly beyond the distal end, just as in *febretha* and not nearly so long as in *armena*. In the latter the apex of forewings is more pointed and the outer margin more oblique. Ground colour of *taurica* is dark grey, the forewings somewhat lighter than *armena*, darker towards base, hindwings as dark as those of *febretha*. The scaling is dark grey, whilst in the latter it is brownish to blackish. Costa and fringes are darker than the surface of the wings, fringes glossy. Underside dark grey, darker than upperside. Neuration as *febretha*. The ♀ is only known in the dried state, it is brown and is similar to that of *febretha*, but in contrast to same, the head and anterior parts are black ventrally. The ♀ sac is also similar, decorated with coarser grass stalks and more irregularly, 10 mm wide, 35 mm long. 3 ♂♂, 1 ♀ from Marash, Taurus, North Syria in August/September at an altitude of 600—900 m; the larvae in June.

*febretha*.

**A. febretha** Boyer (Vol. 2, p. 358; pl. 55 b which certainly does not represent a *febretha* which has quite a different wing contour and a different colour) (14 h). We are giving a fresh illustration.

### 8. Genus: **Hyalina** Rmb. (Deutrohyalina Dalla-Torre).

*albida*.

**H. albida** Esp. (Vol. 2, p. 358, pl. 55 c). According to VORBRODT (5th Supplement), is frequently captured on the wing in day time at Geneva, around the base of the Grand Salève, Vallon de Versoix, Thoiry, Monne-



tier, Bois de Veyrier and has also been frequently bred from the casings that have been found. It occurs end of May, early June. The sacs are found on *Lotus* and *Artemisia campestris*.

**H. zabeth** *Le Cerf*, from Oulmes, Morocco, in April, has for the main part black hairing on upper and undersides of thorax with very little admixture of white. The black hairy scalings of wings are denser, deeply shading over the outer half, costa and margin of forewings. Hindwings more widely black; fringes, especially of hindwings are longer and black to inner angle. Wing expanse 18 mm. Described from 2 ♂♂.

### 9. Genus: **Oreopsyche** *Spr.*

**O. tabanivicinella** *Brd.* (Vol. 2, p. 359, pl. 55 c) is found in the Valais, in the main valley of the Simplon, in the Laquin valley, Saastal, Glacier de Trient and also in the Pyrenees. — The larvae are full fed in June; the moth emerges in July, later than in South France (May and June).

**O. biroi** *Rbl.* (Vol. 2, p. 359). According to SCHAWERDA, this species also occurs in Herzegowina, at the top of the Orjen (altitude 2000 m) and on the Trebevic in Bosnia. He describes the sac as being of the size of that *Ph. graslinella* *Bsd.*, narrower, rather more loosely built and also more loosely covered with particles.

**O. leschenaulti** *Stgr. colossa* *A. B.-H.* (14 h [♂ type]) from North Portugal is distinguishable by its larger size, 18—20 mm as against 15—17 mm expanse. Further the colour of all wings and the body is slightly purer white, which is nothing like the dark black-grey colour of the var. **nigricans** *Stgr.* (14 h [cotype] and Vol. 2, p. 360, pl. 55 d) from Castile, with which the only resemblance is the almost unicolourous black antennae. Also the sac is much larger 24 mm against 17—20 mm on the name form. In the 6 ♂♂, including the original one, the wings are much more glossy, the shape of the forewings is different, the apex being much more acute, so that *colossa* would rather appear to be a separate species.

**O. desertorum** *Trti.* (14 h [♂ type]). Nominated from a ♂ that is now before me. The specimen was captured in nature, has flown and is slightly damaged on the right wing. However it certainly shows certain specific differences from *O. pyrenaella* *H.-Schäff.* (Vol. 2, p. 359, pl. 55 c \*) and *kahri* *Led.* (Vol. 2, p. 359, pl. 55 c) with which it is doubtless closely related. Forewings 8 mm. The antennae are bipectinated with fascicles to their extremity, but they are shorter than in the species referred to, the long pectinations are stouter and shorter, densely ciliate, blackish, especially at the base they are adorned with white hairy scales. The black-brown body is frailer than in the related species, with knotty hairs, grey fascicles of hairs on the top of head and laterally on the thorax. Easily distinguishable from allied species by the different shape of forewings, which are transparent, faintly brownish black with more acute apex and straighter margin. The cell has a more rounded outer wall than the others, it is not so large as shown on TURATI's illustration 4. There are 9 marginal nervules. The somewhat folded hindwing appears to be narrower, the general outline being not definitely clear. Early stages unknown. Ain-Mara, Cyrenaica.

**O. angustella** *H.-Schäff.* (Vol. 2, p. 360) (14 h). — **bicolorella** *Bsd.* (Vol. 2, p. 360, pl. 55 h) (= *moncaunella* *Chapm.*, sec. HEYLAERT's certissime, Ann. Soc. Belge., L., 1906, p. 97) occurs in the Pyrenees and neighbouring districts of Spain, where it is occasionally very common locally, flying in the morning sunshine between 8 and 10 a. m. in June/July in altitudes of 1500—1800 m and around plants of *Genista purgans*. The form varies considerably in colouration and is connected to *angustella* by transitions. The original specimen, which is neither perfect nor well preserved emanates from Spain. — So also does **moncaunella** (15 a) which differs from *bicolorella*, according to CHAPMAN, by its larger size, length of wings being 10 mm, by the more intensive yellow-red tip of abdomen, which contrasts brightly with the black anal tuft and the greater constancy of the colouration, in comparison to *bicolorella*, which varies more and is not so extensively coloured reddish. In the original description comparison was only made with *muscella*. It was caught between 14th and 24th July at an altitude of 1500—2000 m on the Sierra de Moncayo on the boundary of Castile, Aragon and Navarra, scarcely 100 km west of the Pyrenees in Spain.

**O. plumifera valesiella** *Mill.* (Vol. 2, p. 360) (14 h). According to VORBRODT the sacs have been found an altitude of 3200 m. It flies from June to beginning of August in the early morning in the sunshine in Canton Valais, Bern, Switzerland, but only in alternate years. STÄGER describes the ova as pale yellow, no definite structure, smooth, roundish polyedrous, singly, as well as, as a whole embedded in the wool of the abdomen of ♀, in each sac abt. 80 ova. The larvae, the eyes of which can be observed as minute dots in the ova when about to issue forth, feed on sunny, dry, rather barren mountain meadows, mainly on thyme, but also on many other xerophagous low plants, sometimes occurring in immense numbers. The complete metamorphosis takes 2 years. For further details as to the biology see STÄGER, Zeitschrift f. wiss. Insektenbiologie, 1924, p. 131, 163, 181, 216; *valesiella* is distributed widely in mountainous districts at from 1200 m altitude. I have also received same from the central Pyrenees, the Urals and captured same in quantities in the Vosges at abt. 1300 m altitude.

\*) In Vol. 2, pl. 55 c, the name is erroneously printed as *pyrenella*.



## Phalacropterygidi Tutt.

10. Genus: **Scioptera** Rbr. (Lepidoscioptera Dalla-Torre).

A. In comparison to the frail, thin, sparsely haired and tufted body, the wings are large and wide. They are more or less transparent, sparsely covered with rather short, thin hairs. The longly pectinated antennae are relatively feeble being only abt.  $\frac{1}{3}$ rd the length of forewings. (*Standfussia* Tutt.)

*tenella*. **S. tenella** Ad. Spr. (Vol. 2, p. 361, pl. 55 e). Fairly well distributed but local in the Alps of central Switzerland and especially in the southern valleys. For instance it is not uncommon around Zermatt. I have the species from many localities in the Tessin, the Valais, the Bernese Oberland, Gemmi, Faulhorn, Oeschinensee; VORBRÖDT also mentions it as occurring in the Grisons, Misox, Bergell, Engadine. Recent faunistic works no longer mention *tenella* as occurring in Spain (KORB) and the Pyrenees. In regard to altitude, it seems to vary from 205 m at Locarno to abt. 3000 m on the Gornergrat. The species flies in the early morning from June to August. — *zermattensis* Frey is mentioned in all works on Butterflies, as the smaller, darker race from Locarno and in the "Catalogus Lepidopterorum" it is denoted as a species. PÜNGELER, who had bred several 100 specimens of *tenella* from Zermatt, considered same to be identical with *zermattensis*. VORBRÖDT also, as I myself, are unable to see any distinguishing feature to differentiate between specimens bred from Locarno and such from Zermatt, so that there seems hardly any room to doubt the identity of both. Also a microscopic examination of the wing scales proved them to be absolutely identical. See Verh. Nat. Ges. Basel, XXXI, 1920, p. 26 and 30, pl. III, Fig. 1—14.

*vorbrodtella*. **S. vorbrodtella** Wrl. (14 i) ♂ is larger than *tenella* Spr. (Vol. 2, p. 361, pl. 55 e). Forewings 10—11 mm, paler, the wings much more transparent, grey with brownish hue, hairs shorter, thinner and more sparse. Forewings with more subtriangular contour, as wide as *tenella*, but broader, less rounded at apex, the outer margin straighter and somewhat more oblique; also the hindwings are narrower. Corresponding to the paler colouration of the wings, the antennae are much paler brownish grey, the pectinations are longer but only half as thick. Similarly the colour of the hairs of the head and body are brownish grey. Fringes which are the same colour as wings, are longer than those of *tenella*. Fore tibiae have no spine, femora and tibiae have long hairs; examined superficially *vorbrodtella* gives one more the impression of being like a *Sterrhopteryx hirsutella* Hbn. (Vol. 2, p. 362, pl. 55 f), or a small *St. standfussi* H.-Schäff. (Vol. 2, p. 362, pl. 55 f), can however be distinguished by the different build of the antennae and the neuration. The early stages and the ♀ are unknown. Very rare in the Valais and the Engadine; so far only 4 ♂♂ are known. The first was captured by VORBRÖDT on the 11th July 1910 near Iselle 660 m altitude; it is somewhat larger and browner than the 2nd one, which was taken by me on the ridge of the Gornergrat 3136 m on the 17th July 1919 together with *Psodos bentelii* Rätz. flying in the morning sunshine. I secured 2 further ♂♂ ex the collection of STANDFUSS, one of which is labelled "Engadine" and the other simply marked with a query and with no locality indication. No other data were available of either.

B. The wings fairly narrow, opaque; head and body with tufty hairs, antennae longer with very long pectinations, (*Scioptera* Rmb.) species: *S. plumistrella* Hbn. and *S. schiffmilleri* Stgr.

11. Genus: **Psyche** Schrk.

*nivellei*. **Ps. nivellei** Oberth. (14 i). The ♂ is easily distinguishable from all other species of the Genus by its much thinner, frailer and sparsely haired body and the apex of the rounded forewings. Wing expanse 19 to 20 mm. Antennae with longer pectinations, which however are finer than in related species and with long cilia. Colouration of body and wings like those of *viciella*, greyer and wings more transparent. The forewings with 12 veins, 4 + 5 short, 8 + 9 longer (stalk =  $\frac{1}{4}$ ). Hindwings with 8 veins, 3 + 4 from a point. ♀ sac and early stages unknown. From Timhadit in Morocco, coming freely to light in August. I have one ♂ from Zebch near Zebdou in Algeria, caught in September.

*perpallida*. **Ps. viadrina** Stgr. (Vol. 2, p. 361, pl. 55 e). — ab. **perpallida** Heckel has whitish colouration.

*lactescens*. **Ps. lactescens** Oberth. (15 a). The ♂ is described as large, robust, antennae with long pectinations, stout, black; body and wings glossy, milky white. Here we are giving a reproduction of Fig. 712 from OBERTHÜR's Ét. Comp. V. 1. Wing expanse is 21 mm. It occurs in September at Géryville, Algeria. I have not a specimen before me.

14. Genus: **Sterrhopteryx** Hbn.

*hirsutella*. **S. hirsutella** Hbn. (Vol. 2, p. 362, pl. 55 f) emerges towards the evening and flies until midnight. Dr. MÜLLER of Linz observed the emergence at 11 p. m. The imagines come to light. According to VORBRÖDT the larvae feed to the end of May on young shoots of oak stumps and sloe bushes and are not rare in forest clearings; the ♂ sac is found in June at the foot of tree trunks and especially on sloe bushes, the ♀ sac at a height of abt.  $1\frac{1}{2}$ —2 m on oaks.



*S. standfussi* Wocke, nec *H.-Schäff.* (Vol. 2, p. 362, pl. 55 f). — *kurenzovi* Filipjev (14 i) from Sutshan, *kurenzovi*. Ussuri. Of the same size as a small to medium *S. standfussi*; wing expanse 24.5 mm; width of forewings 7 mm, length of same 13 mm, width of hindwings 6.5 mm. Pectinations of antennae abt. 5—6 times longer than the shaft, narrower and less thickened towards the free end than in *hirsutella*, more similar to *standfussi* than to *hirsutella* Hbn. Somewhat wider in the wing than the former, agreeing with same however in colouration of wings and body. Genitalia like those of *hirsutella*, remarkably robustly built, relatively larger, dimensions as in *standfussi*. Flight from mid June to mid July. A paratype before me is of the same size as my largest *hirsutella*. We are illustrating the paratype of *kurenzovi*. — *sajanella* Kozh. from the Sajan *sajanella*. mountains and *contrastella* Kozh. from Minussinsk, Siberia are held by FILIPJEV to be identical with *kurenzovi*. *contrastella*. I have the originals before me. The specimen of *contrastella* has completely lost the abdominal hairs, so that the pale brown chitinous body is visible, that of *sajanella* has grey hairs. Other differences with the exception of small variations in the size, are not observable.

## 16. Genus: **Cochliotheca** Rmb. (Apterona Mill.).

**C. helicinella** *H.-Schäff.* (Vol. 2, p. 363, pl. 55 f) is mentioned by HEYLAERTS as also occurring in Algeria, *helicinella*. Oued-Ounet. It is not rare at Taormina and Syracuse, Sicily and I have abt. 40 ♂♂ and over 100 casings ex coll. TRAUTMANN from there.

**C. gracilis** *Spr.* (Vol. 2, p. 363, pl. 55 g). I have a large number of identical specimens from N. Africa, *gracilis*. Guelt-es-Stel and El Kantara, Algeria, captured 20—28 May. Hitherto in Spain the species was only known from Andalusia and Aragon, but its distribution extends to Catalonia, Montserrat, where I captured 2 ♂♂ at night at light on the 29th July at an altitude of 1100 m. The moths are attracted to a light-sheet at night. The casings have so far not been described. The ♂ measures 4 mm in width and 4 mm in height. It resembles that of *crenulella*, but is coarser and covered with rougher particles of sand and earth. The ♀ sac is much larger and also longer than in the other species, measuring 6 mm, wide and up to 9 mm long with distinct spirals. — **pectinata** *Chrét.* according to information kindly supplied by Mr. LHOMME, is not to be *pectinata*. found in the coll. CHRÉTIEN; it was therefore not possible to supply me with a specimen. It was captured by ALLUAUD at Haute-Reraya in the Grand Atlas. According to the description of the only ♂ known, the wing colouration is very like *C. crenulella* *Brd.* (Vol. 2, p. 363, pl. 55 g) differing however by the long pectinations of antennae, which are almost longer than those of *nylanderi* *Wrli.* (*pusilla* auct.). The transparent wings are yellowish brown, costa dark brown in basal half, fringes paler than the wings. Head and body black-brown, with white hairs. Wing expanse 13 mm. Is probably closely related or even identical with *C. gracilis*.

**C. powelli** *Oberth.* (14 i). Was described as a *Sterrhopteryx*, represents the largest of all known *Cochliotheca* *powelli*. species, having a wing expanse of 14—15 mm. It is compared to *S. hirsutella* *Hbn.* and *Metisa plana* *Wkr.* (Vol. 10, pl. 91 b) from Ceylon. Actually however it is nearer to *C. gracilis* *Spr.* (Vol. 2, p. 363, pl. 55 g), differing only by its much larger size, slightly darker grey, more heavily haired and rounded wings, which have a somewhat more convex shape. The antennae are rather more robust and have wider pectinations and the head has longer grey-black hairs. Abdomen is frail with paler hairs than wing colour. Perhaps when the ♀ is discovered and the early stages are known, this will prove itself to be a race of *C. gracilis*. Mrassine, Morocco in May; Sebdou, Oran, whence a good series of ♂♂ has been recorded.

**C. stauderi** *Wrli.* (14 i [Type]) was discovered by STAUDER on the 7th July 1920 near the summit of *stauderi*. the Aspromonte, Calabria. In general appearance and colour it is like *C. nylanderi* *Wrli.* (*pusilla* auct.) (Vol. 2, p. 363) (14 i) which hitherto has only been known as definitely occurring in the Pyrenees, but it is considerably smaller, with a wing expanse of 9.5 mm as against 13—14 mm of *nylanderi*. It is also a deeper black. Antennae pectinate as in the latter but frailer. Pectinations wider at tip, shorter at base and generally shorter than in *nylanderi*, black. Fringes slightly paler and long, longer than in *nylanderi*. The 3 median nervures, which are separate in *nylanderi*, appear to arise from a short stalk.

**C. pusilla** *Spr.* (Vol. 2, p. 363, not illustrated there) (14 i) is described from a somewhat worn ♂ from *pusilla*. Constantine, Algeria. Wing expanse barely 12 mm. As SPEYER expresses himself, it reminds one much more of a small *Epichnopteryx pulla* (Vol. 2, p. 366, pl. 55 g) than the typical *C. helicinella* (Vol. 2, p. 363, pl. 55 f). Wings are somewhat narrower, less rounded at the angles than in the latter. Colouration is a weakly pale grey whilst body is a fairly deep black. ♀ and early stages unknown. Several specimens before me agree exactly with this description of SPEYER. They were captured by Dr. ROCH of Geneva, in Morocco on 28th March 1923. They are distinguishable by the narrower, more elongate wings and as compared with *helicinella* *H.-Schäff.* from Sicily and *nylanderi* *Wrli.* (14 i) from the Pyrenees, they have a deeper colour. The inner angle of wings is more obtuse and less pronounced than in the latter. — ROTHSCHILD mentions a



further ♂ of *pusilla* Spr. captured 13th May 1913 in Algeria. To be specially noted is the different period of flight: *pusilla* Spr. March/May; *nylanderi* Wrli. (= *pusilla* auct.) of the Pyrenees, July/August.

*nylanderi*.

**C. nylanderi** Wrli. (= *pusilla* auct. nec Spr. Vol. 2, p. 363) (14 i [type]). This appears to be endemic to the central Pyrenees, as hitherto, it only appears to have been captured there. It occurs up to 2000 m altitude and was first described by NYLANDER as *C. helix* Sieb. ♂. To supplement the description and facilitate comparisons, it is to be added in regard to the ♂♂: wing expanse 10–12 mm. Smaller than the somewhat paler grey-black *helicinella* H.-Schäff. (Vol. 2, p. 363, pl. 55 f) and the darker *A. pusilla* Spr. (Vol. 2, p. 363, pl. 14 i). Head, thorax and abdomen black with long and dense hairs, these are much longer and denser than in allied species. The body appears to be more robust than in *pusilla* and *helicinella*. Wings grey-black, the wing contour appearing different from related species by its faintly bulging outer margin. Wings shorter and wider than *pusilla*. Antennae bipectinated, pectinations becoming shorter towards the tip, lamelliform, being much wider at extremity through denser cilia than in *pusilla*, base (shaft) however narrower.

*crenulella*.

**C. crenulella** Brd. (Vol. 2, p. 363, pl. 55 g). Formerly this species was only known from Aix en Provence, S. France, Bolzano, the Tyrol and N. Italy, but meanwhile the ♂♂ have been found in many other localities. I have specimens and ♂ casings from the Tyrol from Etschtal, Terlan, Torbole on the Gardasee, Bolzano (in large numbers); the species is apparently not rare in the warm southerly valleys; further from southern Switzerland, the Tessin, frequent, from Locarno, Rovio, Maroggia, Camedo in the Valle Maggia; VORBRÖDT also mentions Rovellet, Sorengo, from the Valais Martigny, Branson. I have ♂♂ from Italy, from the southern slopes of the Simplon, St. Maria Maggiore near Domodossola, Lombardy, Montagna Grande, central Apennines at 1000 m altitude. From the Spanish peninsular all authors only mention *C. gracilis* Spr., but at Sierra Nevada on 4th July 1926, I caught 2 certain ♂♂ specimens in the Genil valley at abt. 1500 m altitude, at light at night. This is about the extreme western limit of *crenulella*. According to DANNEHL the young larva prefers *Alyssum* and *Silene*, but afterwards takes to *Thymus*, *Stachys*, *Sedum*, *Vicia*, *Melilotus*, *Medicago*, *Dorycnium*, *Lotus*, *Anthyllis*, *Helianthemum*, *Lavendula*, *Geranium*, *Linaria*, *Antirrhinum*, *Veronica* etc., going over to the leaves of trees and shrubs before pupation. At the slightest touch it drops to

*paludella*.

the earth, but when small it lets itself down on a thread. — **paludella** Dhl. from swampy regions around Andrian, Terlan, Sigmundskron, the South Tyrol, is said to be very frail in ♂ sex, scarcely being as large as *crenulella* Brd. (Vol. 2, p. 363, pl. 55 g). It has more elongate forewings with acute apex, which are as wide as hindwings. Colouration an impure brown, fringes checked. The ♀ is like that of *crenulella*. Flight is limited to 18–29 May, whilst *crenulella* occurs from 6th June to end July. Both emerge towards evening. — The larva, which is perhaps slightly paler, can scarcely be distinguished from that of *crenulella*, is found on *Caltha palustris* and *Lythrum salicaria*, when nearly full-fed proceeding to the tops of alder trees, where the ♂ spin up on upperside, the ♀ on underside of the leaves. The casings are provided with a fine whitish coating. The rather clayed casings are flatly convex, the spirals being shortened. This would appear to be a form of *crenulella*, which according to the observations of V. HARTIG, occurs everywhere, where *crenulella* is found in marshy or fen localities. I was unable to procure a specimen. — I should like to remark here that the typical *helicinella*, described and illustrated by BRUND and emanating from Aix, is distinguishable by the very elongate wings and this is much more apparent than is indicated in *paludella*. In regard to the variability

*helix*.

of the casings, the same remarks apply as given under *helix*. — **helix** Sieb. (Vol. 2, p. 364). This is held to be, by nearly all authors with very few exceptions and based on recent experiences, exclusively the parthenogenetical, self-propagating thelytoke (♀♀ only producing ♀♀) form of the bisexual *crenulella* Brd. As HOFFMANN long ago and SEILER more recently have proved by innumerable experiments with *Solenobiae*, the purely parthenogenetical ♀ repels copulation with ♂♂ of its own species and commences immediately to oviposit, whilst the ♀ of the bisexual form awaits the copula and perishes without same and as a rule does not lay eggs that will normally develop without copulation. *helix* appears to conduct itself just like the *Solenobiae*; according to observations of DANNEHL, in the S. Tyrol the *crenulella* ♂♂ were only attracted to the ♀♀ of the bisexual *crenulella* form, neglecting the ♀♀ of the parthenogenetical *helix* form. Having observed this, he formed the impression that this denoted a difference in species, which would appear to be incorrect. He separated the 2 ♀ tribes according to their locality, but the casings showed no distinguishable differences. As is the case with *Solenobia triquetrella* and *spineti* Z., also the purely parthenogenetical forms of *crenulella* seem to occur in fairly rigidly isolated colonies separated from the bisexual forms, where same appear concomitantly and the one only occurs there sporadically. DANNEHL also believes he has observed a fairly sharp distinction of the two forms *helix* and *crenulella* in a vertical direction. The former seems to live fairly close to the earth and the casings are not found for pupation, higher than a man's height on walls, rocks, stones, poles etc., whilst *crenulella* (especially the ♂♂) climb to the summits of bushes and trees (elms, pine trees, ash trees), where whole colonies seem to assemble. Perhaps this peculiarity of the bisexual form is, among others, a reason, why the ♂♂ have not been found in our districts, where possibly such colonies are of rarer occurrence (an analogous case to that of the *Solenobiae*). As a matter of fact V. LINSTOW remarks on finding



♂♂ casings at the crown of fir trees in 1902 at Stettin \*), an observation which confirms that of DANNEHL. *helix* has been proved to occur in Pommerania; it is distributed over the entire palaearctic region, with exception of the extreme north. Recently it has been found by MARÉCHAL in Belgium in Province of Liège. It is often very frequent, whilst the ♂♂ of *crenulella* are only known from very few localities, with the exception of south of the Alps. SEILER, as already remarked, found a similar, though not so extreme mal-distribution in the proportion of ♂♂ and ♀♀ also in the Solenobiae and *Talaeporia tubulosa* according to the more northerly or southerly locality. According to ALF. NÄGELI, Zürich, the number of ova laid in the casing is very small, only 14—18 in each sac. He had found *helix* in large numbers at Glattfelden (Zürich). The larvae hibernated in their casings. The casings of the species, especially of the form *helix*, of which I have a large number in my collection, vary very considerably, both in colour and superficial appearance, as also of the internal dimensions. According to the nature of the soil, they can be dark black-brown, as for instance in specimens from Regensburg, the bavarian Jura and Strigow, or they can be rusty coloured, as for instance at Ruffach in Alsace or they can show all shadings of pale to dark grey, as in the Tyrol and Tessin. The smooth or rough outer surface depends on the finer or coarser grains of sand or earth that the larvae use as their material. — KLIMESCH found the larvae chiefly on *Anthyllis vulneraria*, *Teucrium chamaedrys* and *Scabiosa columbaria*, mining the leaves like a *Coleophora* larva, generally only feeding at night, lying hidden during the day on the ground under the food plant. It devours a round hole in the Epidermis and then feeds on the Parenchyma around same. — V. LINSTOW and others have held \*\*) *crenulella* Brd. and *helix* Sieb. to be two separate species, basing themselves on the semi-geometric not very successful illustration of BRUAND, which especially in the antennae shows distinct variation. *crenulella* from Aix en Provence is illustrated in Monogr. des Psychides Fig. 49 a and b, Pl. II and III, whilst the alleged ♂ of *helix* Sieb. was illustrated by CLAUS from the Tyrol, Bolzano in the Zeitschrift Wiss. Zool. 17, Pl. XXVIII. This question cannot however be decided from these illustrations, because as V. SIEBOLD has pointed out the descriptions of the antennae that BRUAND gave, are better than his illustration and correspond exactly to those mentioned by CLAUS. — *crenulella* flies at sunset in the evening in June/July and is attracted to light.

Subfamily: **Epichnopteryginae** Tutt (Vol. 2, p. 364).

## 20. Genus: **Rebelia** Heyl.

A. Foretibiae of ♂ with spine. Grey to yellow-grey moths with glossy grey to ochreous shiny fringes (*Rebelia* Heyl.).

**R. plumella** H.-Schäff. (= *herrichiella* Strd.) (Vol. 2, p. 365). This species has been found in Switzerland, the N. Tyrol and Poland. It flies in the evening between 7—8.30 p. m. from end April to July. — The larva hibernates once, according to NAUFOCK; the ♀ is easily distinguishable from that of *sapho* and *majorella* by the distinctly prominent yellow colour of the wool of the head and anus. In the other species these are of greyish hue. Time of emergence and period of flight are different from *majorella*, *sapho* and *surientella*, which emerge and fly from 5 to 9 in the morning. According to KLIMESCH the larva has a preference for the flowers of *Helianthemum*, *Bellis* and grasses. The sac is spun to the ground in almost vertical position. — **bavarica** Wrli. (14 i [type]), a constant, small race that flies at sunset on the bare slopes of the Jura at Kehlheim in mid July. It has also been captured by OSTHELDER at Munich. These are throughout captured and not bred specimens and they are of an even size. Wing expanse 11.5 mm, as against 14—16 mm in *plumella*. The wings are rather shorter and wider, their colour paler, the scales shorter and finer. Pectinations of antennae are similarly shorter with sparser cilia.

**R. surientella** Brd. (Vol. 2, p. 365, pl. 55 g). According to TURATI, this occurs at Valsassina, Province Como and he has noticed them year after year in the late afternoon from 21st June to August. The freshly emerged ♀, just like that of *R. sapho* Mill., in expectancy of copulation, stretches the anterior part of its body from the casing. The ♂ flies up, penetrates with its abdomen, down the back of the ♀ deeply into the casing and consummates the copulation in the manner well known in *Psychidae* Genera. The ♀ is 8—9 mm long, has a light yellow abdomen, brownish yellow chitinous head with round black eyes and whitish rudimentary antennae; the thorax is darker than the head with brown reddish scutellum; the last segment of abdomen covered with yellowish wool, in the centre with a greyish circular ridge of similar hairs. Ovipositor with 2 minute brown warts at base and a fine dorsal brown longitudinal streak. — The species is mentioned by VORBRODT as occurring in South Switzerland, by DANIEL as in Hungary, by DANNEHL as in the S. Tyrol.

**R. kruegeri** Trti. (14 k [♂ type]). According to the author this species is very close to *surientella* Brd. *kruegeri*. (Vol. 2, p. 365, pl. 55 g), differing by the more rounded apex, the deeper convex curve of the outer margin

\*) Zeitschrift f. wiss. Insecten-Biologie 1924, Part 2, p. 71.

\*\*) Zeitschrift f. wiss. Insecten-Biologie 1914, Part 2, p. 70.



of forewings, the darker grey-black, faintly brownish colour, slightly less transparent, more opaque wings, more distinctly prominent veins (resembling in this respect the subsequent *R. majorella* Rbl. 14 k). Further by the ends of the fringes being of same shade as the wings and glossy and silky. Build as *surientella* Brd., expanse 15—17 mm. The ♀ reddish grey with slightly more reddish wool; eyes dark brown, head lighter, dark brown thoracic scutellum, wider and paler on 2nd segment than on the 1st. A casing now before me measures 21 mm long, 3 mm wide, almost cylindrical, grey-brown; colour and shape being more like that of *sapho* \*), than *surientella*. Ossimo, Val Camonica, Upper Italy, in July, at an altitude of 600 m. 2 ♂♂ from Broglio in the Tessin, captured in July, at 700 m altitude, are certainly also of this species. According to particulars supplied by TURATI, PÜNGELER considered *krügeri* to be a genuine species. In my opinion it is closer to *plumella*.

*majorella*. **R. majorella** Rbl. (14 k) is described as follows: "remarkably large and with wide wings, purer grey with somewhat less glossy fringes. Forewings much wider at outer margin. Pectinations of antennae longer and sleeker. Forewings 11—12 mm. — Also the ♀ is very large and robust, dull pale yellow with grey anal wool". — In Carinthia and Styria, in alpine valleys and on the lower hills in May to early June, flying in the morning. — Larva like that of the preceding species (*plumella*, *sapho* and *surientella*), however when full grown it bears also lateral yellow dots on the black scutella. The sac is very large and stout, 22—25 mm long, in the ♀ often up to 5 mm thick in centre, whitish grey and often with band-like dark zones". — VOR-BRODT \*\*) says the species occurs on fields in the Tessin, Arogno, Mendrisio, Maroggia, between the 23rd March and 3rd April. — *majorella* ♂ cannot always easily be distinguished from *sapho* (14 k) and according to NAUFOCK the latter cannot always be separated from *surientella* (Vol. 2, p. 365, pl. 55 g). GABRIEL HÖFER surmises that they are forms of the same species. According to NAUFOCK, who has bred *majorella* and LÖBEL, who was able to observe them in nature on a locality just by his house, its flight is between 7—9 a. m. in any weather, at the end of May and early June. LÖBEL asserts that this is only every other year. Breeding under cover NAUFOCK obtained abt. 30% of imagines after 1 year, 70% after 2 years. It occurs in very limited localities that are widely distributed, but where it occurs it is in profusion.

*berytella*. **R. berytella** Rbl. Body and antennae grey-brown, structurally like *R. surientella* Brd., wings larger and wider than in same, reminding one more of *R. majorella* Rbl. (14 k), dark dusty grey with brownish shiny fringes. Forewings 9.5 to 10 mm, expanse 18—18.3 mm, greatest width of forewings being 6 mm. On the Dustje plains near Beirut in Syria at end of April. I have not seen a specimen.

B. Foretibiae of ♂ without spine. The species have whitish grey to whitish wings and white fringes (*Leueheanacanthia* subg. nov. = [*Acentra* Burrows]). In spite of the absence of the spine, I am leaving this nearly related group in the Genus *Rebelia*, owing to the very similar general appearance and the homogeneous casings. HEYLAERTS had actually separated the latter Genus from the *Epichnopteria* particularly on account of the presence of the spine.

*nudella*. **R. nudella** O. (Vol. 2, p. 365, pl. 55 g) (14 k). Is recorded from Switzerland and has been captured in the S. Tyrol, but is not common anywhere. The type specimen originates from around Vienna. All the specimens I have received from France and which were classified as *nudella*, are actually *surientella*. I have not seen definitely certain specimens of this species either from there or from Switzerland. The illustration given represents a hungarian specimen. My austrian and hungarian ♂ specimens have no spine on the foretibiae, as is also the case in the subsequent species, of all of which I have prepared microscopic slides. The illustration in Vol. 2, pl. 55 g is not satisfactory, consequently a fresh illustration is given here. — **balcanica** subsp. nov. (= *vestalis* Rbl. nec Stgr.) (14 k [♂ type]). I have 2 good specimens from Witosch near Sofia before me ex the collection of TRAUTMANN (as *vestalis*). The wings are much wider and shorter, more rounded at apex than *subvestalis* and *nudella*, whiter than in the latter, costa and margin dark grey, similarly the antennae of which the pectinations are shorter than in *nudella*; comparison of lengths 6—7 : 9—10, *subvestalis* 6.5—7. Wing expanse 12—13 mm, *nudella* 14—15 mm. It flies early in the morning of 3rd and 4th July, i. e. later than *nudella*. Bulgaria, Albania.

*vestalis*. **L. vestalis** Stgr. (14 k [♂ type]). According to the 2 original specimens from Sarepta, this must be considered a genuine separate species from *nudella* O. It is smaller and whiter than *nudella* and has entirely differently formed antennae; these are whitish and not dark grey, much finer and more delicate and of all *nudella* forms they have the shortest pectinations. The proportionate length as compared with those of *nudella* is 4—5 : 9—10, whilst a comparison of the expanse of this species is 12—12.5 mm against 14—15 mm of *nudella*. The typical *vestalis* has whitish wings and fringes and only the costa is suffused faintly with darker shade; head and body are with whitish hairs. I only know Sarepta as the locality; all the other *vestalis* I have seen from the Balkans, are a race of *nudella*; those classified from Austria as *vestalis* Stgr. have no resemblance at all to *vestalis* and seem to be a separate but different species.

*subvestalis*. **L. subvestalis** sp. n. (= *vestalis* auct.) (14 k [♂ type]). This species was chiefly obtained by SCHWINGENSCHUSS from Laxenberg in Lower Austria and transmitted to collectors as *vestalis* Stgr. My 4 specimens, ♂♂, hitherto classified as *vestalis* Stgr. in my collection, originated from there. They are smaller than *vestalis*, wing expanse 10.5—11 mm : 12—12.5 mm. The wings are narrower, whitish just slightly more grey than *vestalis*.

\*) *sapho* is illustrated on pl. 14 k and not in Vol. 2, pl. 56 g, so that the erroneous reference in Vol. 2, p. 365, line 8 from top should be deleted.

\*\*) Mitt. E. Schweiz. Ges. XIII, 3/4, p. 206 and XIV, 2, p. 84.



Head and body have darker hairs than the latter. It is easily distinguishable by the much darker, deep grey, robust and denser antennae. Although the wing expanse is smaller, the pectinations are considerably longer than those of *vestalis*, comparative proportion 4—5 : 6.5—7, measured by micrometer. The ♀ before me is dried and not really suitable for description. The head seems to be darker brown. — Casings very narrow, almost cylindrical, smooth, brownish; that of the ♂ 15 mm long, 2 mm wide, of the ♀ 12 mm long, 2—2.5 mm wide. — It differs from that of *nudella* (14 k) by the smaller size, narrower shape of wings, paler whitish colour, shorter pectinations, comparative proportion 4—5 : 9—10 and then before all else, by its biological characteristics : *subvestalis* flies earlier in the year, end of April to end of May, *nudella* however in June. The former emerges in the evening at sunset, *nudella* and *balcanica* however always in the early morning, as REBEL has ascertained of the latter in Bulgaria, and DANNEHL for the former in the S. Tyrol (forenoon in the sunshine), LÖBEL for Carinthia; *subvestalis* inhabits the plains and steppes, *nudella* prefers slopes and sides of the mountains.

## 21. Genus: **Epichnopteryx** Hbn.

### A. The wings without reticulations (*Epichnopteryx*).

**E. pulla** Esp. (= *plumella* Schiff. non descript.) (Vol. 2, p. 366, pl. 55 g). According to VORBRÖDT and *pulla*. KLIMESCH occurs up to 2200 m altitude without any appreciable alteration in size, colouration or scaling. — **montanella** Heyl. (Vol. 2, p. 366) (= *montana* Vorbr. [erratum]; *riffelica* Strd.) from Esterel, Alpes Maritimes *montanella*. is recorded both by VORBRÖDT and PÜNGELER from the Riffelberg, Zermatt, 14th May to 15th July up to 2500 m, by VORBRÖDT also from the Tessin. Larvae up to 2400 m altitude, mid July to early June on grasses. The form strongly resembles the illustration of *Psychidea graecella* MILLIÈRE. Iconogr. II, pl. 77, fig. 8. — **silesiaca** G. Stdfs. (nec Wocke) (14 k). We are giving an illustration of the original specimen from the collection *silesiaca*. of STANDFUSS. It is characterised by Prof. STANDFUSS \*) as “a very enlarged mountain form of *E. pulla* Esp. of the plains, the larvae of which feed through 2 years and which as a constant race is worthy of denomination”. I have in my possession 3 ♂♂ ex the collection of STANDFUSS and captured at Seefeldern near Reinerz, which is the main locality of the type, which he had denominated *silesiaca*. I make the measurement to be 14.5—15 mm, against the author’s 15—18 mm and I do not consider them to be identical with *pontbrillantella* Brd. with which they are placed in a series. The latter have much more elongate and less rounded forewings and are further deeper and darker black. Date of flight is stated to be 28th May to 4th June. Large specimens of 14—14.5 mm expanse occasionally occur among *pulla* and HOFMANN records same from Lahr and I myself have some from Fürth, Nuremberg, also from Rohrseemoos near Kochel, S. Bavaria (OSTHELDER). — **pontbrillantella** Brd. (Vol. 2, p. 366, pl. 55 g) (14 k) also occurs in southern Switzerland in *pontbrillantella*. many localities according to VORBRÖDT, on bushy, dry meadows, in the morning from end of February to end of May. Larva up to 1500 m altitude on grasses. A number of authors hold same to be a genuine species, but I have a number of transition forms from the Tessin, which in part must be held to be *pulla*. — **sibirica** *sibirica*. *subsp. nov.* (15 b [♂ type]). ♂ from Minussinsk (captured 20th June) of the same size and general appearance as *pontbrillantella*, but is less opaque, with prominent veins, dark grey, with rather more elongate wings and slightly shorter pectinations to antennae. Wing expanse 15.5 mm.

**E. sieboldi** Reutti. (Vol. 2, p. 366, pl. 55 h) (15 a). According to the observations of DE ROUGEMENT of *sieboldi*. ♀♀ from the Laquintal in the Valais, this is a genuine species, as the ♂♂ of *sieboldi* were attracted in quantities, whilst no single *pulla* ♂ was attracted. VORBRÖDT records same frequently from Switzerland and the Tessin. It is also known to occur in North and South Tyrol, Styria, Carinthia, Poland and Albania; further I captured same at an altitude of abt. 1300 m in the Vosges (Hohneck on 21st May) in large numbers, varying slightly in size and shape of wings, expanse 11—14 mm. In Alsace it occurs at lower altitudes and below Basle on the Rhine it occurs at abt. 250 m altitude, the wings being 13 mm expanse. — **voelkeri** Trautm. *voelkeri*. According to VÖLKER this appears on the wing at least a fortnight earlier than *pulla* and occurs by preference on warm chalky slopes with scant vegetation, where it flies between 9—11 a.m.

**E. tarnierella** Brd. (Vol. 2, p. 365, pl. 55 g). According to TRAUTMANN this species occurs at Hanover, Bremen, *tarnierella*. Brunswick and Fürth, to SAND in the Dep. Indre, to DE JOANNIS in Dep. Morbihan, to CONSTANT in the Dep. Saône et Loire in central and west France. The form occurring in Holland and S. France probably occurs more frequently than is known and may have been overlooked on account of its smallness. It can be obtained in localities where *Holcus mollis* grows, by sweeping with a sweeping net.

### B. The wings of these minute moths are reticulated. (*Whittleia* Tutt).

**E. undulella** Fisch.-Rös. (Vol. 2, p. 366, pl. 55 h). This was discovered by GELIN at Deux-Sèvres, Marais *undulella*. d’Amuré in W. France on 14th May 1914. — **schwingenschussi** Rbl. (15 a cotype) is a somewhat smaller form *schwingenschussi*. with more elongate wings and darker, coarser reticulations. It occurs at Marchfeld in Lower Austria; it flies on the steppes there in April and is a genuine local race.

\*) Int. Ent. Zeitschrift Gub. 8, p. 144.



*reticella*. **E. reticella** Newm. (Vol. 2, p. 366, pl. 55 h). This has been recorded by MEDER from Husum, north Germany and by KLÖKER from Denmark, by TRAUTMANN from Flensburg, in S. Sweden. It also occurs in N. France flying on forest meadows at the beginning of June and towards 6 p. m. in the evening.

## 22. Genus: **Psychidea** Rmb.

- bombycella*. **P. bombycella** Schiff. (Vol. 2, p. 366, pl. 55 h). This species flies in May, June and July according to the altitude and is found towards the evening on meadows and damp fields. In the mountains it occurs up to a fair altitude and VORBRODT records having taken it at 1400 m altitude on the Mont Chemin and Mayen de Sion in the Valais. DANNEHL mentions having captured it in a smaller, darker, high alpine form, which he incorrectly denominates as *rotundella* Brd., at Sulden in the S. Tyrol at an altitude of 2400 m. He says it is quite common there and he discovered the casings up to 2900 m in the Ortler and Presanella region. — The species varies considerably in size, wing contour, colouration and markings and especially in mountainous territory it is inclined to form local races. For instance — *rotundaria* Brd. (Vol. 2, p. 366) may be held to be such a race. It is reported from the lake of Geneva above Lausanne, but is certainly only found in the Valais, La Forclaz and Giétroz. It is distinguishable by the richer ochreous colour (blond roux), the absence of the reticulation, somewhat smaller size, shorter more rounded forewings, paler head and apparently shorter antennae than the name type form. — *tatricolella* Niel. (15 a [♂ cotype]) denominates a form that NIESIOŁOWSKI caught on the Hohen Tatra in the valley of the 5 polish lakes at an altitude of 1700 m. It is of normal size, has finely reticulate markings on upper and undersides including the fringes and is nicely grey without the ochreous tone of typical *bombycella*. Apex of forewings is not rounded off. The casings were found hidden deep down in the grass; the moths also came to light at night, otherwise however the flight was at 4—6 p.m. According to DANNEHL the moths from higher altitudes are smaller with shorter wings and of deeper colour. Ground colour is more or less dark grey-yellow and usually the reticulate markings are present. Such forms are not identical with the deep yellow ochreous *rotundella* which is devoid of reticulate markings. These small dark dusky specimens are also found on damp hayfields of the plains, such as are to be found around Neudorf, below Basle and in the moist fields on the banks of the Rhine. These specimens seem to prove that these forms occur in varying proportion in any of the colonies. — DANNEHL gives the name *lacteella* to an individual variety, that is small, not reticulated, milky white and glossily hyaline. This was captured at Penegal, S. Tyrol and on the Saualp in Carinthia. It is probably a starvation form.
- helvetica*. **P. helvetica** Trautm. (15 b [♂ type]). Discovered by the author east of Locarno, Tessin, in a shady high alpine forest. It is nearest to *P. proxima* Led. (Vol. 2, p. 366, pl. 55 h). Like same it has in the ♂ sex, dark black-brown colouration of all wings with the grey predominant. In *proxima* the coppery brown tone is more pronounced. It is less densely scaled than the latter, has shorter antennae, pale yellow head and abdominal hairs, somewhat paler yellow glossy fringes and smaller size 7.5 mm forewings: 9—10 mm; wing expanse 16 mm; 19.5 mm according to BRUAND. The specimen in my collection, which so far is unique, gives one the impression of being a different species from *proxima*, as well as of *bombycella*, but it is certainly not, as REBEL seems to assume, a *pectinella* form; it can easily be differentiated from same, as under the microscope, the denser scaling and wider scapulae are clearly apparent. Also the sac, which is in existence, is smaller than that of *bombycella*, more irregularly decorated with coarser projecting grass stalks. As TRAUTMANN records, it was found deep down in a tuft of grass at an angle of 45° with the free end pointing upwards. The imago emerged at the end of June at 5 p.m. The ♀ and larva are unknown. — *retiferella* Wrl. (15 b [♂ type]). This interesting form would seem to be a local race which is smaller than *helvetica*, forewings 7—7.5 mm. I have 16 fairly identical specimens, agreeing in regard to size, wing contour from the Tessin, from Rovio, 500 m, Maroggia 280 m., also from the Grisons, Lostallo, 426 m. It is somewhat paler in colour, more definitely grey hindwings and in contrast to the name type form, it has in fresh specimens a very distinct, dark grey-brown reticulate pattern with pale yellow-grey interstices, which however are generally absent on hindwings. Besides somewhat longer antennae, of abt. ½ length of costa, it has wider forewings, which are rounder at apex. Especially on hindwings the scaling is less dense. According to the width and coordination of the covering scales, this form also has no connection with *pectinella*. ♀, early stages and sacs are unknown and it will only be after further knowledge has been gained regarding the biology of this race and more specimens have been discovered, that one will be able to form a clearer impression of the relationship to *helvetica*, as well as *bombycella* and of these to one another. Possibly all belong to one and the same group of forms.
- apistella*. **P. apistella** Rbl. (15 b) is described as being larger than *helvetica* Trautm. and *proxima* Led. (Vol. 2, p. 366, pl. 55 h), wing expanse 21 mm as against 18 mm in *proxima* and 16 mm in *helvetica*. The wings are wider and more rounded at apex, pectinations of antennae somewhat longer, colouration of wings deeper black-brown, instead of the smoky black of *proxima*. Veins like the latter. *apistella* was discovered on Montegibbio, Modane, Italy, later also found by REBEL at Bologna and in Liguria, is represented in my collection by 2 exactly similar ♂ specimens (Coll. TRAUTMANN), the one labelled “Italia centr.” and the other “Apennines, Bologna, 14. June 1862”, both classified by TRAUTMANN as *proxima*. These specimens have a wing expanse of 19 mm, barely 20 mm; they are therefore not larger than *proxima* from the Altai, of which BRUAND



gives the wing expanse as 19.5 mm (as *ledereriella*), HEYLAERTS even as 20—22 mm, whilst REBEL mentions 21 mm for *apistella*. The original specimens of LEDERER's *proxima*, which are before me, measure 19.5 mm and another specimen 18.5 mm, varying therefore only slightly from my *apistella* from the Apennines; also the wing contour shows scarcely discernible differences. Just as little does the dark grey-brown colouration of one of the specimens, whilst the other is paler brownish. The brown colour would appear to be due to the age of the specimen, because a fresh one from Minussinsk has an almost pure dark grey colour without the distinct brownish sheen. Actually *apistella* has longer pectinations, the proportion is 1.8 : 1.4 to 1.5, also the shaft is thicker (5 : 3) than in any *proxima*, a characteristic which enables one to distinguish the species easily.

**P. pectinella** F. (Vol. 2, p. 366, pl. 55 h). The descriptions hitherto given in literature of the larvae of *pectinella*, this species, all refer to the similar larva of *Oreopsyche muscella*, which has been offered owing to a mistake by hungarian dealers. We owe the description of the genuine *pectinella* larvae to REBEL. They were discovered by ROBERT SPITZ. They are similar to the larva of *bombycella*, smaller, paler inclining to violet-grey, not blackish brown as the latter and their subdivided double rows of dorsal pads, as well as the 3 rows of lateral protuberances are much less prominent than in *bombycella*. When prepared the *pectinella* larva measures 15 mm. — The species is recorded by VORBRODT as occurring in Switzerland in Maroggia, Tessin, Martigny, Stalden in Valais, Simplon; Fahrweid in Zürich. DANNEHL mentions also the South Tyrol.

### c. Subfamily: Fumeinae.

## 23. Genus: **Fumea** Haw. (*Masonia* Tutt).

*Masonia* was based essentially on a slightly larger number of segments to antennae, 20—24, intermediary position of the spine on foretibiae, ·65—71, and insignificant, scarcely constant reduction in the segments of the tarsi of ♀, differences, which in view of BURROWS' authenticated inconstancy of these *Fumea* species, can claim neither generic, subgeneric nor even specific importance. The ♂ genitalia are, according to BURROWS, completely identical. TUTT classified the species *crassiorella* Brd. and *subflavella* Mill. to *Masonia*, as well as a few forms from England, which are however as yet not sufficiently definitely established.

TUTT and CHAPMAN, in creating their species and Genera, have paid especial attention, apart from the number of segments of antennae, to the relative length of the spine of the foretibiae and the position of the spine on same. TUTT expresses by means of a numerical index, the proportion of the length of the foretibia from the juncture of the spine to the extremity of the tibia, as compared to the length of the spine, or according to BURROWS to the over-all length of the tibia. *crassiorella* had an index ·65—71, *casta* ·77—81. According to BURROWS' measurements of CHAPMAN's specimens, these index numbers form a continuous series, so that no definite limit can be fixed for any one species. The variations in measurements differ by at least ·02; in the more highly developed *Psychidae*, the scope of variation in one and the same species can be up to ·05, for instance in *Ps. bombycella* and *R. majorella*. Reliable measurements can only be made by means of microscopic slides and the same applies to the counting of the segments of the antennae. An error in measurement of 0.01 mm would suffice to transplant a species from one to another denomination and according to BURROWS, even to another Genus.

In the *Fumeinae*, as far as I can ascertain, no exact measurements of the spine or of the count of the segments of the antennae have been made over a large quantity of material, so as to enable one to definitely fix the degree of variability in the same species or their relationship to the size of the insect and other factors. It would appear therefore to be incongruous to establish new species and denominate forms, on the basis of minute differences in the index numbers of a few specimens, without there being any other fundamental differences. This more especially when one considers the difficulty in taking exact measurements. For instance in this regard the measurements taken by two authors of the same material, vary quite considerably. BURROWS' measurements of CHAPMAN's material differ materially, for instance in *betulina* from ·04 downwards to ·09 upwards, thus an overall difference of ·13; thereby producing index numbers which overlap into two of TUTT's Genera! In *germanica* the difference amounts to ·07, thus going over into *casta* with ·77—81, in *hibernicella* ·10, in *mitfordella* Chapm. ·06 etc. Through the interloping and overlapping of the indices given for these species, such denominations, which are solely based on these index numbers, must be dropped, unless of course subsequent investigation of large series, proves that there are other essential differences. — Naturally the relative length of the spine is a contributory factor in establishing the subdivision into groups.

A. Wings without reticulation, cellula intrusa absent, pectinations of antennae with scales (*Fumea*).

**F. casta** Pall. (Vol. 2, p. 368, pl. 55 i) (= *bowerella* Chapm., *minor* Chapm., *nitidella* Hbn., *intermediella* *casta* Brd., all based on the number of segments of antennae, varying to the extent of one segment and other minute differences in size). CHAPMAN has separated — **scotica** Chapm. (described as a separate species) *scotica*. from Rannoch and Sutherlandshire, Scotland. It is a robust form, in size of *crassiorella* Brd., or even larger



than same. Forewings 8—9 mm. The index proportion of the foretibia to the spine is  $\cdot 78$ — $\cdot 81$ , (*casta* =  $\cdot 77$ — $\cdot 81$ , according to BURROWS up to  $\cdot 85$ ) whilst it has 19—20 segments to antennae. BURROWS mentions a similarly large and robust *casta* from Scotland with the typical spine of *casta*, so that *scotica* would appear to be nothing else than an especially large and strong race. I have not a specimen before me. — *germanica* *Chapm.* is established as a species from a few ♂♂ from Schwerin, which were first classified as *nitidella* *Hbn.* (= *casta*) and others from Hungary which had been denominated as *affinis* *Reutti* (= *crassiorella* *Brd.*). These were all in the collection of VÖLLSCHOW of Schwerin. According to CHAPMAN the only difference from the typical *F. casta-nitidella* *Hbn.* of HÜBNER, consists in the presence of a fairly long spine in the index proportion  $\cdot 84$ — $\cdot 88$ . However according to BURROWS' measurements of CHAPMAN's specimens, one of VÖLLSCHOW's *affinis* =  $\cdot 81$ , whilst another measures  $\cdot 83$  (*casta* =  $\cdot 77$ — $\cdot 81$ ), so that here also there would appear to be no definite line of demarkation as compared with *casta* and *germanica* can scarcely be retained as a form.

*syriaca.* **F. syriaca** *Rbl.* In build it corresponds precisely to *casta* *Pall.* (Vol. 2, p. 368, pl. 55 i), differing by the much duller, darker black-brown colouration, especially of hindwings. Forewings deep metallic brown, hindwings and fringes of all wings black-brown. Wings and basal half of fringes more densely scaled. Wing expanse 13 mm, forewings 6 mm. ♀ and early stages unknown. I have no specimen before me. Beirut, Syria.

*niphonica.* **F. niphonica** *Hori.* I have no specimen before me. The description is in Japanese.

*mitfordella.* *F. crassiorella* *Brd.* (Vol. 2, p. 367, pl. 55 i). — *mitfordella* *Chapm.* resembles a very small typical *casta*, but forewings are slightly narrower at base. Antennae 17—18 segments, index proportion of spine  $\cdot 71$ — $\cdot 73$  (*casta*  $\cdot 77$ — $\cdot 81$ ). BURROWS in measuring a typical specimen made the measurement  $\cdot 76$ , so that the *casta* index is so closely approximated that this may certainly be included as a *casta* form. The 5 typical specimens are in a bad condition and the locality was not stated or procurable. — *hibernicella* *Chapm.* is smaller than *crassiorella*, it has 19—20 segments to antennae and the length of tibial spine is  $\cdot 67$  and  $\cdot 74$ , resembling a large *casta*. On BURROWS' checking the measurements of the spines of the foretibiae of 3 specimens from Glengarriff, he made the measurements much more namely  $\cdot 77$ ,  $\cdot 77$ ,  $\cdot 76$  and this would indicate a *casta* form, from which in other respects it does not seem to differ materially in any way. — *sorrentina* *subsp. nov.* the darkest of all *Fumea* species. When placed in series it strikes the eye immediately by the deep black-brown wing colour of the ♂. Wing expanse is 12 mm. Antennae with 20—21 segments. Relative length of spine is  $\cdot 71$ — $\cdot 73$ . Hindwings are just as dark as forewings. Body is a still deeper black-brown than the wings, fringes similarly coloured. From Sorrent at 300 m altitude, captured on 16—19th June by STAUDER. Type in my collection. A smaller ♂ of 11 mm from Lagonegro, Calabria, captured on 8th June and in the collection of TURATI should also be classified here.

B. Forewings with reticulation and intracellular cell. Antennae with more than 20 segments. Relative length of spine of foretibiae under  $\cdot 64$  (*Bruandia* *Tutt.*). Pectinations with scales.

*reticulatella.* **F. reticulatella** *Brd.* (Vol. 2, p. 367, pl. 55 i). I have a small specimen from Rehalp, Zürich, where NÄGELI found a number of larvae on 29th May, which emerged on 14th June. It has a wing expanse of 11.5 mm, reticulations faint and of grey colour. Antennae have 21 segments. Relative length of spine  $\cdot 52$ , according to BURROWS *reticulatella* measures  $\cdot 51$ — $\cdot 56$ . In general appearance this form is closer to *comitella*. Similar specimens are obtained in the S. Tyrol and S. Bavaria. — According to WAGNER the species flies at dusk to light in June at Gravosa; the casings are found on the undersides of stones and also on walls and tree stems.

*comitella.* **F. comitella** *Brd.* (Vol. 2, p. 367, pl. 55 i) (15 b). According to DANNEHL this species occurs at an altitude of abt. 1100 to 1800 m in June/July, flying at night, as well as in the early morning and is preferably found in old pine and larch forests, where the casings can be found up to abt. 1 m from the ground. It is local in the S. Tyrol, but occasionally very common in certain localities, for instance on the Mendel Pass. — *saxicolella* *Brd.* (15 b). I obtained several specimens of this form with whitish grey colouration, dark grey margin, fringes and costa, reticulations absent or only faintly indicated. From its build it certainly belongs to *comitella* and not to *subflavella* *Mill.* or *edwardsella* *Tutt.*, although both TUTT and CHAPMAN classified it there. Relative length of spine  $\cdot 62$ . Antennae with 21 segments. From Torbole on Lake Garda.

*subflavella.* **F. subflavella** *Mill.* (Vol. 2, p. 367, no illustration was given) (15 b). The wings are without reticulations, but it is so closely related to the preceding species, that there is no reason to separate same in a Subgenus.

C. Forewings with intracellular cell, wings without reticulation, pectinations without scaly adhesions, relative length of spines  $\cdot 60$ — $\cdot 73$ , according to BURROWS (*Proulia*). Embraces the species *belulina* *Z.*, *eppingella* *Tutt.*, *rouasti* *Heyl.* and *salicolella* *Brd.*

*salicolella.* **F. salicolella** *Brd.* (= *saliciolella* *Stgr.*) (15 b). This species is mentioned by VORBRODT in his book on the Butterflies of Zermatt, as having been bred by PÜNGELER from larvae with black heads found on the stems of small leafed willow. The larvae hibernated and the imagines emerged from 15th June to 28th July. A further locality is Stalden in the Visp Valley. Of these Zermatt specimens I have 1 ♂ and 2 ♀♀, of which one ♀ is inflated and prepared, the other dried. I have also the 3 casings belonging thereto. All bear PÜNGELER's label and inscription: *salicolella* *Brd.*, with the remark: casings at the foot of sunny walls, ♀ on the ground; added to this the locality and the date. PÜNGELER has denominated these as *salicolella*, as well



as similar specimens of DANNEHL from Sarntheim, S. Tyrol. — The ♂ corresponds well with the description of BRUAND, the wings are much more elongate than in *casta* and in colouration like *Bacotia sepium* Spr. Forewings glossy dusky brown, hindwings slightly paler. Wing expanse 12—13 mm. — My ♂ from Zermatt measures 15 mm and is larger than any of my *betulina*; margin is darker, there are minute dark dots at termination of veins, as in *eppingella*. Antennae with 22 segments (*betulina* 21, *eppingella* 25—27), pectinations devoid of scales. The relative length of the spur of the fore tibiae is nearly 70. The casing appears to be almost identical with that of *eppingella* TUTT (Vol. 2, p. 368). It is about midway between that of *betulina* and of *casta* and as was most characteristically described by TUTT. The casing is decorated with Detritus and small fragments of wood and bark and is itself blackish. Usually it has 3—5 longer or shorter stalk decorations arranged longitudinally, partly protruding and extending beyond the tip, just as in *casta* and such as only very rarely occur in *betulina* and in quite isolated instances. The ♂ sac is 8 mm, the ♀ 10 mm long. — This similarity in the composition of the casings and their occurrence on willow trunks (TUTT later on mentioned whitethorn and blackthorn) make it appear probable that *eppingella* is only a smaller form of *salicolella* (which has 25—27 segments to antennae) and that both are very closely related to *betulina*.

## 25. Genus: **Luffia** Tutt.

**L. rebeli** Wlshm. (= *lapidella* Rbl. nec Goeze) (15 a). This occurs on Teneriffe and in many localities *rebeli*. there. Wing expanse 8—12 mm. Antennae bipectinated to three quarters of their length. Head and thorax reddish brown. Forewings silkily glossy, pale stone-grey, rather darker along margins, paler in centre. There are patches with darker scales, one near base diffusing diagonally over the cell towards the costa, a second one in the form of a transverse band approximately before the centre and two or three in the outer half of the costa. Fringes glossy and silky, basal half pale bistre. Hindwings pale bluish grey, fringes paler and more glossy. Abdomen like hindwings, legs pale stone-grey. It is much larger than *lapidella* Goeze and the markings are clearer. The narrow cylindrical casings are frequent on rocks and stone walls. The larvae feed on stone lichens and are very difficult to breed.

## Postscript.

*Auchmophila kordofensis* Rbl. is indicated as occurring in palaearctic Egypt, in the Novitates Macrolepid. of BANG-HAAS I, p. 152 and II, p. 175 and in the Catalogus Lepidopterorum STRAND 1929, p. 130. However none of the localities mentioned by REBEL are situate north of the 15°: Dueim 14—15°, Sennar 13—14°, Nubaka 12—13°, Dilling 12°, Gulfan 11—12°, all therefore in the anglo-egyptian Sudan, Kordofan, none in palaearctic Egypt. The species must therefore be considered a purely ethiopian one and is dealt with and illustrated in Vol. 14, p. 485, pl. 72 h.

## Alphabetical List

with references to the original descriptions of the forms of palaearctic *Psychidae*.

\* signifies that the form is also illustrated in the place cited.

**apistella** Psychidea Rbl. Verh. Zool.-Bot. Ges. Wien 1917, p. (136).

**balcanica** Rbl. Wrli. Seitz Macrolep. Suppl. 2, p. 220. \*

**bavarica** Rbl. Wrli. Mitt. Münch. Ent. Ges. (1926), p. 98.

**berytella** Reb. Rbl. Verh. Zool.-Bot. Ges. Wien 1917, p. (134).

**biroi** Oreops. Rbl. Verh. Zool.-Bot. Ges. Wien, 16, 1915, p. (90). \*

**caucasica** Am. O. B.-H. Iris 26 (1912), p. 109.

**colossa** Oreops. Bang-H. Iris 1917, 20, p. 87.

**contrastella** Sterrh. Kozhant. Jahrbuch d. Martjanovschen Staatsmuseums, Minussinsk, Sib. 1928, Bd. VI, 1, p. 72.

**desertorum** Oreops. Trti. Atti Soc. It. Sci. Nat. 1927, p. 322. \*

**germanica** Fumea Chapm. Ent. Record 1900, XII, p. 125. \*

**gracilis** Cochl. Spr. Stett. Ent. Ztg. 41 (1886) p. 335.

**hetvetica** Psychidea Trautn. Int. Ent. Ztschr. Guben 1915, p. 204.

**hibernicella** Fum. Chapm. Ent. Record 1900, XII, p. 123. \*

**iliensis** Acanth. Wrli. Int. Ent. Ztschr. 21, p. 454.

**kordofensis** Auchm. Rbl. Sitz.-Ber. Ak. Wiss. Wien 1906, 115 (I), p. 72. \*

**kruegeri** Reb. Trti. Atti Soc. Ital. Sci. Nat. 1914, V. III, p. 577. \*

**kurenzovi** Sterrh. Filipj. Ann. Musée Zool. Ac. Sci. U.R.S.S. 1927, p. 261. \*



- laeteella Psychidea *Dhl.* Ent. Ztschr. Frankfurt 42, p. 115.  
 laeteseens Psyche *Oberth.* Bull. Soc. Ent. Fr. 1910, v. 78, p. 333.  
 lefevrei Am. *Oberth.* Ét. Lép. Comp. 19 (I), p. 140. \*
- majorella Reb. *Rbl.* Berge's B'fly Book 1910, p. 459.  
 mauretanica Am. *Rotsch.* Nov. Zool. 20 (1913), p. 140.  
 mitfordella Fum. *Chapm.* Ent. Record, 12, p. 122. \*  
 moncaunella Oreops. *Chapm.* Ent. Record, 15. (1903), p. 325. \*  
 montana Epichn. *Forbr. (Heyl.)* Int. Ent. Ztschr., 1928, p. 434.
- niphonia Fum. *Hori Kontyu* (Insecta) Tokyo I, 1926, p. 28.  
 nivellei Psyche *Oberth.* Ét. Lép. Comp. 19 (I), p. 141. \*  
 nylanderii Cochl. *Wrli.* Ent. Ztschr. Frankfurt. 31, p. 331.
- orophila Acant. *Wrli.* Int. Ent. Ztschr. 21, p. 454.
- pectinata Cochl. *Chrét. Oberth.* Ét. Lép. Comp. 19 (I), 1922, p. 142.  
 perpallida Psyche *Heckel* Insektenbörse 18 (1901), p. 261.  
 powelli Cochl. *Oberth.* Ét. Lép. Comp. 19, 1, p. 141. \*
- rebeli Luffia *Wlism.* Proc. Zool. Soc. Lond. 1907, p. 1027. \*  
 retiferella Psychidea *Wrli.* Societ. Entom. 38 (1923), p. 26. \*
- riffellia Epichn. *Strd.*, Lepid. Cat. Pars 34, (1929), p. 95.
- sajanella Sterrh. *Kozhant.* Jahrbuch Martjanov. Staatsmus. Minussinsk. Sib. VI, 1928, p. 72.
- schwingenschussi Epichn. *Rbl.* Berge's B'fly Book 1910, p. 460.  
 scotica Fum. *Chapm.* Ent. Record 12, 1900, p. 125. \*  
 sibirica Epichn. *Wrli.* Seitz Macrolep. Suppl. 2, p. 221. \*  
 silesiaca Epichn. *Stdfs.* Ztschr. Entomol. Breslau 1850, p. 55.  
 sorrentina Fum. *Wrli.* Seitz Macrolep. Suppl. 2, p. 224.  
 standfussi Sterrh. *Wocke* Ztschr. Ent. Breslau (1851), p. 16.  
 stauderi Cochl. *Wrli.* Soc. Ent. 28 (1923), p. 25. \*  
 subvestalis Reb. *Wrli.* Seitz Macrolep. Suppl. 2, p. 220. \*  
 syriaca Fum. *Rbl.* Verh. Zool.-Bot. Ges. Wien 1917, p. (137).
- tatricolella Psychidea *Nies.*, Polska Ak. Umiejetnosci. Prace Mon. Kom. Fiziogr. Krakowie 1929, V, p. 87, Sep.
- taurica Am. *Wrli.* Seitz Macrolep. Suppl. 2, p. 214. \*
- vorbrottella Sciopt. *Wrli.* Verh. Naturf. Ges. Basel 31 (1920), p. 24. \*
- zabeth Hyal. *Le Cerf* Bull. Soc. Ent. Fr. 1924, p. 27.



## 24. Family: Thyrididae.

By M. GAEDE.

### 1. Genus: **Thyris** Lasp.

*T. fenestrella* Scop. (Vol. 2, p. 371, pl. 50 e). As mentioned in the Main Volume specimens from southern Europe have smaller vitreous spots. Of such specimens the paler spanish form *nevadae* Oberth. was already discussed in Vol. 2. In contrast to same a race flies in Italy (Genoa, Modena, Capri) named: **nigra** O. B.-H. *nigra*. (16 b) which is very dark, almost black. The coppery spots and dots are entirely absent, the fringes and legs are also almost entirely black. Specimens also occur in Mesopotamia in which the hyaline spots are somewhat smaller, the other markings scarcely vary from german specimens. A somewhat larger form seems to occur at Ta-t sien-lu.

### 3. Genus: **Dysodia** Clem.

*D. ignita* Wkr. The variability of this species was mentioned in Vol. 2, p. 372 and a few of the more common forms were mentioned as synonyma. Amongst them also **siculoides** Fldr. (16 a), which is enumerated *siculoides*. in the indian part of this work (Vol. 10, p. 744). As latterly denominations are recognised for quite insignificant subforms, we are giving an illustration of *siculoides* here (16 a). According to PAGENSTECHER the outstanding feature of this form is the absence of the hyaline spot on forewings. As this also occurs in specimens taken at Kashmir, this form is thus found on palaearctic territory.

### 7. Genus: **Striglina** Gn.

**St. fixseni** Alph. This species was described in 1897 from a pair captured in Corea. Since that time *fixseni*. only 1 further ♂ appears to have been caught by LEECH. Ground colour agrees with that of *scitaria* Wkr. dealt with in Vol. 2, p. 373, pl. 50 f. The marking of the lines however varies considerably. The line in *scitaria* that traverses the wings is much more steeply oblique. Besides this a further line occurs posteriorly, which commences at costa slightly before the other line, circumvents same in an arc and then proceeds approximately parallel to the outer margin not extending however as far as the inner margin. On hindwings the chief line, that corresponds to that of *scitaria*, is angulated outwards in the centre of the wing. The second line runs parallel to same about in the middle of the outer area. 26—32 mm.

### 9. Genus: **Rhodoneura** Gn.

**Rh. parallelina** Leech. ♂ pale cinnamon brown, ♀ somewhat darker. Markings the same in both sexes. *parallelina*. Wings with dark brown striations. On forewings two approximately parallel black transverse lines traverse the centre. The first is angulated below costa. The second is conjoined to costa by a short black line. Another line proceeds from costa near apex to the middle of outer margin. On hindwings there is a curved black inner line and a fine line corresponding to the apical line of forewings. 30—32 mm. Central China.

### Genus: **Camptochilus** Hmps.

This Genus is dealt with in Vol. 10, p. 768. A species is now classified here that originally was described as *Pyrinioides* Btlr., then placed by HAMPSON to the Genus *Rhodoneura* and finally again described by WARREN as *Camptochilus*.

**C. aurea** Btlr. (= *divergens* Warr., *schedeli* Gaede) (16 a). Ground colour orange-yellow with fine dark *aurea*. brown striations. A double line proceeds from three quarters of costa of forewings to centre of inner margin and from the same spot two further lines originate, one proceeding to anal angle and the other to the



centre of outer margin. Anterior to same on costa a grey-violet spot. On hindwings similar but fainter lines. 22—27 mm. Japan.

In MATSUMURA's work "6000 Illustr. Insects of Japan" there are besides a number of descriptions of Japanese species in the Japanese language and monocoloured illustrations.

*Strigina suzukii* is probably the same as *Stgr. glareola-duplicifimbria* Warr., *Rhodoneura sugitanii* = *Rh. acaciusalis-strigatula* Fldr.

*fallax*. **Rh. fallax** Mats. can be described as an *exusta* Btlr., in which the basal area is lighter on both wings, so that the central band is more clearly outlined inwardly. The outer band, which is only indicated partially in *exusta*, proceeds here uninterruptedly over both wings and crosses the subapical band of forewings, as it extends right to the costa. Japan.

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### Alphabetical List

with references to the original descriptions of the forms of palaearctic *Thyrididae*.

\* signifies that the form is also illustrated in the place cited.

*aurea* Campt. Btlr. Trans. Ent. Soc. Lond., p. 200 (1881).  
*fallax* Rhod. Mats., 6000 Ins. Japan. p. 960.  
*fixseni* Strig. Alph. Mém. Lépid. Roman. 9, p. 167. \*  
*nigra* Thyris O.-B.-H., Iris 24, p. 32.  
*parallelina* Rhod. Lecch. Trans. Ent. Soc. Lond. p. 377 (1898).  
*siemloides* Dys. Fldr. Reise Novara Lep. 2. Taf. 75. \*

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24 a. Family: **Aegeriidae**.1. Genus: **Aegeria** F.

*Ae. apiformis* Cl. (Vol. 2, p. 376, pl. 51 a). In the typical form the tibiae and tarsi are uniformly rusty brown. — **brunneipes** Trti. from Sardinia has middle and hind tibiae and tarsi dark brown outwardly and *brunneipes* yellowish inwardly. Costa of forewings is slightly darker.

**Ae. yezoensis** Hmps. Antennae brown, yellow on upperside at base. Palpi almost completely yellow. *yezoensis*. Body dark brown with leaden sheen. Tegulae reddish yellow. The 3rd abdominal segment is yellow, the three terminal segments dusted with yellow. Underside red-brown. Tibiae and tarsi yellow-red. Forewings hyaline yellowish. Veins and margins brown with silvery sheen, base dark brown. Above the inner margin a coppery brown streak. Disco-cellular diffuse reddish yellow, similarly below costa near apex. Hindwings yellowish hyaline, margins narrowly brown. ♀ 45—48 mm. Japan.

**Ae. molybdiceps** Hmps. Antennae dark brown, yellow at base. Palpi yellow, with yellow-red and black hairs on underside of tip. Body dark brown with leaden gloss. Tegulae with yellow edges on top and patagia with yellow inner edges. A yellow belt on 1st segment of abdomen. The 2nd and 3rd segments with bright red dusting, 4th segment yellow-red. Underside bright brown, each segment having a yellow-red band. Tibiae and tarsi yellow-red, hind tibiae edged at extremities outwardly with fire-red, inwardly with black-brown. Forewings hyaline yellow, veins and margins brownish red with silvery sheen. Disco-cellular a brilliant orange-red, similarly a streak near the apex. Apical area a rich brown, before the margin red-brown triangles in the interstices between the veins. Hindwings hyaline yellow. ♀ 40—44 mm. Japan. *molybdiceps*.

**Ae. pistarcha** Meyr. Antennae and body blue-black. Palpi yellow with black spot. Tegulae edged with yellow. A bold yellow ring on 1st segment of abdomen, the 2nd and 3rd with narrow yellow edges, the 5th and 6th more heavily yellow, the 4th entirely yellow. The terminal half of abdomen yellow on underside. Legs yellow and black. Forewings hyaline, veins and margins black, only the costa orange-red to beyond end of cell and the inner margin at base. Also the costa near apex and outwardly of the disco-cellular orange-red. The outer half of the marginal area is dull reddish intersected by the black veins. Hindwings hyaline. Fringes of both wings dark grey. ♀ 16 mm. Morocco. *pistarcha*.

2. Genus: **Sphecia** Hbn.

*S. crabroniformis* Lewin (Vol. 2, p. 378, pl. 51 a). — **incognita** Strd. (Warnecke) is an aberrative specimen *incognita*. from Thuringia of an albinotic tendency. Antennae are still normal and black, the yellow patches on head and abdomen are also normal. The whole body however is a pale olive grey, where normally it is deep black. Margins of wings are pale brown, distinctly paler than usual. The legs are approximately as in normal specimens. — **orophila** Zukow. is a mountain form and the counterpart to the preceding. It is smaller (27—30 mm against 35—42 mm). All veins and margins of wings are blackish, base of wings slightly reddish. Ground colour of abdomen inclines to a greenish yellow. From Sulden (S. Tyrol). *orophila*.

**S. montelli** Löfq. is close to *crabroniformis* (Vol. 2, p. 378, pl. 51 a). Head grey-black, collar widely yellow. Thorax grey-black. Abdomen darker than in *crabroniformis*. A brown tuft of hair laterally on 1st segment, otherwise segments 1—6 black, the 3rd to 6th segments anteriorly with varyingly wide yellow edges. The 7th segment delicately dusted with yellow, anal tuft brownish yellow. Both wings like those of *crabroniformis*, the disco-cellular on forewings is said to be somewhat nearer the base. All 3 tibiae blackish, the hind tibiae with white central band. ♀ 40—44 mm. Finland. *montelli*.



- gloriosa*. **S. gloriosa** *Le Cerf* (= *mandarina Le Cerf*) (16 c). Antennae black, head white with red hairs. Collar and patagia yellow. The latter with brown spot anteriorly and at base of forewings. Thorax black brown in centre, posteriorly yellow. Of abdomen the first 2 segments are brown with black edges, the others lemon yellow. The 3rd to 5th segments have black edges, the 4th and 5th besides a tinge of red-brown. Underside of abdomen is yellow, all segments with black-brown edges. Wings hyaline. Forewings with rusty red veins and margins, a bold yellow spot at base. On hindwings veins and outer margin are delicately rusty red. Base and inner margin lemon yellow. Fringes brown. Legs yellow and brown. 50 mm. Thibet.
- oberthüri*. **S. oberthüri** *Le Cerf* (16 d). Head black with white and yellow patches. Collar yellow. Thorax black-brown. The first 5 segments of abdomen are black-brown, only the 3rd has a narrow anterior yellow-red edge, the 6th is yellow anteriorly and black-brown posteriorly. The last two segments are yellow merging into black-brown. Anal tuft of ♂ is brown. Underside brown, all segments with wide black edges. Wings hyaline, black at base, margins red-brown. Legs predominantly red-brown. 40—42 mm. Tze-ku.
- asamaensis*. **S. asamaensis** *Hmps.* Antennae brown, more reddish underneath. Body dark brown, tegulae ochreous. Thorax red-brown behind the patagia. Abdomen with narrow yellow-red belt behind the 2nd segment and diffuse bands on two terminal segments. Anal tuft and legs predominantly yellow-red. Forewings hyaline, veins and margins reddish brown with leaden gloss. Disco-cellular red-brown, similarly a diffuse band behind the cell. Hindwings hyaline yellowish. ♀ 34 mm. Japan.
- 3. Genus: Melittia Wkr.**
- gigantea*. **M. gigantea** *Mr.* (Vol. 10, pl. 94 d). This species, that is dealt with in the Indo-australian part of this work (Vol. 10, p. 790), extends into Corea and Japan. Thorax dark brown. Wings hyaline, disco-cellular widely black, similarly the apical area, so that the outer vitreous area is approximately circular. Costa is ochreous brown. Hindwings with delicate dark edges. Legs yellow-red, edged inwardly with yellow hairs. Tarsi black. 44 mm.
- staudingeri*. **M. staudingeri** *Bsd.* (16 d). This species is described from Sikkim (vide Vol. 10, p. 790) from the northern boundary of the Indian territory and it may be assumed that it penetrates from there into palaearctic regions. We are therefore giving an illustration here.
- gephyra*. **M. gephyra** *Amsel.* This is close to *M. houlberti Le Cerf* (= *aureosquamata Wallgr.*, Vol. 14, pl. 77 g) from Uganda. Antennae black. Palpi, head and thorax reddish yellow. Abdomen blue-black, only the tip reddish yellow. Legs blue-black, only the fore tibiae yellow-red. Forewings dark lustrous blue, hindwings glossy violet blue. Fringes of both wings black. ♀ 31 mm. Jericho.
- japona*. **M. japona** *Hmps.* This name must be introduced for *eurytion Bartel* in Vol. 2, p. 371, pl. 51 c. The genuine *eurytion Ww.* belongs in the Indo-australian territory, but extends as far north as Formosa and is therefore illustrated in Vol. 10, pl. 95 f.

### 3a. Genus: Lenyra Wkr.

This Genus is otherwise only represented by 1 species each from India and Madagascar. It resembles *Melittia*, but the neuration varies somewhat. In forewings veins  $9 + 7 + 8$  are stalked. In hindwings vein 3 and 4 arise from a point.

- simonyi*. **L. simonyi** *Rbl.* Quite blue-black. Palpi, collar, tips of patagia rusty yellow. On hind tibiae the inner spurs have white scales. Forewings slightly lustrous greenish. Hindwings also densely scaled. ♀ 32 mm. S. Arabia. (The actual locality is situated in Ethiopian territory, but its distribution in palaearctic regions, in the unexplored wastes of Arabia, is not improbable. We are therefore giving the description here, particularly as it is omitted in Vol. 14).

### 4. Genus: Paranthrene Hbn.

- tabaniformis* *Rott.* (Vol. 2, p. 380, pl. 51 b). Already in Vol. 2 mention was made of the fact that in northern districts (Berlin, Saxony) specimens occur with 5 irregularly wide belts on abdomen, with antennae scarcely paler than in *tabaniformis*. These were hitherto held to be transition forms to the southern *rhingiaeformis* *Hbn.* (Vol. 2, p. 380, pl. 51 b) and were even denominated as *annulifera Closs.* LE CERF has however discovered that this is the typical *rhingiaeformis* *Hbn.* (described from Saxony). We are therefore now illustrating (16 d) this form. — The species formerly illustrated (Vol. 2, pl. 51 b) as *rhingiaeformis*, should actually be denominated **synagriformis** *Rmb.*, described from Malaga and occurring in S. Europe and N. Africa. RANGNOW has demonstrated in breeding experiments carried out in Macedonia, that this form with its yellow thoracical spots and pale antennae should actually claim specific rights. The larva differs by its red-brown head from the typical *tabaniformis*, the head of which is black-brown. It feeds in willow trees and reaches full growth in one year. Pupation takes place in the burrow. The *tabaniformis* larva feeds in poplar trees and takes two



years to mature, pupation taking place in a cocoon. — **intermedia** *Le Cerf* (16 d) resembles *synagriiformis* in *intermedia*. the ♀ sex having the same yellow patches on thorax and abdomen. The ♂ is relatively small. Thorax has no yellow spots on upperside. On abdomen the yellow belts are absent on the 1st, 4th and 5th segments on the upperside. The 2nd and 3rd have equally wide lateral yellow edges, the 6th and 7th are quite yellow. Both in ♂ and ♀ forewings have a narrow long vitreous strip in and below the cell. N. Africa. — **diaphana** *Schaw.* *diaphana*. Four specimens of this have been captured in Bosnia. The yellow patches of body are slightly paler than usual. Forewings are hyaline. Only the costa, inner margin and disco-cellular being reddish yellow. Outer margin and fringes pale brown.

**P. aurantiacum** *Rbl.* Somewhat similar to *tabaniformis* *Rott.* (Vol. 2, p. 380, pl. 51 b). Antennae long, orange yellow, the lamellae black, brownish at tip. Palpi yellow and orange. Collar yellow at the sides. Patagia with narrow yellow edge, a yellow spot at base of forewings. The 2nd, 4th and 7th segments of abdomen with yellow edges. The 3rd segment is yellow underneath. Fore femora yellow outwardly, otherwise the legs are orange yellow. Forewings narrow, dull orange with black veins and margin. The cuneiform and longitudinal areas are narrow and short, somewhat hyaline behind the cell above vein 3. Hindwings vitreous, disco-cellular orange yellow, the other veins yellow-brown. On underside the scaling of both wings is pale orange yellow. ♂ 32 mm. Amanus mountains.

**P. insolitus** *Le Cerf* (16 d). Body black. Thorax and patagia with a few yellow dots. The 2nd, 6th and 7th segments of abdomen with yellow edges. Anal tuft with a few yellow hairs. On underside all segments with yellow edges. Legs predominantly yellow. Forewings reddish brown, black towards base, with a yellow basal spot on costa. A long narrow hyaline streak in and below the cell. In outer area a similar vitreous spot between veins 3 and 4. Hindwings hyaline, veins and marginal line delicately reddish brown. Underside of forewings paler yellowish. ♂ 30 mm. Akbès.

**P. davidi** *Le Cerf.* Body longer, similar to *bicincta* *Wkr.* (Vol. 2, p. 380, pl. 50 k). Body metallic black. Abdomen with narrow yellow edges on 2nd and 4th segments. Anal tuft with a few white hairs at sides. Forewings blackish brown. The areas in and below the cell are hyaline, diffusedly so up to the end of cell. Hindwings quite hyaline with finely marked black disco-cellular and margin. Differing only materially from *bicincta* *Wkr.* by the slight vitreous area in forewings. ♂ 27—29 mm. Moupin.

**P. pernix** *Leech.* The species was described by the author as a *Bembecia*. In Vol. 2, p. 409 it was placed under the *Chamaesphecia*. According to LE CERF it should be placed here and it can be described as a *davidi* with somewhat different belts on abdomen.

**P. daisensis** *Mats.* Similar to *ferale* *Leech* (Vol. 2, p. 380, pl. 51 d). Black-blue. Tegulae with orange yellow anterior edge. The 4th segment of abdomen with wide orange yellow band, a narrower one at sides of 2nd segment. On forewings there is a narrow subhyaline stripe in the cell and a shorter one below same. Hindwings entirely hyaline. ♂ 42 mm. Honshu (Japan).

**P. yezonica** *Mats.* Palpi anteriorly orange yellow. Body reddish brown with black-brown scales. Abdomen metallic steel blue. An orange yellow belt on 4th segment expanding on underside. Legs black-brown. In ♂ the antennae are serrate. ♂ 38 mm. Hokkaido.

**P. hirayamai** *Mats.* Body reddish brown with darker scales. Tegulae whitish. The 2nd and 4th abdominal segments with a whitish yellow band, a white lateral mark on 6th segment. Legs dark with yellow patches. Forewings dark brown, coppery brown in centre. The veins and disco-cellular darker. Hindwings hyaline, veins and margins coppery brown. Fringes of both wings dark grey. ♀ 20 mm. Honshu.

## 6. Genus: **Synanthedon** *Hbn.*

*S. flaviventris* *Stgr.* (Vol. 2, p. 384, pl. 51 d). This species is also found in England, partly in typical specimens, partly in aberrative forms. In the latter the black patches of forewings are more or less densely dusted with orange yellow. This occurs at base, costa, inner margin and especially heavily on disco-cellular. At outer margin however there are only traces of yellow scales: **fulva** *Trnr.*

*S. cephiiformis* *O.* (Vol. 2, p. 384, pl. 51 d). In **fumosa** *Schütze* the usually yellow patches on body, palpi and legs are a brown-yellow. The hairs at base of both wings are grey. This form was once bred in Saxony, a number of specimens being obtained.

*S. conopiiformis* *Esp.* (Vol. 2, p. 385, pl. 51 d). Specimens from Vendée in which the yellow belts on abdomen and the yellow legs are about as striking, as illustrated in Vol. 2, pl. 51 f for *ichneumoniformis*, are named: **lucasi** *Le Cerf* (16 e).

*S. vespiiformis* *L.* (Vol. 2, p. 385, pl. 51 e). — **polycincta** *Le Cerf* (16 e) is a similar variety to *lucasi* just described above. On abdomen of the ♂ the yellow bands are closely compressed together, only at base a stretch is free of them. This form is found in Spain.



*S. melliniiformis* Lasp. Described from Saxony and dealt with in Vol. 2, p. 385, but not illustrated. An illustration is now being given (16 i).

- codeti.* **S. codeti** Oberth. (16 e). According to LE CERF this is not a form of *vespiformis*, but a genuine species.
- atavus.* A number of subforms are described. — **atavus** Le Cerf occurs at Sebdou in Algeria among typical specimens;
- inversa.* the fore femora have wide yellow edges. — **inversa** Le Cerf (16 e) has base of forelegs yellow. The 4th to 7th abdominal segments are yellow on underside with a black band at base. Forewings of typical colouration. The outer hyaline patch is said to be quadrangular, as wide as the black margin. In the ♀ the forelegs are quite black. The 3rd to 5th abdominal segments are yellow on underside, the 6th having only a few yellow scales. On forewings the disco-cellular is said to be somewhat narrower and the outer margin rounded at the hyaline patch. On upperside the abdomen of ♂ and ♀ has a yellow ring at base and at tip. Besides there is
- maroccana.* a yellow belt on 5th segment which is wider in the ♀. — **maroccana** Le Cerf. In both sexes there is a narrow yellow abdominal ring on the 2nd segment. In the ♂ there are a few yellow hairs on the last segment. The black scaling at outer margin of forewings is very wide, covering the fork in veins 7 + 8. It is bestrewn with pale yellow scales, so that the general impression is one of a grey colour. In the ♀ the 4th to 6th segments of abdomen are completely yellow on upperside. On forewings the hyaline patch extends beyond
- almohades.* the fork of veins 7 + 8. A pair of this form has been captured. 15 mm. Cape Spartel. — **almohades** Le Cerf like the previous form, has 3 yellow bands on abdomen, but has a greater preponderance of yellow. The yellow dusting of the patagia is very heavy at their base and this extends to the centre of inner margin. Thorax is posteriorly entirely yellow. The 4th abdominal segment is yellow on upperside with black base, the edges of the 2nd segment are almost as bold as in the 6th. Forewings correspond to those of typical *codeti*, having a wider dark marginal area than the outer hyaline spot. The inner edge of the marginal area is straight and it covers the fork of veins 7 + 8. The patagia of the ♂ less widely yellow. Thorax is black posteriorly, only a few yellow scales in centre. The 2nd abdominal segment is a deeper yellow on
- kabylaria.* upperside. 15—20 mm. Cordoba, Granada. — **kabylaria** Le Cerf (16 d). This occurs at Constantine and like *maroccana* it has 3 yellow bands on abdomen and the base of forelegs in both sexes is yellow. It is larger than all the other races. In the ♂ the yellow scaling posteriorly on thorax is narrow. The edge of 2nd abdominal segment is narrower on upperside, that of the 6th segment consists only of a few scales, whilst on underside of last segment there are no yellow scales at all. On forewings the marginal area is only faintly dusted with yellow-red. There is no yellow line at base of patagia. In the ♀ the thorax is anteriorly even less yellow than in the ♂. The edge of the 6th segment is as narrow as that of 2nd, the band on 4th segment is narrower in the centre. On underside the 4th and 5th segments are only half yellow, the edge of the 6th is as narrow as on upperside. 18—22 mm. — In typical *codeti* Oberth. the 4th and 7th segments of abdomen are yellow with black base on upper and undersides, the 6th is only in exceptional cases edged delicately with yellow on upperside. On underside the middle of the 5th and 6th segments is yellow. In contrast in the ♀ the 4th segment of abdomen is completely yellow on upper and undersides, the 5th and 6th only having a yellow edge on underside. — In regard to the food plant a mistake was made in Vol. 2, p. 385, it should have read tamarisk and not tamarind.
- bicingulata.* **S. myopaeformis** Bkh. (Vol. 2, p. 385, pl. 51 e). — **bicingulata** Rbl. has also base of abdomen red, whilst in the type only the 4th segment has a red belt.
- S. cruentata** Mann (Vol. 2, p. 387, pl. 52 a). We have to add here the name *mutillaeformis* Godt. to the synonyms. Among the many specimens bred from Catania, where the species is common, there are 3 ♂♂ with scarcely any red scales on centre of abdomen. The forelegs are black and in one instance the white
- lugubris.* colouration of the tip of the antennae is absent: **lugubris** Ragusa.
- theryi.* **S. theryi** Le Cerf (16 d). Antennae black on upperside, on outer edge and on underside reddish yellow, except at tip. Thorax with a few yellow dots. Abdomen black-blue on upperside. The 4th and 7th segments quite yellow, the 2nd and 6th with wide yellow edges. Anal brush with 3 tufts, yellow in centre. Underside yellow, only the anterior half of the 4th and the base of the 8th segments black. Wings hyaline and very elongate. Veins and margins black. The disco-cellular narrowly orange red. On hindwings the veins are delicately black. Legs black and yellow. ♂ 18 mm. Algeria.
- insidiosa.* **S. insidiosa** Le Cerf. Very like *velox* Christ. (Vol. 2, p. 388, pl. 51 e). Antennae, palpi and body black. The 4th and 6th abdominal segments with narrow white edges on upperside. Wings hyaline. There is a snow white spot at base of forewings. Veins and margins blue-black. The disco-cellular outwardly with orange red spot. Similar coloured scales at base of cell and at inner margin. On hindwings the base is somewhat more widely black. Veins and margins narrowly black. On underside the forewings are suffused with pale yellow, the disco-cellular of hindwings is orange red on upperside. Legs black, hind tibiae with a few orange red hairs. ♀ 20 mm. Nanshan.
- mimus.* **S. mimus** Le Cerf (16 e). Very close to *andrenaeformis* Lasp. (Vol. 2, p. 383, pl. 51 d). Antennae blue-black on upperside, brown underneath. Thorax blue-black, collar with yellow scales at the sides. Abdomen blue-black, the 2nd, 4th and 7th segments with pale yellow edges on upperside. There are also yellow hairs in centre of anal tuft. On underside the 4th to 6th segments are completely white, the 8th yellow. Legs black with white patches.



Wings hyaline. Veins and margins of forewings black. The hyaline patch behind the cell is very large, but the margin still covers the spot where veins 7 + 8 divide. Hindwings similar, with yellow costal margin on underside. ♂ 16 mm. Macerata (Italy).

**S. moupinicola** *Strd.* The entire body is bronze black with blue gloss. Legs black with a few white patches. There do not appear to be any coloured belts on abdomen. Wings hyaline. Disco-cellular nervure of forewings is broad and somewhat oblique. The outer margin is parallel to same and straight. The dividing point of veins 7 + 8 is still in the hyaline patch. On hindwings only the anterior part of the disco-cellular is black. ♀ 27 mm. Moupin. *moupinicola.*

**S. martjanovi** *Shelj.* Similar to *tipuliformis* *Cl.* and *flaviventris* *Stgr.* (Vol. 2, pl. 51 d). The entire body black with blue gloss. The 4th and 6th segments of abdomen with yellow belts, that of the latter with white edge on underside. Anal tuft yellow in centre on upperside. Legs black-brown, mid and hind tibiae with white rings. ♂ 18 mm. East Siberia. *martjanovi.*

*S. nihonica* *Bartel* (Vol. 2, p. 388, pl. 50 g) is synonymous with *Conopia quercus* *Mats.* Further MATSUMURA has described a number of *Conopia* species, which we are here enumerating under *Synanthedon*, as also other species, which were classified under *Synanthedon* in Vol. 2, have been designated by him as *Conopia*.

**S. chibensis** *Mats.* Body yellowish brown to dark brown. A few spots and streaks on thorax. The edges of all the segments of abdomen are yellow, those of the 4th and 7th being widest. Legs yellow with black patches. Wings hyaline. Veins and margins of forewings black. Vein 2 is absent, 7 + 8 stalked. ♂ 26 mm. Japan. *chibensis.*

**S. chosensis** *Mats.* Palpi orange-yellow, black laterally. Head black, tegulae white. Abdomen with 3 narrow yellow belts. Legs black with yellowish white patches. Wings hyaline. Veins and margins of forewing black. Costal margin and disco-cellular nervure widely black, marginal area dusky. ♂ 18 mm. Corea. *chosensis.*

**S. galloisi** *Mats.* Body black. Palpi, patagia, legs, belts of abdomen and underside yellow. Legs with black patches. Wings hyaline, veins of forewings black. Disco-cellular nervure with orange-yellow outer edge. Thence upwards to apex yellow-red scales. Hindwings with yellow-grey costa. ♂ 25 mm. Corea. *galloisi.*

**S. producta** *Mats.* Similar to *hector* *Btlr.* (Vol. 2, p. 383, pl. 51 d) differing by the patch at disco-cellular nervure which in this case forms an arc inwards. The 2nd and 4th segments of abdomen have yellow belts, of which the latter is wider and is complete on underside. Palpi and patagia are whitish. ♂ 20 mm. Hokkaido. *producta.*

## 7. Genus: **Dipsosphecia** *Spul.*

*D. dispar* *Stgr.* (Vol. 2, p. 389, pl. 52 a). Two sub-forms have been described. The genuine *dispar* in the ♂ is somewhat brownish yellow also at outer margin on forewings. Inner margin of hindwings is yellowish. The anterior part of the underside of abdomen has no pale bands. The ♀ has a blue-black body, forewings and hindwings are dark and without a hyaline patch, forewings slightly paler. These distinctive particulars were not given in the original description, but are mentioned now, so as to stress the differences of the two new forms. — **oberthüri** *Le Cerf* (16 e) is larger and somewhat paler. The yellow belts on abdomen are wider and more regular on upper and undersides; there is also the indication of a belt on underside at base of abdomen. Forewings less yellowish before the margin, the entire border is narrower; disco-cellular nervure very widely black. On hindwings the inner margin is not dusted with yellow. The ♀ with blue-black body, forewings and hindwings equally dark. Behind the cell, between veins 2 and 4 there are two distinct, narrow hyaline patches. 24—30 mm. Bou-Saada, Algeria. A gynandromorph of this form exists in which the left side and body are female, the right antennae, wings and legs are male. — **dumonti** *Le Cerf* (16 e) has very wide yellow bands on abdomen, especially those of the 4th to 7th segments, where only a very narrow black dividing line is left. At base of anal tuft there is a yellow triangle on upperside. Forewings as in *oberthüri*. However outwardly of disco-cellular the yellow dusting forms a triangular patch (in one specimen this only occurs on the underside). On hindwings veins and disco-cellular are faintly dusted with yellow on upperside, more heavily so however on underside. The ♀ does not vary materially from *oberthüri*. There are 2 pairs of this form in the PÜNGELER collection, one from Gafsa (Tunis) the ♂ of which is a typical *dispar*, the ♀ on the other hand and in contrast to the original description has definitely hyaline hindwings. The 2nd pair from Bou-Saada consists of *dumonti* ♂ and *oberthüri* ♀. According to HAMPSON *dispar* should actually be classified in the otherwise American Genus *Euhagena*, of which one species *nobilis* (Vol. 14, p. 523) also occurs in Africa. *oberthüri.* *dumonti.*

*D. hymenopteriformis* *Bell.* (Vol. 2, p. 390, pl. 52 b). The main form of *hymenopteriformis* has black antennae, 3 white belts on abdomen and a more or less pale patch on forewings behind the cell. — The form **algeriensis** *Le Cerf* (= *algerica* *Le Cerf*) has distinct clear hyaline patches in and behind the cell, in ♂ also a vitreous streak below the cell. — In **ducellieri** ♀ *Le Cerf* (16 f) the white belts of abdomen have additionally a wide anterior yellow edge. Also the antennae are considerably dusted with ochreous yellow. Both forms emanate from Algeria. *algeriensis.* *ducellieri.*



- atlantica*. *D. uroceriformis* Tr. (Vol. 2, p. 391, pl. 51 f). — **atlantica** ♂ *Le Cerf* (16 f) does not vary from typical form on upperside of body. On underside the anterior yellow segmental edgings however are almost complete. On forewings the disco-cellular is more an orange-red than yellow, the outer hyaline patch is larger and also the inner margin is more extensively orange-yellow. On underside of forewings the costa is pale yellow, not black. Morocco.
- albanensis*. *D. ichneumoniformis* F. (Vol. 2, p. 392, pl. 51 f). *lugubris* Stgr. as mentioned already in Vol. 2, has a black abdomen without yellow belts. However it is not the exclusive form of Asia Minor. A specimen from Konia in the PÜNGELER collection has normal yellow belts and the yellow dusting of forewings is even rather more pronounced. — In **albanensis** ♀ *Rbl.* from Albania the vitreous patch of forewings above the inner margin is completely black-brown. Also the outer hyaline area has similar scales. On hindwings the veins are widely dark. — **coreyrensis** ♀ *Rbl.* is an extreme of the previous form. Forewings are completely dusted over with black-brown, only the disco-cellular nervure and inner margin are red. Corfu.
- tunetana*. *D. megillaeformis* Hbn. (Vol. 2, p. 392, pl. 51 f). — **tunetana** Oberth. (16 e) resembles *ichneumoniformis* by the increased number of yellow belts on abdomen. Outer margin of forewings is wider and paler yellow than in type and also the inner margin is distinctly yellow. Tunis.
- norma*. *D. gruneri* Stgr. (Vol. 2, p. 396). A ♀ in the PÜNGELER collection has a delicately fine hyaline streak behind the cell. The illustration on pl. 52 a represents *tenebrosa*, the description of *gruneri* was correct. — The form **norma** *Le Cerf* (16 f) also from Asia Minor, has normally hyaline forewings, disco-cellular nervure is black, widely red outwardly. The edge of the 2nd segment is whiter than type.
- tenebrosa*. **D. tenebrosa** Pglr. Body black. Forewings also black. Narrowly hyaline in the cell and below same a short vitreous streak. Boldly red behind the black disco-cellular nervure. Beyond same a hyaline patch of the same dimensions as the red mark. At inner margin narrowly red. The species is illustrated in Vol. 2, pl. 52 a as *gruneri*, but all the pale segmental edges should be eliminated. Only the anal tuft is laterally grey-yellow. In the ♀ the hyaline patches on forewings are reduced in size. On hindwings the black margin diffuses inwardly. 26–32 mm. Askhabad. Northern Persia was probably erroneously stated as locality for *gruneri* in Vol. 2. The illustration on pl. 52 a as *gruneri* was due to a wrong classification.
- miranda*. *D. tengyraeformis* H.-Schäff. (Vol. 2, p. 396, pl. 51 c). The form **miranda** ♀ *Le Cerf* (16 f) has a white spot on frons and the centre of anal tuft is yellow. Forewings are more inclined to orange than red and this colour extends beyond the disco-cellular nervure, which is not black. Also on underside the forewings are orange instead of black. Anatolia.
- flavida*. *D. sirphiiformis* Luc. (Vol. 2, p. 391). According to LE CERF the description given is incorrect and there appears to have been some confusion with *flavida* Oberth. LE CERF states that the hyaline patch behind the cell in *sirphiiformis* Luc. is not much larger than the scaled marginal area. On abdomen on the upperside of all segments there are alternating narrow and wide yellow edges, no segment is completely yellow. — On the other hand in **flavida** Oberth. (16 f) the hyaline patch is much larger than the marginal area. On abdomen the 2nd segment has a narrow yellow edge, the 4th, 6th and 7th segments are completely yellow. Both species are described from Algeria.
- kalavrytana*. **D. kalavrytana** Shelj. Body black, patagia with golden yellow edges. All segments of abdomen with wide golden yellow edges on upperside. Anal tuft with orange-red central patch on upperside. Mid and hind tibiae yellow-red, tarsi black on upper side. Forewings black-brown. In place of the outer hyaline patch there is an intensively red spot, which is intersected by the black veins. The inner margin is also red. Occasionally there is a narrow hyaline streak in the cell. Hindwings hyaline, only the outer third with dusky dusting. Disco-cellular nervure black, with red outer edge, more widely red towards the costa. Underside of forewings is yellow, also the inner margin, only the disco-cellular has a red edge. ♀ 22 mm. Morea.
- pygmaeum*. **D. pygmaeum** Rbl. Somewhat similar to *stiziformis* H.-Schäff. (Vol. 2, p. 397, pl. 52 a) but differing from same by the distinctive black and yellow legs. Forewings densely scaled with black-brown. A spot at base and a larger one on disco-cellular nervure are red. Palpi yellow. On the black abdomen, segment 3 has lateral yellow marks, segments 8 and 9 have wide yellow belts. 15–17 mm. S. Arabia.

## 8. Genus: **Chamaesphecia** Splr.

- Ch. doryliiformis* O. (Vol. 2, p. 397, pl. 51 k, l). A number of subsidiary forms have been described:
- chimena*. **chimena** ♀ *Le Cerf* (16 i) has no red scales on abdomen and no white edges to segments, the ground colour being uniformly black-brown. Andalusia. — **bellieri** *Le Cerf* (16 i) from Spain is larger. In the ♂ the antennae are more extensively yellow. On forewings the inner margin and disco-cellular nervure are yellow-red. Besides
- tingitana*. in the ♀ the white edges to abdominal segments have wide red anterior margins. — **tingitana** *Le Cerf* (16 g, h) from Morocco has in the ♂ only the central one of the 3 white abdominal belts; in the ♀ the 2 posterior ones are present. Abdomen of ♀ has no reddish dusting, but is as black-brown as in ♂. On forewings slightly red
- chretieni*. at disco-cellular nervure and at inner margin. — **chretieni** ♀ from Tangiers is a somewhat melanic form. The red dusting on upper side of abdomen is missing, a few reddish hairs are still present in anal tuft, only the



most anterior of the 3 normal white belts is faintly retained. — **funebria** *Le Cerf* also from Tangiers is still dark- *funebria*. er. No white belt is retained on abdomen. The anal tuft has no trace of red and also the legs are even darker than in *tingitana*. — The typical locality for *doryliiformis* is Portugal. Later on no specimens appear to have come from there, but only from Spain. The portuguese specimens are not suitable for description, as they are in very bad condition. The spanish race, which is now separated as — **andalusiaca** *Le Cerf* (= *doryliiformis andalusiaca*. auct.) has a bronze black body. Patagia of ♂ with yellow edges, 3 white bands on upperside of abdomen, palpi yellow. Forewings with large hyaline patches. A few yellow scales at disco-cellular. Further yellow-red scales at base of inner margin and on costa. In the ♀ the edges of patagia are red, abdomen somewhat dusted with yellow-red, similarly the anal tuft with yellow-red, which in the ♂ is impure yellowish. On forewings all those patches that are yellow in the ♂, are yellow-red in ♀.

**Ch. euglossaeformis** *Luc.* (16 h and Vol. 2, p. 398, pl. 51 l) would probably best be deemed a form of *euglossaeformis*. *doryliiformis*. A ♂ of this form with 3 white belts on abdomen and yellow dusting instead of red, is named — **flavina** *Le Cerf* (16 f). Also underside of abdomen is extensively yellowish. Constantine. — **intermedia** *Le Cerf* *flavina*. forms a transition to *ceriaeformis* *Luc.* In the ♂ the yellow scales on 4th, 6th and 7th segments are more extensive on upperside. Hind tibiae are orange-red. On forewings the scaled areas are blacker. The red scales at disco-cellular and on inner margin are more intensive. In ♀ the red scaling on abdomen is extensive, the white bands on the other hand scarcely visible. Base of hindwings on upperside is brownish. On forewings the red patches are very pronounced in the ♂. Algeria. — **melanina** *Le Cerf* is a melanic form of *euglossaeformis*. The *melanina*. body is quite black except for the middle of the anal tuft, which is still somewhat red on upperside. There are some red scales retained at inner margin of forewings and also the hind tibiae show traces of red. On the other hand the disco-cellular nervure of forewings is quite devoid of red scales, whilst in the darkest specimens of *ceriaeformis*, these are always present.

**Ch. icteropus** *Z.* (Vol. 2, p. 398, pl. 50 i) from Sicily would appear to be only a dwarf form of *doryliiformis*. Its most western form is **subceriaeformis** *Le Cerf* described from a ♀ from Andalusia. Body black, patagia *subceriaeformis*. with red edges; of the 2 white belts of abdomen, the 2nd one also has a red anterior border. Anal tuft with 2 red spots. Hind tibiae red. The hyaline patches of forewings are small, the inner margin is red at base. — The other forms emanate from N. Africa. — **maghrebica** *Le Cerf* (16 g) has a blue-black body. In the ♂ the *maghrebica*. patagia have delicate yellow edges. On abdomen there is a wide white belt, which has anteriorly a pale yellow edge. The anal tuft is pale yellow in centre and laterally. Legs yellow. On forewings the costa is blue-black, inner margin and disco-cellular nervure fiery red, the hyaline patch large. Also on hindwings there are red scales outwardly on disco-cellular. The ♀ differs from that of *subceriaeformis* as follows: The white edges are absent on abdomen, only the anal tuft is somewhat red in centre. The hyaline patches of forewings are slightly larger. The outer vitreous area is edged inwardly and outwardly faintly with red. The red streak on inner margin is bolder. From W. Morocco. — To be placed here is *ceriaeformis* *Luc.* which occurs in Algeria and which was dealt with in Vol. 2, p. 398, pl. 50 k. — **xanthia** *Le Cerf* (16 g) is a sub-form to same. Here all *xanthia*. the vermilion or red patches of *ceriaeformis* are replaced by yellow. — **tristis** ♀ *Le Cerf* (16 g, h) has no yellow *tristis*. edges to the patagia and no yellow hairs in centre of anal tuft. The tibiae are somewhat blackish at each extremity, otherwise there are no differences from *xanthia*. — **fatma** ♀ *Le Cerf* (16 i) has the typical ver- *fatma*. milion markings of *ceriaeformis* and besides 3 white belts on upperside of abdomen with a few red scales anteriorly to same. In transitions to *ceriaeformis* the red scales may be absent and occasionally also the first white belt is missing. Very rarely only the middle belt of abdomen is present. Algeria. — **auresiana** ♀ *Le Cerf* *auresiana*. is almost identical with *fatma*. The red palpi differentiate same. In all the other forms they are black. Also the base of hindwings is red. From the Aurès mountains. — Geographically *icteropus* *Z.* from Sicily, which was dealt with in Vol. 2, p. 398, pl. 50 i, would be grouped here. — Within the species *doryliiformis* we have the sub-groups *doryliiformis* and *euglossaeformis* on the one hand and those of *icteropus* and *ceriaeformis* on the other and both are close to one another. A dichotomous table for classifying the subspecies cannot be given here for want of space. In OBERTHÜR Vol. 17, p. 406 etc. such a table occupies 5 pages.

**Ch. minianiformis** *Frr.* (Vol. 2, p. 398, pl. 51 l). In the type form the ♂ has yellow palpi which are outwardly with black hairs. In the ♀ they are quite orange. — **nigrobarbata** ♀ *Rbl.* from Crete has deeply black *nigrobarbata*. hairs on central joint of palpi.

**Ch. chrysidiformis** *Esp.* (Vol. 2, p. 399, pl. 52 d). — **sicula** *Le Cerf* although varying among them- *sicula*. selves somewhat, are generally easily recognisable. Palpi of ♂ white. On abdomen edges of 2 segments are white. Disco-cellular nervure of forewings is black on upperside, often with vermilion outer edge, entirely vermilion on underside. On hindwings the black margin is wider at apex. Tarsi are white. In the ♀ the tips of palpi are yellow. The white edges on abdominal segments as in ♂. On forewings there is only a hyaline patch in the cell, below and behind same, wings are scaled with red. The patch on disco-cellular nervure is slightly black. Fore tarsi blue-black. From Sicily. — **melanoxanthia** ♂ *Le Cerf* (16 g) is a sub-form. The *melanoxanthia*. black dusting on forewings is much more extensive, the usual vermilion patches much reduced and pale yellow. On underside the entire markings are pale yellow. Also the tibiae are yellow, the tarsi remain white. The genuine *chrysidiformis* has hitherto not been found in Sicily and *sicula* may perhaps be a separate species. — **castiliana** *Le Cerf* (16 g) is also yellow instead of the typical red on forewings below and behind the cell, *castiliana*.



costa and disco-cellular nervure remain black. Legs and anal tuft yellow only in the ♀ the latter is red-yellow. *anthracias*. All tarsi and underside of costa of forewings are white. — *anthracias* *Le Cerf* is a melanic sub-form. On underside it does not differ from *melanoxanthia*. On upperside of forewings the yellow patches of *castiliana* are dusky. The white belts of abdomen are absent and the legs are black. — Two new sub-forms of *obturata*, which was dealt with in Vol. 2, p. 399, have been described. Both, like *castiliana*, have only one white belt on abdomen. The first of these *margaritosa* *Le Cerf* (16 i) scarcely differs from *obturata*, but as the latter has not yet been illustrated, we are giving an illustration here (16 i, under the name *margaritosa*). — *chlorotica* *Le Cerf* (16 g) shows a much more extensive grey-black dusting in outer area of forewings, the black spot on disco-cellular nervure is very pronounced. Castile.

*biedermanni*. **Ch. *biedermanni* *Le Cerf***. Body blue-black. Patagia with yellow edges. The 2nd, 4th and 6th segments of abdomen with white edges. Tibiae and tarsi yellow. Forewings with large hyaline patches, the outer one being as large as the marginal area behind same. Inner margin of wings and outer  $\frac{2}{3}$  of the disco-cellular vermilion, marginal area red-yellow, otherwise base, margins and veins black. Hindwings hyaline, base and inner margin pale yellow. In the ♀ the patagia are edged with vermilion, also centre of anal tuft and tibiae. On forewings the inner margin and the space behind the cell are vermilion, the rest is dusted with black. Hindwings hyaline, vermilion at base, disco-cellular nervure slightly red. 23 mm. Morocco.

*seitzi* *Pnglr.* (Vol. 2, p. 400, pl. 51 l). It was already mentioned in the original description that the species was subject to variation and this has induced many denominations. The type of *seitzi* ♂ has a red belt on abdomen, specimens without same have not yet been named. — *louisae* *Le Cerf* (16 h) has the last 4 segments of abdomen red in the ♂, in the ♀ only the last 3 are red. On forewings the colour is more of a vermilion and the margin is more widely dusted with black. From Lambessa, where *seitzi* also occurs. The moroccan form — *pallipes* *Le Cerf* differs from *louisae* only by the ochreous white spurs and tarsi to the 3 pairs of legs. — *aicha* ♂ *Le Cerf* is also a moroccan form, differing from *louisae* by traces of hyaline patches in and behind the cell of forewings. — A transition to same is *phoenix* *Le Cerf* from Morocco. In the ♂ the costa is widely black to vein 7 and the disco-cellular nervure merges in same. In and behind the cell there are vestiges of hyaline patches, which are dusted with black and reddish. Outer margin is narrowly black. Hindwings hyaline. In the ♀ there are no hyaline patches on forewings, the cell is black. The 3 last segments of abdomen on upper side and the 4 last segments on underside are black. Morocco. — Larger specimens of all these forms can also be designated by the supplementary name: *major* *Rothsch.*

*schmidtiformis* *Frr.* (Vol. 2, p. 401, pl. 52 e). Already in Vol. 2, two exceptionally pale yellow ♀♀ were mentioned from Konia, corresponding to *chrysidiformis-castiliana*. They can be classified as *pouloti* *Le Cerf*. All the reddish patches of wings, legs and body are yellow.

*fceniformis* *H.-Schäff.* (Vol. 2, p. 400, pl. 50 k). — *meieri* *Std.* denotes a ♂, in which the thin red abdominal belt is absent, the anal tuft is similarly uniformly black on upper and undersides. Aspromonte.

*gravesi*. **Ch. *gravesi* *Rbl.*** Similar to the variable *loewii* *Z.* (Vol. 2, p. 402, pl. 51 g). Palpi lemon-yellow, in the ♂ slightly black outwardly. Antennae of ♂ with long cilia, buff inwardly with black tip, outwardly black brown. Body black, only the frons white, end of patagia yellow-white. Abdomen with lemon-yellow edges to the 2nd, 4th and 6th segments, in the ♂ also on upperside of 7th; on underside there is no belt on 6th segment. Anal tuft black, with yellow hairs in the ♂. Forewings hyaline with wide black edges. The longitudinal area only faintly indicated, sometimes absent in ♀. The cuneiform area of forewings without yellow edge. The outer hyaline area is 5 partite in ♂ and large; in ♀ it is 3 partite and very small. Hindwings hyaline. Underside of costa and inner margin of forewings lemon-yellow, on hindwings base of inner margin similarly. 15–20 mm. Cyprus.

*clermonti*. **Ch. *clermonti* *Le Cerf***. Close to *annellata* *Z.* (Vol. 2, p. 403, pl. 51 g). Antennae very long. Palpi white with black lateral lines. Body blue-black. Patagia finely edged with yellow on uppersides, behind same on thorax yellow-white lateral spots. The 4th and 7th abdominal segments with white edges, anal tuft black with white hairs in centre. On underside the 1st and 4th segments have posterior white edges, the 2nd is quite white. Legs black with white patches. Forewings hyaline with black-brown veins and margins. The longitudinal area is short, the outer vitreous area very large. The disco-cellular nervure is widely black. Hindwings hyaline. Costa of both wings on underside is yellow-white. ♂ 16 mm. Dobrudja.

*dumonti*. **Ch. *dumonti* *Le Cerf*** (16 h). Related to *annellata* *Z.* (Vol. 2, p. 403, pl. 51 g). Body blue-black, patagia with yellow edges. The 4th and 7th abdominal segments with indistinct yellow-white edges, anal tuft variegated with yellow. Legs black with yellow patches. Wings hyaline, veins and margins of forewings widely bronze-black. In the ♀ the 2nd, 4th and 6th abdominal segments are more distinctly edged with yellow-white. Anal tuft is almost completely yellow. 21 mm. Maritime Alps.

*balcanica*. **Ch. *balcanica* *Zukow.*** (16 h). Similar to *cirgisa* *Bartel* and *crassicornis* *Bartel*. Body black, throughout its entire length an interrupted orange-yellow central line. Patagia with orange edges, anal tuft with a few orange hairs in the ♂, in the ♀ predominantly orange with blackish centre. The 2nd, 4th and 6th segments



sharply outlined with white edges on upperside. Forewings hyaline with black margins, in the ♀ margin is wider, so that the longitudinal area is only faintly present at base. The outer area in ♂ is 5 partite, the fork between veins 7 + 8 is sealed; in ♀ it is rather more than 3 partite and shorter. The black outer margin has orange-yellow streaks between the veins. Hindwings hyaline. 22—26 mm. Macedonia. PÜNGELER had denoted the species as *rangnowi*, but never published the name, although specimens may have found their way to other collections under this name.

**Ch. powelli** *Le Cerf* (16 h). Body black, patagia with yellow edges, an interrupted dark yellow central *powelli*. dorsal line. The 2nd, 4th, 5th and 6th segments with white edges. Anal tuft somewhat yellowish. On underside the 4th to 6th segments are predominantly yellow whilst in *balcanica* they are black. Forewings with well developed hyaline patches, the outer one extends almost to the outer margin. Underside of costa pale yellow. Hindwings hyaline. In the ♀ the 2nd and 4th segments are widely edged with yellow, the 5th and 6th narrowly. On forewings the hyaline patches are smaller, the longitudinal area is absent. At disco-cellular nervure there are no yellow scales as in the ♂. The species is described as a *Dipsosphecia*. We are giving as an illustration a figure of *Chamaesphecia powelli* which appears to be the same species, same however has white belts on segments 2, 4 and 6. In other respects the two descriptions are identical. Morocco.

*Ch. stelidiformis* *Frr.* (Vol. 2, p. 406, pl. 51 i). The form — *amygdaloides* *Schleppnitz* is very well described by the author and the variations exactly stated. It is about 1/3rd larger than the main type form from around Vienna. The black margins of the wings are more intensive and those of hindwings also wider. Costa of forewings is wider so that the vitreous cuneiform mark is reduced in size; also the outer hyaline area is smaller. The row of dots on abdomen is more pronounced. The larvae feed in *Euphorbia amygdaloides*. It occurs in N. E. Lower Austria.

**Ch. palustris** *Kautz.* Very similar to *stelidiformis* *Frr.* (Vol. 2, p. 406, pl. 51 i) but larger. Antennae *palustris*. of both sexes blackish without the yellow or brownish markings of *stelidiformis*. Body inclined to be more golden brown, a yellowish white edge to the 4th abdominal segment and a similar dorsal line in ♂, in ♀ with 3 similar spots. Forewings hyaline, brown at margins, the disco-cellular nervure somewhat darker. In the ♀ the longitudinal area is also scaled, in the ♂ however it is hyaline. 28—30 mm. Bruck, Upper Austria.

**Ch. anthrax** *Le Cerf* (16 i). Body deep black. Fore tarsi white, similarly the edge of 4th abdominal *anthrax*. segment and laterally the anal tuft. The 3 vitreous patches of forewing fairly large. ♂ 19 mm. Oran.

**Ch. almana** *Rbl.* Similar to *osmiaeformis* *H.-Schäff.* (Vol. 2, p. 407, pl. 52 d) but the antennae of ♂ *almana*. are longer and deep black. The 2nd, 4th and 6th segments of abdomen are edged widely with pale yellow. On forewings the longitudinal area is scaled with orange. Disco-cellular nervure of hindwings is widely black, also the margins. ♂ 18 mm. Amanus mountains.

**Ch. montandoni** *Le Cerf.* Also similar to *osmiaeformis*. Antennae of ♂ bronze-brown, ochreous white *montandoni*. on upper side before the tip, ochreous brown outwardly. Body bronze-brown, patagia with yellow-white edges. The 2nd and 4th abdominal segments with white edges, the dorsal line ochreous white, on underside all segments have ochreous yellow edges. Both wings with blackish scales at base. On forewings veins and margins are bronze-black, before the outer margin there are white spots between the veins. The outer hyaline area has a straight outer edge. On hindwings the veins are ochreous white on inner margin. In the ♀ the antennae are paler. On abdomen also the 6th segment has a white belt. Anal tuft is ochreous white in centre. On forewings the longitudinal area is less pronounced. 23—24 mm. Dobrudja, Ukraine.

**Ch. koshantschikovi** *Pnglr.* (16 g). Similar to *cirgisa* *Bartel.* Palpi black, only delicately white in *koshantschikovi*. centre. Antennae black. Thorax and abdomen black. Frons creamy white, patagia almost equally so, only still somewhat black at base of wing. At base of abdomen 2 white spots besides which there is a dorsal and lateral row. The 4th abdominal segment is delicately white, almost complete, forming an edge on upperside. Underside blackish, legs almost completely black. Forewings with very wide black margins. The longitudinal area is absent, cuneiform area and outer hyaline area short. In the black marginal area there are whitish scales between the veins which are more distinct on underside. Hindwings with relatively wide black margins. The disco-cellular nervure is also widely black, as also is the interstice between veins 2 and 3. ♀ 26 mm. Syr. Darja.

**Ch. rondouana** *Le Cerf.* Body bronze-black, patagia with yellow edges. The 2nd, 4th and 6th abdominal *rondouana*. segments with delicate white edges, dorsal line yellow and interrupted. Anal tuft somewhat white in centre. Wings hyaline. In forewings the longitudinal area very narrow, the cuneiform area large. The vitreous patch beyond the cell elongated, behind same a narrow black border with yellow spots between the veins. Hindwings hyaline. On underside of forewings the yellow spots are more distinct, costa pale yellow. In the ♀ underside of abdomen bears at end a row of yellow central spots. 21—24 mm. High Pyrenees. — In Vol. 2, p. 391 a *Dips.* (*Cham.*) *rondoui* *Siepi* is mentioned, which must be withdrawn. The type is a damaged specimen of *Ch. chrysidiformis*.

**Ch. kautzi** *Reisser.* Similar to *rondouana* *Le Cerf.* Antennae and body chocolate brown with an oily *kautzi*. gloss. Frons golden yellow, similarly the inner side of palpi and anterior trochanters. Patagia with golden



yellow hairs posteriorly in their upper part. Legs black-brown, outwardly with yellow hairs only on mid and hind tibiae. The 2nd, 4th and 6th segments of abdomen have yellow edges posteriorly, sometimes however only the 4th. Underside devoid of markings. Anal tuft without yellow hairs on upper or underside. Margins of forewings are very wide, longitudinal area is absent, cuneiform area short. The spot on disco-cellular is approximately quadrate. The outer hyaline area small, 4 partite, occasionally only punctiform, somewhat dusted with yellow. There are golden yellow scales distally in the very wide marginal area between the veins. Hindwings hyaline. ♀ 24 mm. Sierra Nevada.

*borreyi*. **Ch. borreyi** *Le Cerf* (16 h). Antennae black, outwardly with white scales almost as far as the tip. Body black, patagia with pale yellow edges. The 2nd, 4th and 6th abdominal segments with white edges, occasionally only the 4th. Dorsal line ochreous white. The entire underside pale grey-brown. Forewings hyaline, also the longitudinal area devoid of scales. The outer vitreous area somewhat wider than the black margin. The latter has yellow spots between the veins. Hindwings hyaline, margins on underside whitish. In the ♀ wings have a white spot on upperside before apex. Abdomen with faint dorsal line. Outer vitreous area of forewings not much wider than disco-cellular nervure and thus more rounded. 18—23 mm. Morocco.

*cretica*. **Ch. cretica** *Rbl.* Very similar to *affinis* *Stgr.* (Vol. 2, p. 412, pl. 51 k). Antennae of ♀ without markings. Body black, patagia with rusty yellow edges. Abdomen with interrupted rusty yellow line which changes to white towards extremity. Anal tuft laterally with rusty yellow. The 4th and 6th segments on upperside with white edges. Mid and hind tibiae somewhat whitish, otherwise the legs are black-brown. Forewings black-brown. Cuneiform area short and wide. Longitudinal area scarcely indicated, outer vitreous area very short. Costa of wing above same pure white. Hindwings hyaline. This species is larger than *affinis* and perhaps only a local form of same. ♀ 18 mm. Crete.

*erodiiphaga*. **Ch. erodiiphaga** *Dumont* is also similar to *affinis*. Antennae of ♂ black-brown on upperside, red-brown on underside. Head black, patagia with white edges turning to yellow posteriorly. On abdomen the 2nd segment is scaled with white and yellow in centre, the 4th and 6th have white edges. Forewings bronze-black, densely scaled with white below the costa, at inner and outer margins. These white scales form spots above the outer vitreous area and at outer margin between the veins. The longitudinal area is insignificant, cuneiform area large, both somewhat scaled with white. The outer hyaline patch is 5 partite. Hindwings hyaline. On underside of forewings veins and costa are white, only disco-cellular and marginal lines black. In the ♀ antennae are ringed with yellow on underside. Patagia almost completely white, the central line of thorax extends right through. Underside of abdomen heavily dusted with white, anal tuft almost completely white in centre. In forewings the longitudinal area absent, the two other hyaline areas with white edges, a distinct white spot before apex. 18—19 mm. Tunis. Larvae in stems of *Erodium arborescens*.

*micra*. **Ch. micra** *Le Cerf* (16 h). Somewhat similar to *albiventris* *Led.* (Vol. 2, p. 412, pl. 52 c). Palpi white, patagia with yellow edges. The 4th and 6th abdominal segments with white edges, dark on underside. The longitudinal area is absent from the black-brown forewing, the two other vitreous areas very minute. Hindwings hyaline. ♀ 12 mm. Lambèse.

*ferganae*. **Ch. ferganae** *Shelj.* Palpi pale yellow, blackish on undersides. Body and legs brown-black. The 4th segment of abdomen with yellow edge. Anal tuft yellow in centre on underside. Costa and outer margin of forewings are widely black-brown, the disco-cellular nervure with rounded black spot. The entire wings dull golden yellow. Fringes slightly paler than outer margin. Hindwings black-brown in outer one-third. Only inner  $\frac{2}{3}$  rds of cell and area below same to inner margin hyaline, the rest thinly scaled. ♂ 22 mm. Osh.

*nigrifrons*. **Ch. nigrifrons** *Le Cerf*. Similar to *aerifrons* *Z.* (Vol. 2, p. 412, pl. 51 k). Palpi white on underside, laterally yellow. Body blue-black. Patagia with yellow edges on upperside and laterally. The 4th, 6th and 7th abdominal segments with yellow edges on upperside, besides a dorsal line is indicated on the first segments. Anal tuft yellow and black, similarly the legs. Forewings blue-black with 3 hyaline areas. A yellow line before the cell. Yellow scales at base and behind the outer vitreous patch. On underside the disco-cellular is black, also the inner and outer margins, otherwise the scaling is yellow. Hindwings hyaline, veins and margins delicately black on upperside, yellow on underside. In the ♂ the longitudinal area is absent on upperside, on underside the yellow dusting is reduced. 15—17 mm. Paris.

*festai*. **Ch. festai** *Trti.* Similar to *pechi* *Stgr.* (Vol. 2, p. 402, pl. 51 g). Antennae and palpi black, the latter reddish in centre on underside. The 4th, 6th and 7th abdominal segments vermilion on upperside. Anal tuft black and red. Underside black. Forewings blue-black with normally large vitreous areas. Disco-cellular nervure with bold black outline. Outer hyaline area rounded outwardly. Underside black-brown, dusted with yellowish at costa, on veins and in outer area. Hindwings hyaline, disco-cellular cuneiform and black. On underside costa and veins very faintly dusted with yellow. In ♀ the hyaline areas are smaller, the outer one almost extinct. Base of antennae and the 2 first joints of palpi vermilion, similarly the upper ends of tibiae on underside of all 3 pairs of legs. On abdomen the uppersides of 1st, 4th and 6th segments are red, on underside same are completely black-blue. Cyrenaica.

### Genus: **Chamanthodon** *Le Cerf*.

This Genus actually exclusively comprises species that belong to the tropical southern asiatic or



african fauna. Compare Vol. 10, p. 781 and Vol. 14, p. 523. Whether the species described here actually belongs to this Genus is open to doubt.

**Ch. coreacola** Mats. Palpi yellow, black outwardly. Abdomen black without yellow belts. Legs black *coreacola*. with yellow patches. Wings hyaline. Veins, disco-cellular nervure and outer margin of forewings black. Inner margin of forewings and costa of hindwings yellow, only the apex is black. ♂ 24 mm. Corea.

# 11. Genus: **Microsphecia** Bartel (recte *Zenodoxus* Gr. & R.)

**M. dorsalis** Le Cerf. Body bronze-brown or inclined to reddish, patagia with yellow scales anteriorly. *dorsalis*. The 1st segment of abdomen is whitish yellow on upperside. The other segments with yellow central and lateral lines to the anal tuft. Legs brown and yellow. Forewings bronze-brown, with 3 yellow patches behind the cell, intersected by dark veins; above same a further spot faintly indicated. On underside also the costa is yellow. Hindwings hyaline; bronze-brown at apex and anal angle, as well as between veins 2 and 3. On underside also the costa and the marginal spots are yellow. 11—15 mm. Amasia. — **obscura** ♀ Le Cerf has *obscura*. no yellow patches on forewings. On abdomen the central line is missing, the lateral line more distinctly interrupted, the 2 last segments are reddish yellow. Amasia. — *dorsalis* is often classified in collections as *tineiformis-brosiformis* Hbn. The genuine *brosiformis* according to LE CERF is only a small *tineiformis* Esp. To judge from the specimens in the PÜNGELER collection the position is as follows: *tineiformis* is generally large, *brosiformis* from Hungary and Konia is smaller. The latter has a yellow marginal spot on upperside of forewings, which is fainter on underside. Except for this there are scarcely any yellow markings on underside. Besides in *brosiformis* the yellow central and lateral lines are absent. It is plain from this that 2 very similar forms occur in Asia Minor.

**M. shakojianus** Mats. Body and wings coppery brown. Palpi, a central band on underside of abdomen *shakojianus*. and partially the legs are yellowish white. The 1st, 2nd, 4th and 5th abdominal segments are yellow anteriorly. Forewings with white longitudinal line in the cell, dark blue scales on disco-cellular nervure. Hindwings hyaline, veins and margins coppery brown. ♂ 18 mm. Corea.

## Alphabetical List

with references to the original descriptions of the forms of palaearctic Aegeriidae enumerated in Suppl. Vol. 2.

\* signifies that the form is also illustrated in the place cited.

- aicha* Cham. *Le Cerf*, Bull. Soc. Ent. Fr. 1925, p. 211.  
*albanensis* Dips. *Rbl.* Zeitschr. Oestr. Ent. Ver. 3, p. 86.  
*algeriensis* Dips. *Le Cerf*, Oberth. Ét. Lép. Comp. 17, p. 229.  
*almasa* Cham. *Rbl.* Sitz.-Ber. Akad. Wiss. Wien 126, p. 275.  
*almohades* Syn. *Le Cerf*, Ét. Lép. Comp. 17, p. 535.  
*amygdaloides* Cham. *Schreppnitz*, Zeitschr. Oestr. Ent. Ver. 18, p. 24.  
*andalusiaea* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 11, f. 4636.  
*anthracias* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 19, p. 31.  
*anthrax* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 11, f. 4667.  
*asamaensis* Sph. *Hmps.* Novit. Zoolog. 26, p. 81.  
*atavus* Syn. *Le Cerf*, Ét. Lép. Comp. 17, p. 542.  
*aurantiacum* Par. *Rbl.* Sitz.-Ber. Akad. Wien 126, p. 274.  
*aresiana* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 11, f. 4659.  
*baleanica* Cham. *Zukow.* Int. Ent. Zeitschr. 23, p. 21.  
*bellieri* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 11, f. 4639.  
*bieingulata* Syn. *Rbl.* Berge's B'fly Book, p. 466.  
*biedermanni* Cham. *Le Cerf*, Bull. Soc. Ent. Fr. 1925, p. 210.  
*borreyi* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 19, p. 133.  
*brunneipes* Aeg. *Trti.* Boll. Soc. Ent. Ital. 51, p. 339.  
*eastiliana* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 19, p. 29.  
*chibensis* Syn. *Mats.* Ins. Matsumur. 6, p. 5. \*  
*chimena* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 11, f. 4638.  
*ehlorotica* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 19, p. 30.  
*ehosensis* Syn. *Mats.* Ins. Matsumur. 6, p. 5. \*  
*ehretieni* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 17, p. 425.  
*elermonti* Cham. *Le Cerf*, Bull. Soc. Ent. Fr. 1914, p. 62. \*  
*eodeti* Syn. *Oberth.* Ét. Ent. 6 (3), p. 67. \*  
*coreyrensis* Dips. *Rbl.* Zeitschr. Oestr. Ent. Ver. 3, p. 86.  
*coreacola* Cham. *Mats.* Ins. Matsumur. 6, p. 5. \*  
*eretica* Cham. *Rbl.* Ann. Wien. Hofmus. 30, p. 143. \*  
*daisensis* Par. *Mats.* Ins. Matsumur. 6, p. 7. \*  
*dauidi* Par. *Le Cerf*, Ét. Lép. Comp. 14, p. 259. \*  
*diaphana* Par. *Sehaw.* Verh. Zool.-Bot. Ges. Wien 71, p. 165.  
*dorsalis* Micr. *Le Cerf*, Bull. Soc. Ent. Fr. 1914, p. 272. \*  
*ducellieri* Dips. *Le Cerf*, Oberth. Ét. Lép. Comp. 11, f. 4628.  
*dumonti* Dips. *Le Cerf*, Oberth. Ét. Lép. Comp. 17, p. 371. \*  
*dumonti* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 19, p. 35.  
*erodiiphaga* Cham. *Dum.* Bull. Soc. Ent. Fr. 1922, p. 215.  
*euglossaeformis* Cham. *Lue.* Expl. Algér. Lép. p. 368. \*  
*fatma* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 11, f. 4656.  
*ferganae* Cham. *Shetj.* Iris 38, p. 184.  
*festai* Cham. *Trti.* Boll. Mus. Zool. Torino 39, (27) p. 5.  
*flavida* Dips. *Oberth.* Ét. Ent. 13, p. 24. \*  
*flavina* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 17, p. 431.  
*fulva* Syn. *Trnr.* Ent. Rec. 40, p. 165.  
*fumosa* Syn. *Schütze.* Iris 32, p. 120.  
*funnebris* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 11, f. 4646.  
*galloisi* Syn. *Mats.* Ins. Matsumur. 6, p. 6. \*  
*gephyra* Mel. Amsel (ined.)  
*gigantea* Mel. *Mr.* Proc. Zool. Soc. Lond. 1879, p. 413.  
*gloriosa* Sphec. *Le Cerf*, Bull. Soc. Ent. Fr. 1914, p. 421.  
*gravesi* Cham. *Rbl.* Verh. Zool.-Bot. Ges. Wien 77, p. (60).  
*hirayamai* Par. *Mats.* Ins. Matsumur. 6, p. 7. \*  
*ineognita* Sphec. *Strd.* Arch. Naturgesch. 91 A 12, p. 282.  
*insidiosa* Syn. *Le Cerf*, Bull. Soc. Ent. Fr. 1911, p. 93.  
*insolitus* Par. *Le Cerf*, Bull. Soc. Ent. Fr. 1914, p. 422.  
*intermedia* Cham. *Le Cerf*, Oberth. Ét. Lép. Comp. 11, f. 4643.  
*intermedia* Par. *Le Cerf*, Oberth. Ét. Lép. Comp. 17, p. 218. \*  
*inversa* Syn. *Le Cerf*, Oberth. Ét. Lép. Comp. 17, p. 534. \*  
*japona* Mel. *Hmps.* Novit. Zoolog. 26, p. 91.  
*kabylaria* Syn. *Le Cerf*, Ét. Lép. Comp. 17, p. 534. \*



- kalavrytana Dips. *Shelj.* Iris 38, p. 183.  
 kautzi Cham. *Rssr. Ztschr. Oestr. Ent. Ver.* 15, p. 101. \*  
 keshantschikovi Cham. *Pglr.* Iris 28, p. 54. \*
- louisae Cham. *Le Cerf.* Bull. Soc. Ent. Fr. 1915, p. 54.  
 lucasi Syn. *Le Cerf.* Oberth. Ét. Lép. Comp. 19, p. 13.  
 lugubris Syn. *Rag. Boll. Labor. Zool. Portici* 16, p. 213.
- maghrebica Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 17, p. 441.  
 margaritosa Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 19, p. 30.  
 major, Cham. *Rothsch.* Bull. Soc. Ent. Maroc. 5, p. 337.  
 marocana Syn. *Le Cerf.* Ét. Lép. Comp. 17, p. 534.  
 martjanovi Syn. *Shelj.* Neu. Beitr. syst. Ins. 1, p. 104.  
 melanina Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 11, p. 320.  
 melanoxanthia Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 19, p. 28.  
 meieri Cham. *Std.* Iris 35, p. 31.  
 micra Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 11, f. 4663.  
 mimus Syn. *Le Cerf.* Oberth. Ét. Lép. Comp. 19, p. 17. \*  
 miranda Dips. *Le Cerf.* Bull. Soc. Ent. Fr. 1914, p. 423.  
 molybdoceps Aeg. *Hmps. Novit. Zool.* 26, p. 82.  
 montaudeni Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 19, p. 37.  
 montelli Sphec. *Löfqu. Notul. Ent.* 2, p. 83. \*  
 moupinicola Syn. *Strd. Catalog. Lep.* Nr. 31, p. 30.
- nigrifrons Cham. *Le Cerf.* Bull. Soc. Ent. Fr. 1911, p. 244.  
 nigrobarbata Cham. *Rbl. Ann. Wien. Hofmus.* 30, p. 144.  
 norma Dips. *Le Cerf.* Bull. Soc. Ent. Fr. 1914, p. 423.
- oberthüri Dips. *Le Cerf.* Oberth. Ét. Lép. Comp. 17, p. 268.  
 oberthüri Sphec. *Le Cerf.* Bull. Soc. Ent. Fr. 1914, p. 422.  
 obscura Micr. *Le Cerf.* Bull. Soc. Ent. Fr. 1914, p. 274.
- orophila Sphec. *Zukow. Int. Ent. Zeitschr.* 23, p. 20.  
 pallipes Cham. *Le Cerf.* Bull. Soc. Ent. Fr. 1925, p. 211.  
 palustris Cham. *Kautz, Zeitschr. Oestr. Ent. Ver.* 12, p. 1. \*  
 phoenix Cham. *Le Cerf.* Bull. Soc. Ent. Fr. 1925, p. 210.  
 pistarcha Aeg. *Meyr. Exot. Microlep.* 4, p. 50.  
 pouloti Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 19, p. 32.  
 polycincta Syn. *Le Cerf.* Oberth. Ét. Lép. Comp. 19, p. 19.  
 powelli Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 11, f. 4664.  
 producta Syn. *Mats. Ins. Matsumur.* 6, p. 6. \*  
 pygmaeum Dips. *Rbl. Anzeiger Akad. Wien* 36, p. 361.
- quercus Con. *Mats. 1000 Ins. Suppl.* 3, p. 87. \*
- rondouana Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 19, p. 32. \*
- shakojianus Micr. *Mats. Ins. Matsumur.* 6, p. 8. \*  
 sicula Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 19, p. 27.  
 simonyi Lenyra *Rbl. Anzeig. Akad. Wien* 36, p. 361.  
 subceriaeformis Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 11, f. 4650.  
 synagriformis Par. *Rbr. Cat. Lep. Andal.* 2, p. 148. \*
- tenebrosa Dips. *Pglr.* Iris 28, p. 53.  
 theryi Syn. *Le Cerf.* Oberth. Ét. Lép. Comp. 17, p. 534. \*  
 tingitana Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 11, f. 4644.  
 tristis Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 11, f. 4655.  
 tunetana Dips. *Le Cerf.* Oberth. Ét. Lép. Comp. 17, p. 269.
- xanthia Cham. *Le Cerf.* Oberth. Ét. Lép. Comp. 11, f. 4653.
- yezoensis Aeg. *Hmps. Novit. Zool.* 26, p. 81.  
 yezonica Par. *Mats. Ins. Matsumur.* 6, p. 7. \*



## 25. Family: Cossidae.

### 1. Genus: **Duomitus** Btl.

This Genus is classified in Vol. 10, p. 813 and Vol. 14, p. 546 as *Xyleutes* Hbn., the type of which is *strix* Cr. *Duomitus* Btlr. is based on the species *ceramica* Wkr. = *lignosa* Btlr., which varies somewhat in the arrangement of the markings from *strix* (Vol. 10, pl. 97 b), but otherwise quite fits in with the Genus *Xyleutes*. When HOULBERT in his monograph regarding *Duomitus* states that same is entirely different from *Xyleutes*, this would seem to be an exaggeration, even when one considers that a specialist usually goes rather far in subdivision. One need have no compunction in combining the two Genera and it is all the easier to give the older name the preference, as all the species placed here are subdivided under so many generic names that even prescriptive rights will not be impinged. The american species, of which a few hitherto have been designated as *Xyleutes*, have been denominated since 1882 as *Prionoxystus* Grote, so that no misunderstanding can arise in that quarter. — Besides it must be remarked that *Xyleutes-Duomitus* would be better inserted before *Azygophleps* (Suppl. Vol. 2, p. 244) instead of right at the beginning. Apart from the arrangement of the markings, the similarity of *Xyleutes* and *Azygophleps* is so great, that AURIVILLIUS felt inclined to unite them. — The following experience with *Xyleutes* species may be of interest: Dr. SEITZ when in India was presented with a number of *X. leuconotus* by some natives and these all soon went greasy in the paper covers. He then asked the Hindus to excise the contents of the abdomens and fill same with cotton wool before placing them in the papers and he showed them how to do this with a freshly killed specimen. Presently the natives brought him some boxes with living *Xyleutes* moths that were crawling about on the bottom of the boxes. On examination it proved that all the moths had been dealt with according to instructions, but without having first been killed, as it is contrary to native religious commandments to take the life of anything living! The natives evidently preferred to follow the precepts without regard to the suffering and cruelty involved, in a desire to carry out the instructions they had received.

### 2. Genus: **Cossus** F.

**C. cossus** L. (Vol. 2, p. 419, pl. 53 c). The dark Lapland form *stygianus* Stich. has long been known; *cossus*. the larvae feed in birch stems. *subnigra* O. Schultz was bred from a larva found in Germany without indication as to the food plant. This form certainly differs from *stygianus* in that the segments of the abdomen have no pale edges. — **nigra** Dietze from Locarno is a sooty black, in contrast to the dusky dark brownish of *stygianus*; *nigra*. collar and abdomen are velvety black, only the vertex retains a yellowish sheen. Subapical and discal areas of forewings are slightly paler whitish grey. No particulars are given of the hindwings. — **aceris** Griep was *aceris*. bred from larvae feeding in maple. Forewings very dusky. In central area there are quite a large number of olive green scales. Hindwings impure grey with few markings and fairly typical. — The author bred a moth from a larva feeding in a birch stem found at Frankfort on the Oder, which was exactly like *stygianus*. Possibly *subnigra* had also fed on birch. — **orientalis** Gaede is darker and larger than *stygianus*. On forewings the *orientalis*. pale area of a normal *cossus* is generally discernible in its outer area from costa to lower end of disco-cellular nervure. A black line, that is very thick, proceeds from anal angle vertically to costa. Similarly there is the posterior part of a submarginal line. Hindwings very dark, only the base and partially also the cell are somewhat paler. Underside scarcely darker than typical. 62—90 mm. N. Corea. — **albescens** Kitt from Albar- *albescens*. racin is partially suffused with white. On forewings apex and central costal zone are basally whitish grey. Also thorax has a whitish grey centre. The markings on the pale ground colour are distinct and clear. There is a faint resemblance to *C. terebra*.

**C. osthelderi** Daniel is like a small *cossus* L. with creamy white ground colour on both wings. Forewings *osthelderi*. somewhat more truncate, the central area more profusely striated with black. In consequence of the pale ground colour all striations stand out more prominently, also on hindwings. Body is as pale as the wings, a black streak is indicated on collar, however there is no yellow band. Shaft of antennae is black, the long pectinations are white, ♂ 51—55 mm. N. Amanus.



*cheesmani*.

**C. cheesmani** Tams. Closely related to *C. aries* Pnglr. (Vol. 2, p. 420, pl. 53 b). Forewings white. A pale dull yellowish patch between the costa and upper wall of cell, similarly between end of cell and outer margin and again below cell to inner margin except in the region of the upper submedian nervure. In *aries* the yellow patches are less extensive than is shown in the illustration. The dark striations seem to be less pronounced in the marginal area of *cheesmani*. The pale hindwings on which there are only quite insignificant markings are very different. ♂ 48 mm. Arabia.

*colossus*.

**C. colossus** Stgr. (Vol. 2, p. 420) (16 b). We are now giving an illustration of this species which was omitted in Vol. 2.

### 3. Genus: **Holcocer** Stgr.

*H. consobrinus* Pnglr. (Vol. 2, p. 421, pl. 53 b). This species varies considerably in size (25—50 mm), also the form and distinctness of the submarginal line of forewings varies in each of the 8 specimens before me. The central band, when it is present at all, is very widened on costa. — *sheljuzhko*i Schaw. has a greyer ground colour. There is always a spot on vein 3 at outer margin, which only 2 of my *consobrinus* also show. This spot conjoins with the submarginal line and median band. The main difference from *consobrinus* seems to be that the median band is scarcely widened at costa. The size also varies considerably: 35—55 mm expanse. Aksu.

*H. arenicola* Stgr. (Vol. 2, p. 421, pl. 53 d) and *insularis* Stgr. (Vol. 2, p. 422, pl. 53 e). Whilst the form *japonica*. *insularis* from Askold is decidedly smaller than *arenicola*, *japonica* Gaede on the other hand is somewhat larger and the markings, which in *insularis* are already somewhat less monotonous, become still more contrasting through the paler transverse stripes. Hindwings and abdomen are quite as brown as in *insularis*, forewings a purer brown, not fuscous, the paler patches grey. The inner half devoid of markings, a paler patch in median area *insularis*. from costa to inner margin, 44—50 mm. Yokohama. — We are giving a fresh illustration here of *insularis* (16 b).

### 5. Genus: **Hypopta** Hbn.

*nycteris*.

**H. nycteris** John. Similar to *thrips* Hbn. (Vol. 2, p. 424, pl. 53 h) but the ground colour is a more ashy grey, the ocellus like mark is smaller and not circumscribed by a paler border. On the other hand a grey-brown shade extends from this spot to the apex. Antennae more boldly pectinated than in *thrips*. There are dark brown spots on costa and a similar coloured streak close below end of cell. Short dark striations in outer area. At margin there are minute triangular spots. Hindwings brownish grey. 36 mm. N. Ferghana.

*herzi*.

**H. herzi** Alph. (Vol. 2, p. 424) (16 b). The specimen illustrated as *herzi* in Vol. 2, pl. 52 h probably figures a variety of *turcomanica* (Vol. 2, pl. 53 h). We are therefore now giving an illustration of *herzi* from a cotype in the collection of PÜNGELER. It would almost seem as if *herzi* were only a pale form of *turcomanica*. *intractatus* Stgr. (Vol. 2, p. 424) would then also belong hereto, it is not only faintly marked, but pale and the markings are quite diffuse. The specimen in the PÜNGELER collection is quite perfect and not worn. In the same collection there is one ♂ from Kolp (Armenia, KORB) which has grey-white ground colour and not yellowish white. It has a few short rows of dots on costa near apex and besides a submarginal row. It has a great resemblance to *turcomanica*, although it is classified under *intractatus*. *herzi* is usually yellowish white with dark olive brown striations and spots, of which a few are on the costa. A somewhat bolder row of dots extends from behind the cell to centre of inner margin. Another such row that proceeds from apex exactly joins with same. In *turcomanica* on the contrary the latter row extends outwardly of the row that terminates on inner margin, and diffuses. All the other differences in the ground colour and distinctness of other markings are not decisive, according to APHERAKY. If this is so, also the 2nd specimen of *herzi* in the PÜNGELER collection would have to be classified with *turcomanica*.

*issycus*.

**H. issycus** B.-Haas (i. l. ?) (16 b). Somewhat similar to *turcomanica* Alph. Ground colour of the body is brownish white. Forewings white. The brownish black line from the apex extends downwards to vein 4. Somewhat inwardly of same a line then begins that ends slightly behind the centre of inner margin. Short black striations on costa. Basally of the two main lines there is a brownish shade. Similar patches in basal area and in centre of outer margin. There are small brown spots at outer margin, inwardly of same to the two main lines the colour is white. Fringes are marked with dark checks. Hindwings and abdomen faintly reddish brown. ♂ 34 mm. Issyk-kul.

*mussolinii*.

**H. mussolinii** Trti. Very similar to the remarkably constant *reibelli* Oberth. (Vol. 2, p. 425, pl. 53 h). It is larger, ground colour somewhat darker. The silvery stripe on costa does not vary. The triangular central spot extends nearer to the outer margin. Also the lowest streak that projects threequarters to the anal angle, whilst in *reibelli* it only goes about as far as the middle of the inner margin. ♂ 37 mm. Cyrenaica.

### 6. Genus: **Paropta** Stgr.

*frater*.

**P. frater** Warn. This species was actually described as a *Cossus*, but as it is compared to *henleyi* Rothsch. and *niloticus* Joan. we are placing same in this Genus. WARNECKE deems *henleyi* and *niloticus* to be separate



species. Our illustration (Vol. 2, p. 425, pl. 55 l) represents *niloticus*. The latter is recognisable by the much fainter striations of forewings, in basal area besides they are quite absent; hindwings on upper and undersides are almost completely or nearly devoid of markings. Apart from the bold main lines *henleyi* has a denser network of finer lines. Also on hindwings there are distinct reticular lines. On underside the costa of hindwings is blackish. In *frater* the forewings are irregularly covered with fainter and distincter black striations. In the ♀ especially there is a bolder line behind the cell (somewhat as is shown in the illustration of *cossus* ♂ in Vol. 2, pl. 52 b). The ground colour is ashy grey with yellowish tone. Hindwings of ♂ and ♀ are devoid of markings. 30—45 mm. Sanaa (Arabia), presumably also extending into palaearctic territory.

## 7. Genus: **Dyspessa** Hbn.

*D. ulula* Bkh. (Vol. 2, p. 426, pl. 52 k). — **pallida** Rothsch. ♂ is described: The white spots much more *pallida*. extensive and diffuse. Sometimes the ground colour is quite suffused with white. The ♀ on the other hand is as dark as *infuscata* Stgr. Algeria. Whether *pallida* differs from the species dealt with in Vol. 2, p. 426, pl. 52 k as *pallidata* Stgr., cannot be discerned from the description. The following two forms: *marmorata* and *algeriensis* are now held to be separate species.

*D. marmorata* Rmb. (Vol. 2, p. 426). The subform **maroccana** Rothsch. is to be added. It is much darker *maroccana*. brown than type. The pale patches are almost entirely restricted to the margin and near same. The ♀ is also darker and the white patches smaller. Morocco. — **nigrita** Wagner in consequence of its size, is clearly to be *nigrita*. classified with *marmorata* Rmb. Forewings and thorax pure white with very bold markings. Hindwings and abdomen blackish. On underside all wings are black, but the costa of hindwings is whitish. Also the legs and the underside of the entire body are white. Anatolia. A very similar specimen, as far as the upperside is concerned, is placed under *ulula* in the PÜNGELER collection. It was captured at Digne. However the underside is also pale.

*D. algeriensis* Rmb. (Vol. 2, p. 426). — **cypriaca** Rbl. from Cyprus differs from *algeriensis* by the complete absence of all white markings except in the middle cell of forewings and by the fringes which are devoid of checks. In the PÜNGELER collection there are 1 ♂ and 2 ♀♀ of *algeriensis*. The description given of *cypriaca* would also apply to these, except that one of the ♀ has fringes with checks. *infuscata* Stgr. from Pontus, according to a pair in the same collection, has a faint pale patch at two-thirds the length of costa. To what degree the species and forms mentioned here can claim specific rank, is at the moment more or less a matter of personal opinion. Perhaps with the exception of *marmorata*, the series of *ulula*, *algeriensis* etc. in the PÜNGELER collection embrace specimens under one and the same denomination that are of totally different appearance, whilst often specimens under different separate classifications are so alike that they can scarcely be differentiated. — It would seem therefore, as if only a careful examination of the genitalia of a large number of specimens of the various forms and species of the *ulula* group, together with exact data as to the areas of their distribution and occurrence will bring satisfactory elucidation as to their specific grouping. It would for instance appear quite possible that the specimen from Digne mentioned under *nigrita* of *ulula*, may actually be *nigrita*, but at the moment this cannot be definitely asserted.

**D. hethitica** Dan. Similar to *pallidata* Stgr. (Vol. 2, p. 426, pl. 52 k) but larger, 27—37 mm. The dark *hethitica*. markings of forewings are more inclined to be dark grey than brown. The cell is white, standing out prominently; the costa also is white in the basal two-thirds. Hindwings pure white with dark veins. In the ♀ the hindwings are somewhat darker. Marash. — Also *kurdistanica* (Vol. 2, p. 451) is similar to *pallidata*. The author should have been stated as TURATI (not BANG-HAAS) who had illustrated same in Nat. Sicil. 21, pl. 6, Fig. 28.

**D. turbinans** Trti. The denomination has been made owing to its mannerism when attracted to light. *turbinans*. Other species of this Genus when attracted to a lamp settle on the sheet and crawl around. *turbinans* restlessly encircles the lamp. In other respects *turbinans* differs from *kabylaria* B.-Haas (which was rather too grey in colour in the illustration in Vol. 2, pl. 52 k) by dark spots on forewings near the fringes and a somewhat paler marginal area. Nevertheless the dark spots near the fringes also in *kabylaria* extend to the outer one-third of costa, although this is not distinctly shown in the illustration. The dark patch on inner margin with its pale surroundings as shown in our illustration of *kabylaria* is very distinctive and well executed. ♂ 18—24 mm. Cyrenaica.

**D. cyrenaica** Trti. Compared by the author to *nigritula* Stgr. and *minima* B.-Haas (Vol. 2, p. 427, *cyrenaica*. pl. 52 k) and established from a single ♀. All wings blackish brown with slight violet sheen being also transparent. Costa of forewings finely yellowish, this however does not extend as far as the apex. At close of cell there is a faint yellow patch and a black dot. According to the illustration in Vol. 2, pl. 52 k, *minima* is considerably paler. One might assume that *cyrenaica* is actually a small specimen of *algeriensis*. Cyrenaica.

*D. jordana* Stgr. (Vol. 2, p. 427, pl. 55 l). Large specimens (37 mm) are denominated **maxima** Trti. *maxima*. These are typical of Cyrenaica, but a ♂ in the PÜNGELER collection is equally large. *agilis-magna* is only a trifle smaller.

**D. emilia** Stgr. The ♂ has already been described and illustrated, see Vol. 2, p. 426, pl. 52 k. One ♀ of *emilia*. the species in the PÜNGELER collection somewhat resembles *roborowskii* (Vol. 2, pl. 52 i) in colour of body and forewings, but the hindwings of *emilia* ♀ are faintly brownish. On forewings the dark median band is absent.



*saxicola.*

**D. saxicola** *Christ.* is very similar to the preceding species, but considerably larger. Ground colour of forewings of ♂ yellowish, the diffuse brown band is straighter than in *emilia* and the brown anterior mark is absent. Hindwings are much darker than in *emilia*. ♂ 30 mm. Transcaucasia.

*kruegeri.*

**D. kruegeri** *Trti.* Body dark olive brown. Forewings somewhat paler than the body and with yellow veins. Hindwings a shade paler still, the veins scarcely stand out at all. In the ♀ markings of forewings are somewhat more diffuse, the hindwings inclined to be darker and the veins are also scarcely any paler. 30—35 mm. The generic name of *Isoceras* *Trti.* is proposed for this species, as the antennae of the ♀ are similarly pectinated as in the ♂. Also the arrangement of the markings differs considerably from that of the other *Dyspessa* species.

### 8. Genus: **Stygia** *Latr.*

*S. ledereri* *Stgr.* (Vol. 2, p. 428, pl. 55 k). In this Volume *Dieida persa* *Strd.* was erroneously dealt with on p. 2 under the *Zygaenidae*. *persa* differs from *ledereri* by its legs. It has black legs; middle tibiae and tarsi are golden yellow. In *ledereri* the legs are black, tarsi somewhat grey. Besides *persa* is somewhat larger. Whether the denomination is justifiable, is a matter of opinion. *persa* has been discovered by PFEIFFER and DANIEL also in Marash and they have established its relationship with *ledereri*.

### 9. Genus: **Zeuzera** *Latr.*

*Zeuzera pyrina* *L.* (Vol. 2, p. 429, pl. 52 g). — **paulomaculata** *Stich.* (16 b) is a ♀ that has only very few spots on forewings. These few however are generally very large. — **octopunctata** *Bsd.* is a dwarf form from Sicily. Besides the usual 6 spots on thorax it has 2 further spots at base of abdomen. — ab. **conflua** *Schultz* has the spots of forewings enlarged and partially conjoined to a fairly wide extent, especially at inner margin. On the other hand in a ♀ specimen in the PÜNGELER collection the spots are heavily confluent between vein 2 and the costa, less so at inner margin.

*leuconotum.*

**Z. leuconotum** *Btlr.* "Closely related to *pyrina*, but considerably larger. No spots anteriorly on thorax." ♀ 75 mm. Tokci (Japan).

### 9a. Genus: **Azygophleps** *Hmps.*

This Genus, that is distributed in numerous species over the Indian and African territories, is dealt with fully in Vol. 10, p. 821 and Vol. 14, p. 544. It differs theoretically from *Zeuzera* chiefly by the absence of the bar between the cell and vein 8 of hindwings. The markings on the other hand are so very different that the two Genera can scarcely be mistaken for one another.

*A. albofasciata* *Mr.* (Vol. 10, pl. 97 c). This species is chiefly an Indian one, but it occurs at Kashmir on Palaearctic territory. Forewings dark brown, densely striated with blackish. Only below the costa there is a wide white radial band. Hindwings pale brown with faint reticular lines. 55—65 mm.

*helenae.*

**A. helenae** *Le Cerf.* Similar to *nubila* *Stgr.* (Vol. 2, p. 429 as *Zeuzera*). Thorax grey-brown, abdomen somewhat paler, with similar streaks as in *nubila* (pl. 52 g). Forewings pale greyish red with delicate black lattice markings, especially on costa, in cell and at inner margin. These reticulations are absent below cell and at outer margin above the upper submedian nervure. At disco-cellular nervure there is a black spot and below the cell a black nebulous patch. Hindwings grey-white with distinct striations only at anal angle. In the ♀ the black dusting is more extensive. Hindwings with more numerous striations. 40—53 mm. Morocco.

*babadzhanidii.*

*A. nubila* *Stgr.* (Vol. 2, p. 429, pl. 52 g). **babadzhanidii** *Shelj.* is more regularly duskily dusted. Only the base is paler. Body and hindwings do not vary from those of *nubila*. ♂ 33 mm. Transcaucasia.

### 10. Genus: **Phragmataecia** *Newm.*

*cinerea.*

*Ph. castaneae* *Hbn.* (Vol. 2, p. 429, pl. 54 h). — **cinerea** *Teich* denotes small, narrow-winged specimens of greyish or pale brownish grey ground colouration. — *sicca* *Dhl.* is similarly described. It is however larger and in typical specimens the blackish dots that are present in *cinerea*, are absent here. — **melaina** *Daniel* denotes dark ♂ specimens with grey-black thorax. The collar which is of normal colour contrasts in its paleness. Forewings duskily black, only the costal margin is finely paler. Hindwings faintly dusky, abdomen of normal colouration. This form is found among typical specimens in Hungary.



11. Genus: **Phragmacossia** Schaw.

This Genus differs from *Azygophleps* Hmps. by the terminal spurs to the mid and hind tibiae. It differs from *Phragmataecia* by the more prominent palpi. Type *reticulata* Pnglr. (Vol. 2, p. 430, pl. 52 h).

**Phr. tigrisia** Schaw. (16 e). Forewings whitish brown with a few distinct dark lattice lines in marginal *tigrisia* area; in *reticulata* the most prominent lines are in the median area. Thorax and antennae are somewhat more pronouncedly brown. Hindwings are only slightly paler than forewings. ♂ 45 mm. Mossul.

## Alphabetical List

with references to the original descriptions of the forms of palaearctic Cossidae enumerated in Supplementary Volume 2.

\* indicates that the form is also illustrated in the place cited.

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| <p><i>aceris</i> Coss. <i>Gricp</i>, Int. Ent. Zeitschr. 12, p. 84.<br/> <i>albescens</i> Coss. <i>Kitt</i>, Zeitschr. Oestr. Ent. Ver. 10, p. 29.<br/> <i>albofasciata</i> Az. <i>Mr.</i> Descr. Lep. Atkins. p. 37.</p> <p><i>babadzhanidii</i> Azyg. <i>Schelj.</i> Iris 27, p. 21. *</p> <p><i>cheesmani</i> Coss. <i>Tams</i>, Ann. Mag. Nat. Hist. (9) 15, p. 147. *<br/> <i>cinerea</i> Phrag. <i>Teich</i>, Stett. Ent. Zeitschr. 1884, p. 212.<br/> <i>conflua</i> Zeuz. <i>Schultz</i>, Nyt Mag. Naturv. 43, p. 121.<br/> <i>cypriaca</i> Dysp. <i>Rbl.</i> Verh. Zool.-Bot. Ges. Wien 77, p. (62). *<br/> <i>cyrenaica</i> Dysp. <i>Trti.</i> Nat. Sicil. 1919, p. 263. *</p> <p><i>frater</i> Par. <i>Warn.</i> Int. Ent. Zeitschr. 23, p. 389. *</p> <p><i>helenae</i> Azyg. <i>Lc Cerf</i>, Bull. Soc. Ent. Fr. 1924, p. 27.<br/> <i>hethitica</i> Dysp. <i>Daniel</i> Mitt. Münch. Ent. Ges. 22, p. 16.</p> <p><i>issyeus</i> Hyp. <i>O. B.-H.</i> Seitz Macrolep., Suppl. 2, p. 242. *</p> <p><i>japonica</i> Holc. <i>Gaede</i>, Deutsche Ent. Zeitschr. 1929, p. 304. *</p> <p><i>kruegeri</i> Dysp. <i>Trti.</i> Atti. Soc. Zool. Ital. 63, p. 51. *</p> <p><i>leueonotum</i> Zeuz. <i>Btlr.</i> Trans. Ent. Soc. Lond. 1881, p. 22.</p> | <p><i>maroccana</i> Dysp. <i>Rothsch.</i> Novit. Zool. 24, p. 408.<br/> <i>maxima</i> Dysp. <i>Trti.</i> Atti Soc. It. Ilist. Nat. Milano 69, p. 54.<br/> <i>melaina</i> Pragm. <i>Daniel</i>, Mitt. Münch. Ent. Ges. 18, p. 81. *<br/> <i>mussolinii</i> Hyp. <i>Trti.</i> Atti Soc. It. Sci. Nat. 65, p. 222. *</p> <p><i>nigra</i> Coss. <i>Dietze</i>, Ent. Zeitschr. 33, p. 4.<br/> <i>nigrita</i> Dysp. <i>Wagner</i>, Int. Ent. Zeitschr. 24, p. 492. *<br/> <i>nycteris</i> Hyp. <i>John</i>, Revue Russe Ent. 18, p. 91.</p> <p><i>octopunctata</i> Zeuz. <i>Bsd.</i> Icon. 2, p. 181. *<br/> <i>orientalis</i> Coss. <i>Gaede</i>, Deutsche Ent. Zeitschr. 1929, p. 303. *<br/> <i>osthelderi</i> Coss. <i>Daniel</i>, Mitt. Münch. Ent. Ges. 22, p. 95.</p> <p><i>pallida</i> Dysp. <i>Rothsch.</i> Novit. Zool. 24, p. 407.<br/> <i>paulomaculata</i> Zeuz. <i>Stich.</i> Zeitschr. Wiss. Ins.-Biol. 14, p. 200. *</p> <p><i>saxicola</i> Dysp. <i>Christ.</i> Rom. Mem. Lép. 2, p. 5. *<br/> <i>sheljuzkoi</i> Holc. <i>Schaw.</i> Mitt. Münch. Ent. Ges. 20, p. 138. *<br/> <i>sieca</i> Phrag. <i>Dhl.</i> Ent. Zeitschr. 43, p. 148.<br/> <i>subnigra</i> Coss. <i>Schultz</i>, Soc. Ent. 25, p. 84.</p> <p><i>tigrisia</i> Phrag. <i>Schaw.</i> Verh. Zool.-Bot. Ges. Wien 73, p. (161).<br/> <i>turbinans</i> Dysp. <i>Trti.</i> Atti Soc. It. Sc. Nat. 65, p. 35. *</p> |
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## 26. Family: Hepialidae.

By M. GAEDE.

### 1. Genus: **Hepialus** F.

*H. humuli* L. (Vol. 2, p. 434, pl. 54 b, c). In districts where the species is common, it is relatively easy to secure a series of specimens showing widely different markings. Almost unicoloured ♀ specimens, devoid of markings are named **dannenbergi** Steph. The ground colour varies in all shades from pale yellow through brown to red, but these colour variations are not denominated, the lack of markings being the characteristic feature. — The name *pusillus* Steph. for small specimens is mentioned, merely for the sake of completeness.

*H. sylvinus* L. (Vol. 2, p. 435, pl. 54 g). We have to add the name *radiata* Bod. In same the 2 normal pale bands are almost completely extinct and replaced by darker brown than the buff brown ground colour. The veins are very definitely marked with brown towards the outer margin and this creates an almost exotic impression. Hindwings faintly suffused with rose. Found in Belgium. — *kruegeri* Trti. is almost certainly only a form of *sylvinus*. The apex of forewings is slightly more acute. The terminations of both white bands are more closely approximated on the inner margin. The triangular pale spot in centre of costa has at its lower angle a sharper point than in *sylvinus*, where it is usually more or less rounded off. Occasionally this triangular mark is even entirely absent in *sylvinus*. In the ♀ the outer band is scarcely forked at costa, there is only a faint projection outwardly. In *sylvinus* on the other hand both branches are more or less equally long. Ficuzza (Palermo) and Bulgaria. — *victoriae* Petkow. Ground colour of the ♂ rusty red, the white markings considerably enwidened. The two main lines that form bands in this form, are widely conjoined at inner margin. The submarginal band is forked at costa. The small "V" marking of typical *sylvinus* is also much wider and extends to costa. By this means a patch of the ground colour is quite isolated at costa between its branches. Hindwings approximately as in typical specimens. Bulgaria.

*H. tunetanus* Oberth. Thorax and forewings reddish brown, abdomen and hindwings similarly but slightly paler. Fringes without checks or blotches. ♂ 32 mm. Tunis. Perhaps this is related to *fusconebulosa-gallicus* and *aemilianus* (Vol. 2, p. 434 and 435), which are also almost devoid of markings.

*H. amasinus* H.-Schäff. Ground colour brownish yellow, darker at base and in marginal area. The 2 white transverse lines are narrow and distinct. The inner line commencing just before the centre of inner margin proceeds somewhat inwards to the centre of wings, then at a rectangle outwards, the upper branch being about as long as the lower one. The outer line from two-thirds of inner margin extends in an almost straight line to near the apex. At costa and before the outer margin there are short white streaks, that border on brown semicircular marks. Hindwings grey-brown. ♂ 24 mm. Asia Minor. This species has for long been the subject of misconception and even PFITZNER had quite a different species in his mind, when dealing with the species in Vol. 2, p. 435, pl. 54 e, as was recently ascertained by PFLEIFFER. Refer also in this regard to the following species.

*H. adriaticus* Pfeiff. This is the name that appertains to the species that has hitherto been wrongly referred to in books and classified in collections as *amasinus*. If one compares the original and recent descriptions of *amasinus*, one will observe considerable divergences. The genuine *amasinus* is actually so far only to be found in Asia Minor. Whether specimens reported from Greece and Sicily belong to same or to *adriaticus*, has yet to be definitely ascertained. Most of the incorrect *amasinus*, which now have to be re-classified *adriaticus*, originate from Istria and Dalmatia.

*H. ganna* Hbn. (Vol. 2, p. 436, pl. 54 f.) It was already mentioned in Vol. 2, that the spots of the bands are often isolated. Extreme specimens in which only vestiges of these spots are retained, are named **reducta**. — *confluens* Hellw. is a name given to inversely marked specimens in which the dentate spots are expanded, becoming confluent in all directions.

*H. hecta* L. (Vol. 2, p. 436, pl. 54 g) Sometimes small silvery white spots occur at outer margin of forewings over the inner angle. If these spots extend along the entire margin and if they are fairly large, the form



- decorata*. is named **decorata** *Krul*. This is described from East Russia, but it probably occurs occasionally everywhere, where the species is common. These spots can sometimes be conjoined with the outer band thus forming radial streaks. — Still more extreme specimens in which there are also wide silvery streaks on the hindwings at the margin and in the interstices between the dark veins are called **strigosa** *Hartw.* — **hectica** *O. B.-H.* (15 e) has golden stripes instead of the normal silvery ones. The inner stripe consists of 3 confluent spots. The outer one of separated spots of which 3 are at apex, then one obliquely inwards and somewhat lower and then a larger one at inner margin. This form can also occur anywhere. I have a specimen from Sojmonowsk (in the Urals) in which the spots are distinctly yellow, but not quite as extreme as is the case in *hectica*. *hectica* emanates from the neighbourhood of Irkutsk (Sajan).
- fuscoargenteus*. **H. fuscoargenteus** *O. B.-H.* (15 e). Ground colour of the ♂ is black-brown, paler grey in the ♀. The outer band somewhat resembles that of *fuscomaculosa* *de Geer* (Vol. 2, pl. 54 d) in its shape, but it extends rather more vertically. The inner band is like that of *macilentus* (Vol. 2, p. 436, pl. 54 f) but it is more dismembered and the spot markings are coarser. 36—46 mm. Irkutsk (Sajan). — **sordida** *Nordstr.* from Kamschatka resembles *Arctia caja* in the arrangement of its markings. Forewings pale brown with silvery white bands and spots. Hindwings grey-brown with pale brown spots on costa. In one specimen among 3 ♀♀ at my disposal the white markings are heavily mottled with brown.

*H. nebulosus-armoricanus* *Oberth.* In Vol. 2, p. 434 a doubt was thrown on the correctness of the locality indicated for this form. As BANG-HAAS has meanwhile received identical specimens from China, there seems scarcely any doubt left that the original indication of the origin was due to a mistake. The form is therefore certainly not european, the type will have come from Ta-t sien-lu, as it is well known that OBERTHÜR received a lot of material from that quarter.

### 5. Genus: **Phassus** *Wkr.*

- bouvieri*. **Ph. bouvieri** *Oberth.* Whilst *regius* *Stgr.* (Vol. 2, p. 438, pl. 54 b) has only a few golden yellow spots, which are absent in *roseus* *Oberth.* although same is much more profusely coloured red, we have the opposite extreme in *bouvieri*. The ground colour corresponds approximately to that of *Hep. sylvinus-laeta* (Vol. 2, pl. 54 d) on both wings. The arrangement of the markings scarcely differs from that of *regius*, only there are golden yellow spots distributed over the entire forewing. ♂ 55 mm. Ta-t sien-lu.

## Alphabetical List

with references to the original descriptions of the forms of palaearctic Hepialidae enumerated in Supplementary Volume 2.

\* indicates that the form is also illustrated in the place cited.

<i>adriaticus</i> <i>Hep. Osth. Mitt. Münch. Ent. Ges.</i> 41, p. 47.	<i>kruegeri</i> <i>Hep. Trti. Natural. Siciliano</i> 21, p. 123. *
<i>bouvieri</i> <i>Phass. Oberth. Ét. Lép. Comp.</i> 7, p. 671. *	<i>pusillus</i> <i>Hep. Steph. Societ. Entomol.</i> 38, p. 46.
<i>confluens</i> <i>Hep. Hellw. Gr.-Schmett. N.-Tirols</i> , p. 328.	<i>radiata</i> <i>Hep. Bod. Rev. Mens. Namur</i> 1910, p. 69.
<i>dannenbergi</i> <i>Hep. Steph. Societ. Entomol.</i> 38, p. 45.	<i>reducta</i> <i>Hep. Deutsch, Zt. Oestr. Ent.-Ver.</i> 7, p. 30.
<i>decorata</i> <i>Hep. Krul. Societ. Entomol.</i> 23, p. 18.	<i>sordida</i> <i>Hep. Nordstr. Ark. f. Zool.</i> 20 (12), p. 6.
<i>fuscoargenteus</i> <i>Hep. O. B.-H. Horae Macrolep.</i> 1, p. 83. *	<i>strigosa</i> <i>Hep. Hartw. Ent. Zeitschr.</i> 36, p. 43.
<i>hectica</i> <i>Hep. O. B.-H. Horae Macrolep.</i> 1, p. 84.	<i>tunetanus</i> <i>Hep. Oberth. Ét. Lép. Comp.</i> 13, p. 29. *
	<i>victoriae</i> <i>Hep. Petkow. Arbeit. Bulg. Ges.</i> 6, p. 100.



## Addenda and Errata to Supplementary Volume 2.

### 1. Family: Zygaenidae, Burnets.

With the very extensive more recent literature, especially as appertaining to the Genus *Zygaena*, it was impossible in 1930 to make a complete survey embracing also the older literature. In the meanwhile a great deal of work has been done and especially the asiatic *Zygaenidae* have been subjected to a thorough revision. Besides a number of fresh descriptions and denominations have been established.

### 2. Genus: **Dieida** Strd.

p. 2, line 23 from below. — According to DANIEL, Munich, *persa* Strd. may be held to be identical with *Stygia ledereri* Stgr. At the best *persa* Strd. may be retained as denoting a race of *ledereri* Stgr. Compare also what was said on p. 244.

### 16. Genus: **Zygaena** F.

#### I. Subgen. **Mesembrynus** Hbn.

p. 7, line 27 from top. *Z. erythrus* Hbn. The ab. *hirpina* Zickert (not *irpina* as stated in Vol. 2, p. 18) does not originate from the Riviera, but from Paternopoli (Avellino) Campagna. It flies mid July. The 3 longitudinal streaks of forewing form a solid red area, having suppressed all but vestiges of the dark ground colour on costal, inner and outer margins.

p. 7, line 13 from below. *Z. purpuralis* Brünnich. The type race was described from Denmark (Isle of Seeland), around Copenhagen. I have received from the Zoological Museum of the University of Copenhagen a series of freshly captured danish *purpuralis* from Adserbo and Tisvilde in the north of the Isle of Seeland and captured in July. In general these correspond to the original illustration of BRÜNNICH of his *purpuralis* in regard to size, wing contour and formation of spots. It would appear that *purpuralis* does not — or no longer does — occur in the immediate surroundings of Copenhagen. I therefore take the specimens of those populations from around Adserbo and Tisvilde as typical of *purpuralis*. They are relatively small specimens with short rather rounded off forewings and fairly deep blue-black bodies in ♂, greenish black in ♀ and especially the ♂ has densely haired body. Ground colour in ♂ is generally bluish black and glossy, in the ♀ it is more inclined to be greenish black. The red of the spots of forewings and the hindwings is a rather dull dark carmine. The scales are not less dense, in fact in some ♂♂ they appear to be denser than for instance those of the populations from around Berlin. The size of the spots on forewings adapts itself to the size of the specimen, sometimes the streaks are separated, sometimes they merge, but in no specimen are they interrupted. The wedge-shaped spot is generally small, not expanding towards apex, occasionally it approaches fairly close to margin, in others spot 6 is only faintly indicated. The margins of hindwings in the ♂♂ are only visible at apices and they are lighter than the dark fringes. The ♀♀ have no margin to hindwings and somewhat paler fringes. One ♂ has fairly wide, almost uniformly wide margin to hindwings right to the inner margin: ab. **latemarginata** ab. nov. The few specimens before me from Rörwig, Hornbaek and also from Faxe on Seeland, similarly those from the Isle of Möen scarcely vary at all from the type population. *purpuralis* is said to also occur on the Isle of Fünen near Faaborg. *latemarginata*.

The var. **caledonensis** Reiss from around Oban (Argyle), W. Scotland, is much more thinly scaled than typical *purpuralis*, but is just as densely haired as same. In regard to the sparse scaling, it approaches the var. *nubigena* Led. from the High Alps, but on an average it is larger and has rather bolder clubs to antennae. The central of the red streaks is abbreviated and only diffuses slightly at its extremity, the streaks are merely separated by the blackish veins. The blackish margin at apex of hindwings of ♂ is as in typical *purpuralis*. *caledonensis*.

Irish specimens in my collection, labelled Clare coast and Ardahan, Galway, ex coll. TUTT, captured end of June, show a red colour that appears more or less admixed with yellow and differing from all danish, scottish or german populations known to me. Those from the first-named locality are smaller than *purpuralis*, whilst those from the latter are almost as large as german specimens. In other respects and in the formation of the spots they are very similar. The hairs of the body in the ♂♂ are not more dense, the scaling is partially somewhat weaker than in german specimens. I denominate the race: **hibernica** var. nov. (= *nubigena hibernica*).



*Birchall*). As the locality of the type population I name Ardahan, Galway. Types ♂ ♀ and cotypes in my collection, further cotypes in the Museum at Tring. Whether specimens from english localities belong to *hibernica*, I am not at present in a position to define, as I have none before me. Here must be mentioned ab. *lutescens*. *lutescens* Tutt (from Galway) with yellow markings in place of red. The ab. *obscura* Tutt (Vol. 2, p. 18) of which the original specimens emanate from Carnarvonshire (Wales) has the spots of forewings and in lesser degree the hindwings suffused with black, faint red scales are partially visible.

The *purpuralis* populations from the borders of the north german plains southwards to the alps, excluding the high Alps, which differ from the type race of Seeland by their larger size, more extensive markings, less dense hairiness of the body and thinner scaling of wings, should be denominated with the next oldest name after *purpuralis*, viz: subsp. *pythia* F. The locality of the existing type of *pythia* ex the FABRICIUS collection in Kiel cannot be ascertained and will probably never be known. FABRICIUS simply indicated Germany as the origin. The names *scabiosae* Scher. (Regensburg), *pilosellae* Esp. (Erlangen), *minos* Hbn. (Augsburg) should meanwhile be held to be synonyma of *pythia* \*). All the aberrations denominated in Vol. 2, p. 18 and 19 and in Suppl. Vol. 2, p. 7 under *purpuralis* should be classified here. In place of the name *rubrotecta* Vrtz. the older name: ab *omniconfluens* Vorbr. should be substituted and in place of *plutonia* Vrtz. the name ab. *parvima-*  
*maculata* Vorbr.: *mediointerrupta* Vorbr. is synonymous with the older name ab. *interrupta* Stgr. and *divisa*  
*parrima-* Vorbr. similarly with ab. *seamaculata* Bgff. GUHN describes from Rüdersdorf (Berlin) an alleged dwarf race  
*culata.* as var. *pimpinellae*: it is thinly scaled, colour paler, rose, the grey larvae feed on *Pimpinella nigra*.  
*pimpinelluc.*

*cracoviensis.* HOLIK establishes the var. *cracoviensis* for W. Galicia (Cracow). Wing contour wide, truncate. Scaling coarse, sooty, fairly dense with faint superficial blue gloss, the ♀♀ barely paler or not at all. Red markings and hindwings carmine. The central streak terminating in an almost straight cut outwardly, scarcely curved in at all nor lobate. Hairs of thorax and abdomen short. The most remarkable distinguishing feature is the completely black fringes of the wings.

*kijevana.* The var. *kijevana* Przeg. from Tshary near Teterew, Province Kieff, has elongate relatively narrow forewings, which are accordingly correspondingly pointedly oval at apex. Scaling of ♂ is dense with dull blue-black gloss, the ♀ is more thinly scaled and has duller colouration. Markings of forewings are deep scarlet, very regularly shaped, but fairly narrow. Spot 6 is short and oval and is broadly attached to spot 5. Fringes of forewings pale. Hindwings similarly narrow. Only the ♂ sometimes has indications of a margin through a slight duskiness at apex. The antennae are long and in contrast to the other races, they gradually thicken towards the club. Body moderately hairy. Legs strikingly black. To be classified here: ab. *cingulata* (Bgff.)  
*cingulata.* *Holik* with red abdominal belt; ab. *rubrotecta* (Vrtz.) *Holik*, spots of forewings very distended and confluent, the latter aberration is rare.  
*rubrotecta.*

*erythroides.* PRZEGENDZA describes from Menaggio on Lake Como in July the var. *erythroides*. This race has very wide, brilliant red markings on forewings. The central streak expands fan-shape towards the margin where it diffuses, terminating in a wide clear cut edge. The wings are narrow of dull black ground colour without a superficial gloss. In many (abt. one-third) of the specimens of this race the red wedge-shaped spot is much enlarged in both sexes, so that only a relatively small black outer margin is all that remains of the ground colour. The spots in the majority of cases are scarcely divided by the ground colour. Fine streak-like red dustings extending over the lower streak to the hind margin (similar to those of *erythrus*) are striking in this race. This streak is more pronounced in ♂ than in the ♀. The ♀ is much less densely scaled, corresponding to ab. *griseus* Bgff., markings otherwise being as in ♂. Antennae are relatively short.

*carnica.* From the Carnic Alps, Sappada, 1300 m altitude, var. *carnica* Vrtz. is denominated. According to the description it is an intermediate form between *nubigena* Led. and *pluto* O., VERITY compares it to *carsica* Rocci from Karst, which however is not diaphanous. Margins of hindwings are about as those of *carsica* Rocci.

*sareptensis.* p. 8, line 10 from below, subsp. *sareptensis* was first described by KRULIKOWSKY (= *sareptensis* i. l. *Stgr.*, *sareptensis* Rbl.) from specimens from the central Urals, Ufa, Kasan, Sarapol and Saratov. To judge by specimens before me from Werchne-Uralsk and Kalkanowa in the S. Urals, *sareptensis* is scarcely larger than *pythia* F. and has distinctly more thinly scaled, paler forewings with normal spots. The hindwings especially are pale red, almost rose and without any margin. The red often seems to have an admixture of yellow. In the ♀♀ the dark patches of the forewings are more or less whitish grey or with a yellowish hue. Sometimes there are traces of a white collar and of whitish edged scapulae. Specimens from Sarepta and the other localities

\*) In the register of labels of FABRICIUS, which is still in existence, he has quite rightly enumerated *scabiosae* Scher. and *pilosella* Esp. as synonyms of *pythia* F.



indicated will probably not differ materially. Here we must classify ab. *redlichi* Krul. (Sergijevsk, Samara) *redlichi*. with red abdominal belt.

p. 9, line 19 from top. I possess specimens identical with subsp. *tianschanica* Bgff. from the Tarbagatai, Saur mountains, from an altitude of 2800 m.

p. 9, line 29 from top: read *serpillum* instead of *serphyllum*.

p. 9 *Z. erebaea* Bgff. According to a specimen of a ♂ in my collection with a label of HABERHAUER, this also occurs in the Taurus.

p. 9 *Z. corycia* Stgr. From the original specimens of STAUDINGER (2 ♂♂), I consider it more correct to deem the specimens of LEDERER from the Taurus as the type and not those from Manissa, as there is a doubt in regard to the latter locality. Compared to *brizae* Esp. the typical *corycia* is smaller with shorter more truncate forewings, the scaling is thinner and the red duller and not so bright. One of the ♂♂ before me shows the streak marks 3—5 almost intersected by the dark ground colour.

The subspecies *staudingeriana* Reiss (= *corycia* Seitz) from Bjarre in the Lebanon, 1—15 June 1931 (1300—1850 m altitude) as a type race, has a brighter red. The club of antennae, especially that of the ♂♂, is generally much heavier than in typical *corycia* from the Taurus, sometimes even the club of ♂ *brizae* Esp. is exceeded. In the ♀ the club of antennae is always less heavy than in ♂. The ♂ is very variable in regard to size. Sometimes it is as large as *brizae*. Also the hairs of body are denser. The legs are black. The longitudinal marks are well developed, never constricted or interrupted. On underside the spots are somewhat enlarged, but they are paler than on upperside. The blackish blue margins to hindwings vary in width, they are boldest at apex and generally extend to inner angle. The blackish fringes are darker than the margin. The specimens collected by CREMONA around Beirut, which are in my collection, agree in general with this diagnosis, but they are not larger than typical *corycia*. A ♂ ex the coll. STAUDINGER, labelled Lebanon (LEDERER) does not differ in size, the antennae are also not heavier than those of *corycia*, however the red is the more vivid shade, mentioned by STAUDINGER. Unfortunately the exact locality is not ascertainable. — A *corycia* race occurring around Zebdani in Antelebanon, of which 2 specimens were captured on 17th May 1931, is delicately built and also more thinly scaled than *staudingeriana*. Margins of hindwings in these specimens are even narrower than in typical *corycia*.

p. 9, line 8 from below. The ♂ type and not the ♀ of subsp. *adanensis* Reiss is illustrated on pl. 1 h.

## II. Subgen. *Silvicola* Bgff.

BURGEFF's closer examination of the genitalia has revealed that *gallica* Oberth., *giesekingiana* Reiss, *nevadensis* Rmb. and *chacs* Bgff. may be held to have genitalia that vary sufficiently to be considered species. Further they are more closely allied among themselves than with *romeo* Dup. and *lineata* Reiss, which themselves have close affinities, see p. 252/3. It is therefore necessary to classify *gallica* Oberth. and *giesekingiana* Reiss in Subgen. *Silvicola* Bgff. All these species have no connection at all with *brizae* Esp., *corycia* Stgr. and *erebaea* Bgff.

p. 9, line 3 from below. *Z. gallica* Oberth. In the original description OBERTHÜR compares *gallica* with *corycia* Stgr. from Akbès and Eden. The streak marks in comparison with *corycia* are narrower, less prolonged and hindwings have wider margins. The general impression of *gallica* is delicate and faintly dusky, the wings are thinly scaled. I have specimens from Digne and Le Boréon, from 1400 m altitude.

p. 9, line 1 from below. *Z. giesekingiana* Reiss is closely related to *gallica*, but the differences in the genitalia are sufficient for specific separation (BURGEFF). This species appears to be more thinly scaled than *gallica*. Besides being taken at Vence, it has recently been captured in June in some quantity near Grasse. The illustration on pl. 1 h shows rather too much blue in the ground colour and the red is somewhat too fiery.

p. 11, line 16 from below. *Z. nevadensis* Rmb. Besides the degree of relationship mentioned above, this species also has affinities with *romeo* Dup. and *lineata* Reiss and their races. The type race emanates from the central areas of the Sierra Nevada in S. Spain. The specimens are generally smaller than *giesekingiana* with short truncate rounded forewings and thinly scaled. Ground colour bluish black with a faint greenish hue. Forewings with 5 dull red spots. Spot 1 elongated and pointed, spot 2 rounded off, almost oviform, spot 3 very small, slightly elongated, spot 4 fairly large, often slightly conjoined with spot 2. Hindwings short, rounded off at apex, with a more or less wide, dull, almost hyaline margin. It expands at apex and sometimes projects along the costa gradually fading away. It merges with the dull red of the hindwings. The antennae, especially of the ♂ have distinct clubs. The colouration on pl. 1 k is somewhat too bright. — The specimens mentioned in the Supplementary Volume on p. 11, line 16 from below, from around Guarda in Portugal, are very close to the type race. They are also thinly scaled and with dull red. Margins of hindwings faint. In



the few specimens of this portuguese *nevadensis* colony that have so far been captured and of which some are in my collection, spot 2 is more or less closely conjoined with 4. ab. **scabiosoides** Reiss denotes a ♀ aberration in which spots 3 and 5 are conjoined by a red bar along the vein. The wing contour of the 2 ♀♀ is distinctly more elongated and not nearly so truncate. Should these distinguishing features prove to be constant, this race should be named: **kricheldorffi** var. nov. These specimens were captured along the edge of a small damp field and were relatively rare. — Neighbouring on these subdiaphanous *nevadensis* of S. Spain and Portugal, a more densely scaled race (especially in ♂) occurs end of July and beginning of August at 1400—1600 m altitude in the Sierra Nogra and Sierra Alta near Albarracin in Aragon. It occurs on meadows sloping towards the south and on which young oak scrub grows. I introduce the race as var. **falleriana** Reiss. The antennae and body are deep black. Wing contour is more rounded at apex than in *nevadensis*. The antennae of ♂ are rather more heavily clavate. Ground colour of forewings bluish black in ♂, red rather more brilliant, hindwings with fairly wide blue black margin to inner margin, widest at apex, contrasting sharply from the rather vivid red. Antennae of ♀ rather less heavy, ground colour inclined to greenish black, margins of hindwings narrower and fainter, but distinctly outlined against the red. Spot 1 in ♂ and ♀ diffusing to about the level of spot 3, sometimes conjoining with same by red scales above the nervure. Spots 2 and 4 widely separated, rarely approximating one another as in *nevadensis*. Spot 4 generally elliptical, spot 5 always circular. Fringes bluish black.

The subsp. **schmidtii** Reiss (16 k) emanates from the spurs of the Sierra de Gredos, around Arenas St. Pedro, Prov. Avila, west of Madrid in June. It is remarkable that this striking race has only been discovered now, when one considers how close to Madrid it occurs. It is considerably larger than *nevadensis* and the other races enumerated above. In both sexes it is just as densely scaled as *falleriana* ♂ with brilliant pale carmine red with a touch of vermilion in it. Antennae, especially of ♂ with distinct but light club, tip rounded off, as in *nevadensis*. Body bluish black with relatively long abdomen. Spot 1 diffuses to about the level of the small spot 3, sometimes being joined to same by red diffusion over the vein. Only in one ♂ is spot 3 separated, about as in *romeo* Dup. Spot 2 is generally slightly prolonged towards spot 4. Spot 4 is generally enlarged in the direction of spot 2, only occasionally spots 2 and 4 are faintly joined together along the vein. Spot 5 is also much enlarged and extended to an oval shape, having an inclination to approach spot 3. Rarely spot 3 is conjoined with spot 5 along the vein. Margins of hindwings bluish black, distinctly outlined and generally narrower than in *falleriana*. In one ♀ in which the spots of forewing are very enlarged, the margin of hindwing is much reduced. On underside of forewings the spot markings are generally situate in a sort of rosy haze that covers the entire area. It occurs sporadically in forest clearings and open woodland on the leaves of low growing plants and is rarely found on flowers (Dr. A. SCHMIDT). The ♀ type is illustrated.

*Z. nevadensis* appears to be widely distributed in Spain and Portugal and it is probably only a question of time till fresh localities are found. The colonies at Sequeros, Pena de Francia in W. Spain, occurring at an altitude of 1000 m and which I mentioned on p. 11, line 15 from below, of this Supplement, cannot be properly apprized from the few specimens before me, but they would appear to be close to *schmidtii*.

p. 11, line 16 from top. *Z. romeo* Dup.\*) (= celeus H.-Schäff.). All the races and forms dealt with under subsp. *romeo* Dup. on p. 11, lines 16—40 from top, belong here. The type race from Sicily has the most heavily clavate antennae in both sexes. Forewings expand slightly outwards, outer margin is rounded off, similarly apex. The spots are usually separated, spot 4 large, elongate, projecting towards the inner angle and also inwardly. Spot 3 is small, 1 longer than 2, 5 roundish terminating in a point outwardly. The red is almost cinnabar red, margin of hindwings moderately wide. On underside there is often a somewhat reddish colouration between the spots. I have *romeo* from Le Madonie in June. The exact locality of the type in Sicily is not known. CABERLA mentions a population of *romeo* from the Caronia near Mistretta in Sicily (at an altitude of over 1000 m), which is only 25—27 mm large and resembles *subalpina* Calb. (p. 11, line 10 from top) as regards markings; on underside all the spots are conjoined. — The var. *neapolitana* Calb. emanates from the mountains around Campagna. Antennae are like those of *orion* H.-Schäff., but less heavily clavate. Red of the ♂ is a deep carmine or better still a carmoisine, in the ♀ a paler, fainter carmoisine. The black marginal band of hindwings is double or three times as wide. The darkest ♂♂ have only 2 red rays on hindwings extending from base to centre of wings. The spots 2 and 4 are rarely confluent: ab. *analiconjuncta* Bgff. The ab. *nigerrima* Zickert of which it was stated in Vol. 2, p. 19 that these were plain black individuals, are actually specimens with very dusky fore and hindwings.

\*) SCHEVEN gives the name *scabiosae* to specimens from Regensburg which are illustrated by SCHÄFFER as *purpuralis-pythia* — SCHÄFFER, Icones Insectorum Ratisbonensium, Pl. 16, fig. 4 and 5 —. The illustrations of SCHÄFFER are so distinct that no doubt is possible. Therefore the next oldest name: *romeo* Dup. is valid to designate the species. The *purpuralis-pythia* still occurs in profusion at Regensburg, whilst according to my information *scabiosae* Esp. is no longer found anywhere near Regensburg. Even if *scabiosae* Esp. occurred at Regensburg in the time of SCHÄFFER, it must have been so rare that it cannot have predominated and can scarcely have been differentiated among the innumerable *pythia*, that look so similar.



The genitalia of *romeo* Dup. differ from those of the races of central Europe, which vary among themselves but which have sleeker, narrower wings with more acute apices and sleeker more pointed antennae. I am grouping these together under the denomination — **lineata** *subsp. nov.* It is not easy to separate these *lineata*. races from the *romeo* races, as for instance in the southern Alps a doubtful mixture of the 2 races occurs, that makes a division of the 2 groups difficult. Further a few of the eastern races cannot definitely be placed with either the one or the other of the groups. The genitalia of the various populations, according to BURGEFF, vary with the individual specimen, further the genitalia of the different races vary among themselves. Therefore in spite of the differences in the genitalia for instance of *romeo* (Sicily) and *lineata* (Germany) one can in this case speak of a unit of species, in which in the determinate area of distribution not only the outward appearance but also the genitalia of the individuals are subject to variation.

As the type race of *lineata* (16 k) I designate the population of Dollnstein, captured mid July, embracing broadly the populations of the franconian Jura and central Germany, as far as same are not already separately denominated. They are mostly dainty insects with constricted, but rarely quite interrupted streak marks. Scaling is relatively thin. The ♂ type ex my collection is illustrated. The ♀ type is also in my collection. Cotypes are to be found in the collection of PRZEGENDZA.

The races enumerated under *scabiosae* on p. 10, lines 13—44 and var. *eupyrenaea* Bgff. (p. 11, line 1 at top), which also occurs on the Picos de Europa, should be classified here.

p. 10, line 18 from below. Quite close to *tenuicurva* Bgff. the var. **polonia** Przeg. from Szerzeniowce *polonia*. near Lemberg, should be placed. According to the description it reminds one somewhat of the italian races by its dense black scaling, relatively wide margin of hindwings, medium wide wings, the faintly curved margin of forewings with rounded apex. The antennae are fine and distend gradually to a pointed club. Markings of forewings are much reduced with a strong inclination of the brilliant red spots to separation. Spots 3 and 5 are separated in the majority of specimens. Spots 2 and 4 are narrowly conjoined. It occurs at end of June.

The race from the N. Ukraine of *lineata*: var. **irpenjensis** Holik & Reiss from Irpenj (Province of Kieff) *irpenjensis*. belongs to the narrow winged type, this characteristic is much more apparent in same than in *tenuicurva* Bgff. and in moravian specimens. Hindwings are narrow and pointed at apex. This is so extended and acute that the costa is generally almost straight and not curved. Antennae are long and sleek terminating in a point. The reduction in the size of the streak markings is striking, the *divisa* forms occur very frequently. It closely resembles the *asiatica* Bgff. from the Urals, however on account of the pointed wings, it is better linked to *lineata*.

### III. Subgen. **Lycastes** Hbn.

p. 11, line 10 from below. *Z. exulans* Hochenw. & Reiner. The original types of the ab. *striata* Tutt with spots 2 and 4, as well as 3 and 5 of forewings more or less confluent, originate from Andermatt and Le Lautaret. The denominations of VORBRÖDT: ab. **costalielongata**: spot 1 elongated along costa, ab. **analielon-** *costali-*  
**gata**: spots 2 and 4 loosely conjoined, ab. **apicalielongata**: spots 3 and 5 loosely conjoined, all denote merely *elongata*.  
transition forms to *striata*, whilst *parallela* Vorbr. and *pseudoscabiosae* Hoffm. are synonyms of *striata* Tutt. *analielon-*  
*gata*.  
*apicali-*  
*elongata*.

p. 12, line 22 from below. I have now also obtained subsp. *sajana* Bgff. from Chulungaisha Mondy in the Sajan mountains in July at an altitude of 3100 m altitude.

The subsp. *exsiliens* Stgr. (Vol. 2, p. 24, pl. 6 c) of which the original specimen (1 ♂) is said to have been captured at Tarbagatai and which according to ELWES also occurs in the Altai. According to the original description it has very transparent greenish black forewings with 5 small red spots, which are arranged in the same order as those of *exulans*, those of the latter however being much larger. Of the 2 basal spots, the upper one is a narrow and short streak, the lower one somewhat oval and very small. Of the 2 central spots, the one at the commencement of the central cell is like a large dot, whilst the one situate below same outwardly almost appears to be cordiform and is of about the same size as the 5th spot placed at the end of central cell. This spot is oval, fairly clearly outlined and also only small in size. On underside the 2 basal spots are only indicated by a few red hairs. Fringes, as in *vanadis*, are quite dark and there is no indication of any trace of a whitish or yellowish circumscription to the red spots. Hindwings have very wide dark margins, extending almost to central cell. As they are also black at base, this colour is predominant and the pale red therefore actually only appears in centre and at inner angle. Head and body are completely black, only the legs are partially variegated with yellow hairs. The illustration of *exsiliens* (not *exiliens* as stated on p. 12, line 19 from below) on pl. 6 c of Vol. 2 does not entirely agree with this diagnosis and it is doubtful whether STAUDINGER's original was depicted.



IV. Subgen. *Hyala* Bgff.

p. 13, line 24 from top. *Z. favonia* Freyer (= *cedri* Bruand). PRZEGENDZA denominates as var. *sebdouensis*. **douensis** a race that is close to var. *staudingeri* Aust. It emanates from Sebdou in W. Algeria and is striking by its dainty appearance and shorter forewings. On an average it is smaller than *favonia* from Bône and Batna. The steel-grey scaling is somewhat denser than in specimens from E. Algeria, which appear transparent in consequence of their sparse scaling. Hairs on thorax are grey and sparse. The most important characteristic of this race is a regular, not very wide but nevertheless wider margin on hindwings than in the other *favonia* races. Further every specimen has a peculiarly short abdomen with a narrow abdominal belt in the ♂.

p. 13, line 27 from top. I possess the var. *staudingeri* Aust. thinly scaled, with abdominal belt on only one segment; from the Museum at Tring. It is labelled Masser Mines, Lalla Marnia, mid June 1914, leg. FAROULT and is now in my collection. AUSTAUT's originals were captured at Nemours in W. Algeria.

p. 13, line 24 from below. Also of the moroccan subsp. *cadillaci* Oberth., typical of Azrou, I have 2 ♂♂, one labelled Daïet-Achlef, 22nd June 1923, leg. POWELL, the other Tarseft Pass, Central Atlas, 2200 m, 11th June 1925, leg. HARTERT and YOUNG, both like *cadillaci* with rosy red spot markings and almost rose coloured hindwings. Thorax black without any grey-white hairs, abdomen heavily haired with a single belt. In the first named specimen the spots of forewing are enlarged, spots 3 and 5 are faintly conjoined whilst 5 and 6 are definitely separate. The latter specimen almost indicates the streak spot marking of *purpuralis*, spot 1 much elongated, 2 and 4 widely conjoined, similarly 3 and 5, besides 5 and 6 conjoined as in *thevestis* Stgr.; these streak markings are only separated by the veins.

p. 13, line 22 from below. What was said on p. 13 in regard to *Z. thevestis* Stgr., only applies to the localities Lambessa and Tebessa. At Géryville, whence the race type emanates, Gueltes-Stel and Aflou both ♂ and ♀ have enlarged spots on forewings and spots 5 and 6 become confluent towards one another and towards the apex in a greater or lesser degree. Spots 3 and 5 are not conjoined in the specimens before me. The red of the spots, hindwings and the 3 abdominal belts (which are not complete on underside) is more brilliant and almost vermilion colour. This outstanding race, of which OBERTHÜR wrote already in 1888, is denominated *centralgeria* subsp. nov. The *thevestis* ♀ has no such fiery colour. It has, just like *centralgeria* ♂ ♀ instead of the fairly widely separated spots 5 and 6 of the ♂, a large axe-shaped end spot. Spot 1 extends to and beyond spot 3. The latter, in contrast to my specimens of *centralgeria*, is conjoined by a fine red streak with the apical spot and this diffuses and expands considerably towards the apex. The collar and scapulae of *thevestis* and *centralgeria* are more finely and smoothly haired (scaled) with whitish grey than is the case in *favonia*.

p. 14, line 3—21 from top. *Z. sarpedon* Hbn. According to more recent research, it appears questionable whether *balearica* Bsd. which was reported to be identical with my *confluenta*, occurs as a race at Cadiz. It should be added that BOISDUVAL described and illustrated his *balearica* twice. Only the second time he illustrated a specimen from Cadiz. The first description, which is the only one that is valid, is quite different from the second and both illustrations differ materially. Specimens occur among *hispanica* and *variabilis* which are rather more or less densely scaled, the red varying according to the density, from rose to a brilliant yellow-red. These have spot 5 diffusing into an axe-like mark. Further spot 1 may diffuse along the costa as far as spot 3 and spot 2 may be widely confluent with spot 4. This form occurs in all transitions as an aberration and I have specimens from Cuenca, Albarracin, Chielana and Granada. An intermediate specimen that is densely scaled and with the red heavily admixed with yellow and in which spot 5 diffuses, I have named ab. *rubrior* (Cuenca), see p. 14, line 14 from below. In this specimen spot 3 is missing and spots 1 and 2 are not enlarged. One might denominate the *hispanica* and *variabilis* with considerably enlarged forewing spots as ab. *balearica* Bsd., if one did not have to wait to see how the *sarpedon* races from the Balearic Islands, on which the denomination was based, look. I would therefore propose, that *balearica* Bsd. is reserved for specimens from the Balearic Islands and to apply my denomination as subspecies **confluenta** to the populations from Totana and Sierra de Espunna (Mercia). In these the confluence of the spots, the expansion of spot 5, the yellowish admixture in the red and the denser scaling of the dark portions of the wing are constant characteristics. Among the many specimens which I have had for comparative purposes, there is only 1 ♂ from Totana that has the same spot marking as *hispanica* and with a purer red having less admixture of yellow: ab. **pseudo-hispanica**. **hispanica** Reiss. The *confluenta* Reiss has an extreme similarity with *centralgeria* Reiss from central Algeria.

p. 14, line 8 from below. *Z. punctum* O. Specimens from Balic on the Rumanian Silver Coast correspond in general to the typical hungarian *punctum*. Among these is ab. **pseudodystrepta** (Bgff.) Reiss with pronounced *dystrepta* markings. — From around Fiume (Susak Trsat, 25th June 1931, 140 m, leg. KOLB) I have a nice series with very reduced spot markings, about like the genuine *itala* Bgff. or *contamineoides* Stgr. In comparison this race has narrower and more acute wings than any race hitherto known to me. The red



with slightly less admixture of yellow, margin of hindwing rather less bold than in the typical *punctum* from Hungary. I denominate this readily distinguishable race, which is no doubt widely distributed along the seaboard: **kolbi** var. *nov.* in honour of Dr. KOLB of Munich. The types are in my collection. Cotypes besides *kolbi* are in the collections of Dr. KOLB and DANIEL in Munich. A specimen labelled Dalmatia, exactly corresponds to *kolbi*.

p. 14, line 7 from below. VERITY has recently given some interesting particulars in regard to the Italian *punctum* races. The var. *itala* Bgff. (= *italica* Stgr.) originated according to STAUDINGER from central and southern Italy and is larger than the typical *punctum* from Hungary. To a marked degree the white scaling and hairs on thorax are missing. It forms in a certain sense a transition to var. *contamineoides* Stgr. VERITY proposes to select as type population of *itala*, the colonies from the coast of Leghorn, Montenero, 200 m altitude taken in June/July. — The race from around Florence up to 900 m altitude, VERITY names **italaparva**, type *italaparva*. population Pian di Mugnone (Florence). It is smaller than *itala* and approaches typical *punctum* in point of size. It is more sparsely scaled and with duller colouration.

In central Italy (Mt. Sibillini) QUERCI discovered in a small valley below the summit of the Pizzo tre Vescovi at 1700 m altitude, mid July, a delicate race, which VERITY names var. **excelsior**. The scaling is relatively feeble. The dark parts of wing are grey, the red is pale rose and has no inclination towards yellow. In spite of the fact that generally speaking the spots are very reduced in size, specimens occur which are very difficult to differentiate from small *rubicundus* Hbn.: ab. **rubicundiformis** Vrtz. *excelsior*. *rubicundiformis*.

The new races mentioned by VERITY: *microdystrepta* — Valle del Petrella, 1200 m, Mt. Aurunci (Casserta), end of June; *superdystrepta* — Esperia, Mt. Aurunci and *dystrepta* — Mt. Simbruini (900—1000 m), appear to be more or less identical with var. *jaitensis* Std. (p. 14, line 3 from below) and it would probably not be at all easy in a few years to distinguish these races in freshly captured specimens.

p. 15, line 17 from top. *Z. contaminei* Bsd. From the Picos de Europa in N. Spain I obtained this species from A. KRICHELDORFF, the specimens being very large and fine were captured between Treviso and La Liebana. Especially from the latter locality the specimens distinctly show a small spot 3 on forewings, which BOISDUVAL in his original description of *contaminei* from around Barège in the Pyrenees, also mentioned. This however is absent in my specimens from Gèdre. Specimens (♀) with rudimentary red abdominal belt, which BOISDUVAL mentions as frequently occurring, have not yet come into my possession.

p. 15, line 19 from top. The var. *ledereri* Rmb. from the Sierra de Ronda in S. Spain, described by RAMBUR from a specimen captured by LEDERER, judged by the original illustration may be said to be close to *Z. nevadensis* Rmb. in regard to size and markings and except for the heavier antennae. RAMBUR says that *ledereri* has narrower wings than *contaminei*. The spot markings are described as follows: Spot 1 slightly diffusing on costa, very pointed; spot 2 conjoined to spot 1, loosely connected with spot 4; spot 3 small, like a small streak, spot 5 distended. Hindwings not hyaline at base; the dark margin wider at apex, not so dark as the fringes. Margins clearly outlined against red of hindwings. A ♂ captured by KRICHELDORFF near Guarda in Portugal is larger and more robust than the usual *nevadensis-kricheldorffi* occurring there and has also heavier antennae with heavier clubs. The antennae however are not as heavy as in *contaminei*, which is otherwise quite as large. As the other description of *ledereri* approximately applies to this specimen, I assume it to be a *ledereri*.

#### VI. Subgen. *Peucedanophila* Bgff.

p. 15, line 28 from below. *Z. cynarae* Esp. PRZEGENDZA has named the population from the Stadtwald near Kieff: var. **sylvana**. It differs distinctly from the type race from Lemberg by its strikingly elongated, narrow forewings with rounded apices. The spot markings are small, scaling not particularly dense and having grey-green gloss. The antennae are fairly delicate with gradually expanding clubs. In the ♀♀ the antennae are very like those of *filipendulae*, but shorter. Margin of hindwing is like in the type race, but wider. Body relatively long with short black hairs and narrow red abdominal belt. The ♀♀ are not generally paler in colour. In this race the following aberrations occur: ab. **tricingulata** (Bgff.) Holik with 3 red abdominal belts, ab. **rubrianata** (Bgff.) Holik with red anal clasps, ab. **confluens** (Bgff.) Holik with confluent spots on forewing in every possible combination. This confluence of the spots is not of rare occurrence. Most frequently spots 2 and 4 conjoin, this may be complete or the two spots may be joined by a bar. More rarely spots 3 and 4 or 3 and 5 become confluent. Sometimes both spots 2 and 4, as well as 3 and 5 are confluent and spot 1 may be extended to costal margin. In ab. **omniconfluens** (Shelj. i. l.) Holik the entire spot area of forewings is completely red, only the dark margin is retained. *sylvana*. *tricingulata*, *rubrianata*, *confluens*. *omniconfluens*.



*uralensis.*

The var. *uralensis* H.-Schäff. from the Urals, does not belong to *centaureae* Fisch.-Wald., as has been assumed hitherto, but is a *cynarae* race. HERRICH-SCHÄFFER has described and illustrated a small specimen (♀) with confluent spots 2 and 4, as well as 3 and 5. Specimens from Kalkanowa, S. Urals, 830 m altitude, correspond in general to HERRICH-SCHÄFFER's description. The specimens are thinly scaled with dull red. Usually the 5 spots of forewings are separated and the wings are rather more densely scaled than hindwings. The latter have a wide, blackish, almost hyaline margin, wider in ♀. Many specimens are relatively small, often not being larger than *meliloti*, others, especially ♂♂ are larger. Frequently spots 2 and 4, as also spots 3 and 5 are approximated on the veins and occasionally they may be conjoined. Ground colour of ♂ inclined to bluish, of ♀ more to greenish. Abdominal belt in most of the ♂♂ only visible laterally, whilst in the ♀♀ it is complete on upperside, however in all specimens it is open ventrally.

*rubrianata.*

p. 15, line 19 from below. To var. *pustiae* Bgff. we have to add ab. **rubrianata** Bgff. (Vol. 2, p. 442).

*taurinorum.*

p. 16, line 2 from top. According to VERITY var. **taurinorum** Vrtz. from Turin represents a transition race between *veronicae* and *turatii*. — VERITY describes var. **tusca** from Pian di Mugnana (Florence) as type and further from Palazzuolo di Romagna (700 m altitude), which as the preceding form must be considered a race of subsp. *turatii*; *tusca*, just as *taurinorum*, is smaller than *turatii* and about as large as *humilis*. The degree of the scaling is about halfway between that of *turatii* and *taurinorum*. The ground colour of the ♂ is always glossily bluish, whilst that of the ♀ is dull dark grey and not milky greenish grey as in *taurinorum*. The dark margins of hindwing are just as narrow as in *taurinorum* and hereby the two races differ from *turatii*, as well as *humilis*, with which *turatii* has most resemblance. var. *tusca* was only discovered in 1921 in Florence, although STEFANELLI, VERITY and QUERCI had collected intensively there for years, in fact for tens of years. The reason for this is that *turatii* and its races occur in strictly restricted localities and the flight of the ♂♂ is limited to a few days, after which they disappear. The ♀♀, as I was able personally to observe in the hills around Genoa, scarcely fly at all.

p. 16, line 22 from top. *Z. centaureae* Fisch.-Wald., described exclusively from S. Russia, type race being from Sarepta, has been ascertained to occur in the S. Urals and in the immediate and more distant surroundings of Kieff, flying along with *cynarae* races (although strictly separated from same) occurring there. Both species have separate areas of distribution. BARTEL already in 1902 laid stress on the specific characteristics of *centaureae*. An examination of the genitalia has confirmed this. Whether the population of Nijni-Uralsk (pl. 2 a of this Supplement) differs from the race type from Sarepta, cannot be definitely ascertained from the few specimens at my disposal, but it is probably very close to same.

p. 16, line 22 from below. The var. *ukrainica* Shelj. occurs as the type at Kirillovskije ovragi near Kieff. It has also been captured at Kamenka (not far from Dymy).

## VII. Subgen. **Lictoria** Bgff.

p. 16, line 13 from below. *Z. achilleae* Esp. ROGER VERITY considers *fulvia* F.\*) to be the oldest denomination of the species and refers in this respect to ESPER, who in his original description of *achilleae* mentions *fulvia* as being the same insect. Also BORKHAUSEN and OCHSENHEIMER presume that *fulvia* F. is identical with *achilleae* Esp. KIRBY proposed a correction in this regard in his Catalogue of 1892. The race type of *fulvia* emanates from Austria. As I have not been able to establish the fact of the identity of *fulvia* and *achilleae* by a comparison of the FABRICIUS collection and his catalogue of labels, I hold it to be best to retain the denomination of this species as hitherto.

BURGEFF grouped together under the denomination ab. *confluens* Dziurz. (Vol. 2, p. 27) all kinds of forms of confluent spots. I consider this to be a more simple solution than giving each form of confluence a separate name, as VORBRODT has done. I therefore place the denominations of VORBRODT: *costalinelongata*, *analinelongata*, *analiconfluens* and *apicalimaculata* as synonyms to ab. *confluens* Dziurz. VORBRODT also establishes an ab. **sexmaculata** with 6-spotted forewings. — Should the names utilised hitherto for aberrations: *ta. augsburga* Bgff. (Augsburg) (p. 16, line 4 from below) and *janthina* Bsd. (p. 17, line 15 from below), later on *teneunco*, be used to denominate races, the name: ab. **teneunco** now created by VERITY may be accepted for the type *acumine*, race and all races in which the axe-shaped mark is especially well developed. The name ab. **acumine** Vrtz. can be selected to apply to specimens with small round spot 5 that diffuses in a streak in the direction of spot 6 that is missing. Further names by VERITY: *uncoflabello* and *crasseunco* denote transition forms to *teneunco*.

*caledoniae.*

A very striking race is subsp. **caledoniae** Vrtz. (= *caledonica* Reiss) from W. Scotland, which VERITY has described from the Isle of Mull and which I possess from the peninsular of Morven. It has most resemblance to *alpestris* Bgff. from the Alps from altitudes between 1200 and 2000 m, but is smaller and appears to be still

\*) The type of *fulvia* F. is no longer to be found in the FABRICIUS collection in Kiel. Also a catalogue of labels of FABRICIUS, which still exists, does not mention the name. However next to *lonicerae* Scher. there is a pencil note with reference to *fulvia*, which whilst not having been made by FABRICIUS personally is yet in an old fashioned, but unknown handwriting.



more thinly scaled than same. Wings almost transparent with hyaline ray at base of hindwings. Ground colour of ♂ and ♀ dull blackish with no interspersions of yellowish scales, the red being an obscure carmine rose. Thorax and abdomen distinctly and densely haired. Forewings pronouncedly truncate at apex. Spots of forewings much reduced in size. Spot 6 small, attached to spot 5. Hindwings merely with blackish fringes. The ♀ in my collection shows spots 2 and 4 faintly conjoined despite the smallness of the spots. It can be distinguished from *zobeli* Reiss from E. Prussia chiefly by the shape of the wings, although it is also much larger and more densely scaled. A ♂ in my collection from around Stockholm (S. Sweden) has similar wing contour to *caledoniae*, but it is more robust, more densely scaled and has much larger spots on forewings than same.

In the neighbourhood of Kieff (Kirillovskije ovragi) var. *stauderi* Holik & Reiss occurs, which is to *stauderi*. be classified as a race under subsp. *zobeli* Reiss. Wing contour is variable. Besides distinctly narrow and pointed winged ♂♂, there are also such with very broad and truncate wings. The ♀♀ vary similarly, they are faintly, sometimes scarcely perceptibly dusted with yellow. Scaling is fairly dense. The markings are not well developed, especially the reniform spot is much reduced in most ♂♂ and in a large percentage of the ♀♀. The red is a carmine rose; in the ♀ especially on forewings there is sometimes a faint admixture of vermilion. The reduction in the spots is more pronounced than in typical *zobeli* from Osterode, the form is smaller and wings shorter than same. Further *zobeli* has a slightly greater admixture of vermilion in the colouration. The following aberrations occur: ab. *flava* (Dziurz.) Holik ab. *cingulata* (Dziurz.) Holik, ab. *rubri- flava.*  
*anata* (Shelj. i. l.) Holik: with red anal clasps, ab. *flavopraetexta* (Bgff.) Holik: spots with yellowish cir- *cingulata.*  
cumscription and ab. *confluens* (Dziurz.) Holik in varying combinations of confluence, most generally spots *rubrianata.*  
2 and 4 being confluent. *flavoprae- texta.*  
*confluens.*

p. 17, line 19 from below. According to the original description subsp. *aragonensis* Stgr. emanates from Albarracin, as does the ♂ illustrated on pl. 2 b of this supplement. STAUDINGER's types were captured by ZAPATER and KORB. Spots of forewings enlarged, spots 2 and 4 generally widely confluent. The ♀ is fairly heavily dusted with grey.

p. 17, line 13 from below. In ab. *giesekingi* Wagn. (Vol. 2, p. 21) of the typical subsp. *wagneri* Mill. according to the original description only spot 3 of forewings is absent. This denomination can of course be used also for specimens with further reductions in the spot markings. Instead of ab. *achilleoides* (Vol. 2, p. 21) the name should be ab. *achilloides* Wagn., the spots of forewing are enlarged, spot 5 diffuses forming an axe-like mark, hindwings have narrower margin.

PRZEGENDZA describes a race from Voce near Spotorno (300 m altitude) that belongs to subsp. *ligustica* Rocci and which he denominates as var. *vozea* from ♂♂ captured early June. According to the description, *vozea*. in this race the apices of fore and hindwings are generally very truncate. Hindwings with irregular but fairly wide margin, especially at apex. Markings of forewings on an average smaller than in *ligustica*. Generally they are six-spotted, but spot 6 is very small in all specimens or is almost extinct. It differs from *ligustica* from Genoa by the broader wings.

p. 18, line 22 from top. VERITY has made a special study of *triptolemus* Hbn. He refers to HÜBNER's indications and considers the S. Tyrol to be the home of subsp. *triptolemus* Hbn. In my opinion only *castellana* Stdr., the high altitude race from the S. Tyrol can come into question. This race shall in future be deemed the genuine *triptolemus* Hbn. and *castellana* Stdr., p. 17, line 25 from below, held to be synonymous, as the exact locality of *triptolemus* Hbn. will probably never be ascertained. — VERITY separates 2 further races from subsp. *triptolemus* Hbn. The var. *cicaleti* Vrtj. from the Pian di Mugnone near Florence *cicaleti*. has, in comparison with *triptolemus* Hbn. somewhat enlarged spots on forewing, whilst against *praeclara* Bgff. it is smaller and has narrower wings. The red is richer and more brilliant, the gloss more pronounced and the ♀♀ have much more whitish dusting on forewings than genuine *triptolemus* Hbn. and *praeclara* Bgff. VERITY denominates as var. *tuscamodica* a race from Mt. Conca (400 m) that again inclines to resemble *trip- tuscamodi-*  
*tolemus* Hbn. from the S. Tyrol. *ca.*

p. 18, line 4 from below. var. *caliacrensis* Reiss occurring end June to mid July around Balçic on *caliacren-*  
the rumanian Silver Coast varies from subsp. *macedonica* Bgff. (Dojran lake, near Veles and on the Plagusha *sis.*  
Planina). It is not quite uniform in size and wing contour. The whitish hairiness of thorax is less pronounced in the ♂♂ and the white double collar is not distinctly visible in all ♂♂. In comparison to *macedonica* the ♀♀ only have increased yellow scaling around the spots of forewings, so that these appear to have distinct yellow circumscriptions. The ♂♂ are almost devoid of any admixture of yellow scales on forewings. The red colouration is approximately as in *macedonica*. The most striking and characteristic distinguishing feature is the spot formation. The spots of forewings are generally reduced, especially however the apical spot. Spot 6, as in *transsylvaniae* Bgff., is frequently attached to spot 5 and in one of the ♀♀ before me it is practically extinct. The ab. *confluens* (Dziurz.) Reiss in which especially spots 2 and 4 are widely con- *confluens.*  
fluent, is fairly frequent in spite of the inclination of the apical spot towards reduction. ab. *cingulata* (Dziurz.) *cingulata.*  
Reiss, hitherto only found in ♂ sex, has a distinctly visible red abdominal belt on one segment.



p. 19, line 4 from top. The following is still to be recorded regarding the asiatic races: The types of subsp. *bitorquata* Mén. presumably emanate from the mountains of Talysh. According to photographs of same now before me from the Zool. Institute of the Academy of Science at Leningrad, it is a large and robust race, larger and with wider wings than is shown in the similarly photographed types of *fraxini* Mén. Probably MÉNÉTRIES only had ♀♀ before him for his description. According to the original record the forewings are finely dusted with yellow, apex and inner margin being steel-blue. It is apparent that my subsp. *georgiae* (Suppl. Vol. 2, p. 19) from Abbas-Tuman and the Tiflis mountains most closely resembles same, but it has narrower wings, reduced spots and less yellow dusting on forewings in the ♀.

p. 19, line 8 from top. The original specimens of var. *phoenicea* Stgr. were captured by MANISSADJIAN in fairly large numbers near Malatia in early August. As mentioned in Vol. 2, p. 27, it is distinguishable by the almost completely red forewings with narrow blackish outer margin. In some specimens the single spots of forewings are not discernible, in others, especially the ♀♀ they can be distinguished by a very dense yellow-grey incassation. This is the main characteristic of var. *senilis* Bgff. from the alpine regions around Malatia.

p. 19, line 8 from top. STAUDINGER compares his var. *antiochena* (original types from Antioch in LEDERER's collection) with his *aragonensis*, which is very similar to the former, having similarly much larger spots to forewings. As against *aragonensis* the forewings are less greeny glossy black and the apical spot is not so widely axe-shaped outwardly, although it is equally large. The ♀♀ of *antiochena* are rather more heavily dusted with white or yellow-grey towards the outer margin of forewings than is the case in *aragonensis*.

p. 19, line 20 from top. *Z. ignifera* Korb. The only known localities of this fine spanish *Zygaena* are Albarracin and Cuenca. The 1st specimen was captured in the year 1887 near the mountain village of Huelamo at Cuenca in New Castile by the brother of Mr. MAX KORB. Not until July 1896 did Mr. and Mrs. KORB obtain another specimen, as on their collecting expeditions of 1890 and 1893 in the same regions no specimen was to be found. It would appear as if in some years this rare species does not occur at all. The metamorphosis from egg to imago takes more than a year and in certain years special climatic conditions may play a part. QUERCI captured *ignifera* near Cuenca in the years 1926 and 1928, whilst FALLER obtained it in 1930 at Albarracin, probably in the old localities. The specimens in my collection were all obtained at the beginning of August.

p. 19, line 22 from top. *Z. ecki* Christ. (16 i, k). Club of antennae fairly heavy. Body, dorsum and abdomen are black-blue, the latter in the ♂ with a dark red semicircular belt on upperside, which is absent in ♀. Femora black-blue, tibiae and tarsi impure buff. Forewings with moderately rounded apex, steely green, darker at margin and inclined to blue. Scaling not especially dense. Of the two brilliant red basal spots (1 and 2), the upper one is narrow, lanciform, the lower one is wider of similar formation, both being separated by the dark costal nervure. The central pair of spots (3 and 4) is small, both roundish, the lower being somewhat larger than the upper one. Spots 5 and 6 loosely conjoined. Usually the spots have a faint yellowish circumscription, especially in the ♀, but sometimes these edges are absent. The margin is blue-black, the narrow fringes being brown. Hindwings brilliant red with narrow black margin, that only expands slightly at inner margin and at apex. The original types were captured in July by ECK, the brother-in-law of CHRISTOPH at Shakuh in North Persia, at considerable altitudes. No other locality is mentioned in literature. I have one ♀ that is said to have been captured ad Disful in Persia. As the ♂♂ invariably have a more or less distinct dark red abdominal belt that is always open on underside, the f. *cingulata* denominated by HIRSCHKE has no justification.

It may be presumed that *ecki* Christ. and *haematina* Kollar (p. 19) are in certain respects homonymous, size, form and spot markings indicate this. The ♂ and ♀ of *ecki* from Shakuh (♂ from my collection, ♀ from the Zool. Museum of the Berlin University) are being illustrated here.

p. 19, line 22 from top. *Z. cambysea* Led. is described from a single ♂ captured in the neighbourhood of Astrabad in N. Persia by HABERHAUER in the year 1867. Antennae with heavy thickset clubs. Body black-blue. Forewings thinly scaled, bluish black, the spots pale minium red, 1, 2, 3 and 4 confluent forming a large combined spot, that however does not extend as far as the inner margin. The apical spot (5 and 6) is generally widely separated from the central spot area. It is however large and roundish, extending outwardly close to outer margin and towards the costa. The scapulae of the ♀ show traces of yellowish scaling in contrast to those of ♂ which are blue-black. Besides in the ♀ there is a distinctly visible yellowish green gloss on the costa almost to apex of wings and at inner angle of forewings contrasting with the bluish black ground. Hindwings pale red with blue-black fringes. The red in the illustration in Vol. 2, pl. 7 i is not satisfactory, but the formation of the spots is correct except that the apical spot is not sufficiently widely separated from the other spot markings.



The original types of subsp. *rosacea* Romff. originate from Istissou, west of Erivan in Armenia. It is very distinctly distinguishable from *cambysea* by the more brilliant, purer rose-red and the inclination in nearly all specimens of spots 1, 2, 3 and 4 of the spot area to become confluent with the apical spot (5 and 6). Generally also *rosacea* is larger and more robust than *cambysea*. The confluence of the spots of forewings is in some specimens so great that the spot area of the wings is completely rose-red. Specimens with a similar arrangement of spots to those of *cambysea* are denominated **pseudocambysea** Reiss. In the ♀ the differences, as compared with the ♂ already mentioned under *cambysea* occur in a still more marked degree. *pseudocambysea*.

p. 19, line 24 from top. *Z. armena* Eversm. (= *kadenii* Led.) is described from the South of the Caucasus and recognisably illustrated on pl. 7 c in Vol. 2. It always has a complete brilliant red abdominal belt and can be recognised thereby. ROMANOFF says it is very frequent in June and July at Borjom, Achalzich and Abbas-Tuman. I select the population at Abbas-Tuman as type race. In regions at high altitudes in these territories it seems to form alpine populations of var. *caucasica* Rbl. (*Stgr.* i. l. p. 19).

### VIII. Subgen. *Peristygia* Bgff.

p. 19, line 15 from below. *Z. anthyllidis* Bsd. (= *erebus* Meig.) is described from the neighbourhood of Barège in the Pyrenees. The first indication of BOISDUVAL as "S. Spain" is not confirmed.

p. 20, line 20 from below. *Z. graslini* Led. This *Zygaena*, that is probably closely related to the *rhadamanthus-oxytropis* group, was first discovered (flying in April) by FRANZ ZACH near Beirut in Syria. Wing contour similar to that of *rhadamanthus* or *oxytropis*. The hairs of the body, especially in the ♂ are dense, bristly and black. Legs and antennae similarly coloured. The latter especially in the ♂ are very heavy and terminate as in *rhadamanthus* in a heavy blunt club. Forewings are dull steely blue or greenish black. The usual markings consist of 3 pairs of brilliant vermilion spots, one over another and sharply outlined. The inner 2 pairs (1, 2 and 3, 4) narrowly divided by the inner marginal nervure of discal cell, the outer pair (5, 6) however always attached. Spots 1 and 2 are the longest, both equally long and each double as long as wide, spot 1 almost touches the costa. Of the central pair (3 and 4) spot 4 is larger than spot 3, it is irregularly formed and situate obliquely outwardly. Of the outer pair (5 and 6) spot 5 is about the same shape as 3 and 4, in size however it is about midway between them. Attached to same on the marginal side is spot 6. Hindwings are cinnabar red with narrow black margin. On underside forewings are thinly scaled and the red markings are nebulous and confluent. Hindwings have underside like upperside. Frequently spots 1 and 3 or the central pair become confluent, rarely however all spots are conjoined. In ab. *confluens* Dziurz. spots 1 and 3, as well as 2 and 4 become confluent forming longitudinal streaks, occasionally also spot 5, 6 is conjoined with spots 3 and 4. This covers the original ab. *confluens* Dziurz. from Beirut. In order to avoid unnecessary denominations I include all possible forms of confluence under the designation ab. *confluens*. As LEDERER in his original description of the type race mentions that forms of confluence are not rare, there is no justification to denominate any of the transition forms of ab. *confluens* Dziurz.

In the 2nd half of June an easily distinguishable and uniform race occurs at Bjarre in the Lebanon: var. **pfeifferi** Reiss (16 i). It is constantly smaller than the type race from Beirut. Forewings show nearly the same degree of heavy blue or green metallic gloss as for instance *oxytropis* from Genoa. Spots of forewings and hindwings are never vermilion but always more of a pale carmine red. Antennae are approximately as in the small *oxytropis* var. *laterubra* from Mt. Sirente in the Abruzzi. Those of ♂ with rather heavier clubs than those of ♀. *pfeifferi* approaches *laterubra* in general appearance owing to the extensive reduction of the spot markings. A faint confluence on the vein between spots 1 and 3 is of rare occurrence. Spots 3 and 4 are completely separated by the ground colour in abt. one quarter of the ♂♂ specimens before me. The nebulous red between the paler spots on underside of forewings is generally reduced and the area between spots 3 and 5 usually consists of a more or less distinct blue-black patch entirely devoid of red scales. A cotype ex my collection is illustrated. *pfeifferi*.

The var. **kulzeri** Reiss from Zebdani in the Antelebanon occurring in the 1st half of May at an altitude of 1100 m has a characteristically short and wide wing contour, whilst the clavate antennae are heavy and decidedly long. The scaling is not uniformly dense in all specimens, especially the ♀♀ are often less densely scaled than the type race of *graslini*. Such specimens that are more heavily scaled resemble in colouration and formation of spots normal specimens of the type race of *graslini* from Beirut, but the ed especially of hindwings is occasionally somewhat admixed with pale carmine. Forewings show a very dull blue or green gloss. The inclination of the spots of forewings towards confluence is decidedly less than is the case in *graslini* from Beirut. A specimen before me captured on 31st March near Damascus has a certain resem- *kulzeri*.



blance to *kulzeri*. The populations from around Haifa and from Chan Hadrur between Jericho and Jerusalem (the latter captured on 24th March), of which I have only seen single specimens, cannot be distinguished from the type race.

*rebeli*.

The denomination subsp. **rebeli** Reiss comprises the *graslini* populations from Dül Dül Dagħ, Yükses Dagħ in the Amanus, from Hadjin in the Antetaurus and probably also those from Marash, if one considers solely the inclination to a reduction in the size of the clubs of the antennae, the larger shape and the paler carmine or carmine-rose colouration. The type race from Yükses Dagħ was captured in the 1st half of April 1932 and a rich series obtained. The specimens were probably captured at a relatively low altitude, as can be judged by the early date of capture and are with few exceptions larger and more robust than *graslini* from Beirut. The red is much less vermillion and rather a carmine red or rose. The clubs of the antennae in most of the specimens, especially however in the unusually large and robust ♀♀, are less heavy. The sizes of spots of forewings vary extraordinarily. About one half of the ♂♂ before me and a quarter of the ♀♀ belong to ab. **confluens** (Dziurz.) Reiss or form distinct transitions to this aberration. Concurrently but less frequently there are specimens with reduced spots on forewings and with widely separated spots 3 and 4 appearing through the dull glossy bluish or more rarely greenish ground colour. One ♂ also has spots 5 and 6 completely separated: ab. **sexmaculata** Reiss. — — LEDERER describes the larva that he found in February and March as being velvety black with glossy black head. The legs and collar are yellow and there are 2 rows of pale rosy red warts, 2 in juxtaposition on each segment along the dorsum.

p. 21, line 13 from top. *Z. rhadamanthus* Esp. The subsp. *algarbiensis* Christ. from Faro, S. Portugal is based on specimens captured by KORB. It is larger and more robust and has heavier clubs to antennae, but is otherwise comparable to dark *barcina* Vrtý. (p. 20). In the ♂ especially the 6th spot of forewings is rudimentary. Abdomen has a normal red belt which is especially pronounced in ♀. I have unfortunately only a few specimens with somewhat more reddish hindwings from Cebreros, Sierra de Gredos, mid-Spain.

p. 21, line 15 from top. *Z. lavandulae* Esp. The population of *lavandulae* from around Barcelona, of which I have a very long series, shows in many specimens a distinct reduction in the size of the spots, especially 3 and 4.

p. 21, line 26 from below. *Z. theryi* Joannis (= *nisseni* Rothsch.). The types of *Z. theryi* were captured by Mr. A. THÉRY in the neighbourhood of Philippeville.

## IX. Subgen. **Coelestis** Bgff.

### 1. *cuvieri* Group.

p. 21, line 16 from below. *Z. cuvieri* Bsd. The distribution of this species as regards Persia and Transcaspia can no longer be maintained. I consider that *cuvieri* does not occur in N. Persia and Transcaspia, beside the *manlia* races and that *manlia* probably is in very close relationship to *cuvieri*. Next to *manlia* we have *Z. rubricollis* Hmps. from Chitral.

The locality of the type of *cuvieri* described by BOISDUVAL, is probably Amadia (BOISDUVAL stated "Amaden"). According to the description and illustration of the type race from Amadia it has fairly distinct spots on forewings and a relatively wide blue-black margin to hindwings. A ♀ before me from Hadjin in the Antetaurus has, in comparison to the type race, considerably reduced spots on forewings, thus approaching subsp. *libani* Bgff. from the Lebanon. Like however the type race from Amadia it has a wider margin to hindwings than any other population known to me. The ab. *confluens* Oberth. (p. 21) denotes specimens from Mesopotamia, probably from the neighbourhood of Mardin. It refers to specimens in which the 3 twin spots of forewings, which otherwise are divided by the ground colour, are more or less widely confluent lengthwise, never however along their entire breadth. In the specimen illustrated by OBERTHÜR, the basal and central spots are more thoroughly conjoined than the central and apical spots. The ab. **confluens** (Oberth.) Dziurz. occurs together with ab. *totarubra* Dziurz. among the subsp. *libani* Bgff. (p. 21) in the Lebanon district. STAUDINGER also indicates Diabekir and ROMANOFF Ochtchapert near Erivan and Kasikoparan as localities, occurring early July. Especially from the localities around Erivan in Armenia many specimens have found their way into collections from the material collected by KORB. My series, which also contains ab. *confluens*, does not show a pronounced blue-black margin to hindwings, so that it varies in this respect from typical *cuvieri* from Amadia. The specimen illustrated in Vol. 2, pl. 6 h probably originated from around Erivan.

p. 22, line 7 from top. *Z. manlia* Led. was first described from Astrabad in N. Persia, where HABERHAUER discovered it in 1867. The illustration in Vol. 2, pl. 6 h corresponds especially in regard to the spot formation, to the original type illustrated by LEDERER. According to that figure and LEDERER's description spots 5 and 6 of forewings are not attached, but widely separated. The types were captured, according to



LEDERER, at considerable altitudes. Wing contour like *carniolica*. Body blue-black. Collar and a narrow complete abdominal belt pale carmoisin red. Club of antennae fairly heavy. Forewings with 6 pale carmoisin red spots, shaped as in *carniolica*, the surrounds not being paler. The two spots at base (1 and 2) confluent, extending to costa and inner margin, the two central spots (3 and 4) similarly confluent, the lower one being larger and situate obliquely outward. Spot 5 is small, spot 6 shaped as in *carniolica*. Hindwings pale carmoisin red with narrow blue-black margin which expands at apex and inner angle. — The subsp. *cacuminum* Christ. (p. 22) captured on Thymus in July on the stoney plateau and high precipices near Shahkuh, has according to CHRISTOPH a close resemblance to this *manlia*. The only differences are a decided reduction in the spots and more pronounced hairiness. These characteristics may be caused by the higher altitude as compared to that of *manlia*. The illustrations in Vol. 2, pl. 6 k show too bright a red, it should be a dull rosy red. Head, thorax and abdomen are black with faint steely blue or green sheen. Legs black, the forelegs glossy yellowish (almost golden) on inner side. Collar and narrow abdominal belt, that is complete on underside, are rosy red. In ♂ the belt is absent on upperside. Forewings thinly scaled, bluish or greenish black with 6 dull rosy red spots. Two (1 and 2) at base, the upper one of which extends to a point and is triangular in shape, the lower one is larger and rounded off posteriorly. These two spots cover the somewhat larger upper half of the wing, somewhat as in *Z. lonicerae*. Of the two small central spots (3 and 4), the smaller upper one (3) is situate not far from costa, exactly in centre of wing, the lower larger spot (4) is somewhat further posteriorly and incurved, slanting slightly obliquely inwardly. Spot 5 is rather larger than spot 4 and spot 6 is the largest of all and oval. Hindwings with blue-black margin as in *manlia*. There is the possibility that *manlia* and *cacuminum* merge in one another at certain altitudes near Astrabad and Shahkuh. So far I have not succeeded in ascertaining what the *manlia*, captured by CHRISTOPH near Ordubad look like.

The subsp. *turkmenica* Reiss (= *manlia* Bang-Haas i. l.) (16 i), the race from Jablonowka, Achal-<sup>turkmeni-</sup> Tekke occurring in July at around 2000 m altitude and differing from *manlia* and *cacuminum* by the generally narrower and more pointed wings. Forewings have a faint bluish (in the ♀, greenish) metallic gloss, the red being a somewhat brilliant carmine rose. The abdominal belt, that is complete on underside, is of the same shade. Spot 6 is always fairly widely attached at its lower angle to spot 5 and sometimes also at upper angle along the vein. Similar specimens were obtained at Askhabad and Arwas in Transcaspia. The ♂ type ex my collection is illustrated (16 i) (as *turkmena*).

p. 23, line 25 from top. *Z. lydia* Stgr. (16 k) also belongs to the group of *Zygaena* that resemble *cuvieri*. It is probably very close indeed to *cuvieri*, being captured according to STAUDINGER at the same place and time. Apart from the smaller and more dainty form, it only differs from *cuvieri* (for instance from Hadjin) by the absence of the abdominal belt and the wider margin of the hindwings. The type race occurs mid May near Malatia. The ground colour is a somewhat transparent, generally blue glossy black. The spots are carmine rose to rosy red. The basal spot (1 and 2) extends as in *cuvieri* from costa to inner margin. The longish central spot (3 and 4) gives the impression of a completely confluent twin spot. In one of the original types of STAUDINGER (♀) the central spot is confluent with the basal spot, as often occurs in *cuvieri*. The outer spot (5 and 6) is generally just as large or even larger than the central spot and irregularly oval. On underside the spots are also present, although not so distinctly outlined. Hindwings are faintly transparent carmine rose, somewhat as in *cuvieri*, but with margins like *graslini*, not heavier. The red collar is narrower than in *cuvieri*. One could conjecture that *lydia* might have evolved as a species from an intermixing of *cuvieri* and *graslini*. In Vol. 2, pl. 7 a the typical *lydia* from Malatia was no doubt illustrated, but the antennae, which in build resemble those of *cuvieri* and are only more dainty, are not well executed and the red of the illustrations is rather too bright. A ♂ and ♀ of the original types in the STAUDINGER collection are illustrated (16 k).

Besides this somewhat larger type race from the neighbourhood of Malatia, STAUDINGER mentions in his description a series of similar specimens from Hadjin (captured end of May) which represent a distinct mountain race and which I separate as subsp. *hadjinensis* Reiss (16 k). I am illustrating the ♂ type ex the <sup>hadjinen-</sup> STAUDINGER collection and the ♀ type ex my collection. According to 2 ♂♂ ex the STAUDINGER collection and my ♀ in conjunction with the particulars given by STAUDINGER in the original description of *lydia*, *hadjinensis* is distinguishable by its smaller form, shorter, thinner antennae having lighter clubs with somewhat rounded tips and by the rudimentary red collar. Further there is a considerable reduction in the spots of forewings, so that especially in the ♂♂ the formation of the spots resembles *graslini*. Besides *hadjinensis* has a much more densely haired thorax and abdomen. Ground colour with faint bluish gloss. The red of spots of forewings and the hindwings is pale rose. The main distinguishing features from *graslini* are the rudimentary red collar and the fact that in spite of the reduction in the spots, the basal spot (1 and 2) regularly stretches from costa to inner margin, whilst in *graslini* races it never extends to the inner margin.



2. *tamara* Group.

p. 21, line 4 from below. *Z. tamara* Christ. The original specimens of this very pretty *Zygaena* were captured by Miss A. KUBISTEC early in August presumably in 1888 and in large quantities of both sexes near Ordubad. Also the ab. *daemon* Christ. emanates from Ordubad. It would appear therefore that *tamara* is only to be found in that locality. Head, antennae, thorax and abdomen are glossy blue-black, the legs are dusky in consequence of black scales on femora. Collar in the ♀ is pale orange-yellow, similarly occasionally also the scapulae. The 3 penultimate segments of abdomen are a brilliant bright red. The anal segment is black with short terminal hairs. The colour of forewings is steely glossy blue-black although through the expansion of the 3 pale orange-yellow spots, this ground colour is only visible as narrow transverse bands and partly as margin of the wings. The anterior basal spot (1 and 2) occupies the first third of the wing in its entire breadth including costa and inner margin; the obtuse conical central spot (3 and 4) only allows the black ground colour to appear through on both sides, thus creating narrow transverse bands. The large obtuse and irregularly triangular apical spot (5 and 6) no doubt created by the merging of two spots, ends almost as a rightangle at apex of wing. Hindwings of ♂ are usually unicolourous pale orange-yellow and somewhat transparent, sometimes however showing a trace of pale red. In the ♀ the predominant shade is a pale light red in which frequently longitudinal yellow streaks are visible. On underside the yellow of the spots is somewhat paler and the two anterior spots more or less merge.

The designation ab. *rubra* Rbl. (not *Stgr.-Rbl.*) can only refer to ♂♂ with pale red hindwings. The *quadripuncta* Reiss, also from Ordubad, has a reduced apical spot and the dark ground colour distinctly separates spots 5 and 6.

p. 21, line 2 from below. *Z. placida* O. B.-H. is well illustrated on pl. 2 h of Suppl. Vol. 2, but unfortunately the vermilion red scapulae, which appear in both sexes, are not visible. In its great resemblance to *tamara*, one might consider same to be a subspecies thereof. In Suppl. Vol. 2 on p. 22, line 4 from top the word „only“ before red should be deleted. The legs of *placida* are yellowish red. Like *tamara* it occurs in August and was sent to BANG-HAAS together with *cuvieri* Bsd. which was flying in the same locality.

p. 22, line 6 from top. *Z. escalerae* Pouj. 3 male specimens were captured by ESCALERA in July 1899 on the upper course of the Karun in the Chindaar valley in Persia. The arrangement of the orange coloured spots of forewing is similar to that of *tamara* and *placida*. In other respects *escalerae* also fairly strongly resembles these two *Zygaena*, apart from its more delicate build and somewhat reduced spot markings. Head and thorax are blackish, frons, palpi, collar and scapulae are minium red. Anal clasps are laterally black and legs yellowish.

3. *sedi* Group.

p. 23, line 18 from below. *Z. sedi* F. (= *sedi* Freyer), type race from Sarepta. The ♀ with whitish collar, which is sometimes barely indicated. The fairly widely confluent spots of forewings are notable. In the ♂ they are slightly, in the ♀ most distinctly encircled by yellowish white. I have specimens of a population from Bogdoberg in the lower right bank of the Volga, halfway between Zaryzin and Astrachan, which *sliwenensis* is almost identical with the type race. — The var. *sliwenensis* Reiss (= *fraxini* Haberhauer i. l., *sedi* Bgff.) from Sliwen (Slivno) in Bulgaria in comparison with *sedi*, shows a reduction in the spots whilst the yellowish white circumscriptions of the spots are wider in both sexes. *Z. sedi* and *sliwenensis* have a third basal spot (2 a) which penetrates like a ray towards the inner margin. In the ♂ of *sliwenensis* the much reduced spots 3 and 4 are only attached by their yellowish white surrounds. In the ♀ the spots of forewings, as compared with *sedi*, are also reduced, but not to the same degree as in the ♂. The confluent spots at base (1 and 2), also the middle spots (3 and 4) and the apical spots (5 and 6) appear to be separated from one another by their heavy yellowish circumscriptions. Sometimes also spots 3 and 4 are daintily separated from one another by the interspersions of yellow scales in the ♀. — STAUDINGER mentions that *sedi* was captured by KINDERMANN near Tokat and by LEDERER on the Boz-Dagh in Asia Minor. It is unfortunately impossible to check this owing to lack of opportunity. It should be mentioned that in several collections there are specimens of *sedi* with the locality label “Armenia”, which according to the particulars given by BURGEFF and also according to the material at my disposal, do not differ from *sliwenensis*. These may have been captured by HABERHAUER in Bulgaria and because they were classified as *fraxini*, they may have been simply labelled “Armenia”. The occurrence of the subsequent species in the Caucasus, allows one to assume that the *sedi* group may still be distributed south of the Caucasus and join up there with the *fraxini* group. This is however very doubtful, as according to a specimen in the STAUDINGER collection *fraxini* occurs at Manglis in Georgia and the only possibility would seem to be that the two groups mingle in Transcaucasia. The presence of the basal spot 2 a on forewings in the specimens before me that are labelled “Armenia” entirely precludes their belonging to the *fraxini* group and clearly characterises them as belonging to the *sedi* group. I have further 2 ♂♂ labelled Merv in Turcomania, Tancré, which scarcely vary from my south russian *sedi*. I add this doubtful locality to encourage further investigations.



**Z. nobilis** Reiss. (= *armena* car. Rom.?) (16 l) was discovered in 1914 near Oni (N. E. Kutai) in the *nobilis*. Caucasus. I presume that *nobilis* is related to *sedī*, but its classification as a subspecies will only come into question, when intermediary forms are found. The striking blue (more rarely green) gloss of the ground colour in both sexes is common to *nobilis* and *sedī*. The brilliant carmine red of the spots and hindwings, which in *nobilis* is even a shade more brilliant, the 3rd basal spot (2 a) towards the inner margin of forewings, the narrow margin of hindwings and the confluence of the spots on underside despite their considerable reduction as compared with *sedī*, are all common to both. The whitish collar is distinct in ♀, sometimes even there is a double collar. Thorax and abdomen are black both in *sedī* and *nobilis*, having a faint bluish sheen. The antennae have rather heavier clubs than those of *sedī*. The sexes, which do not vary much in themselves, vary in the arrangement and size of the spots. I refer in this respect to the illustrations of the types of ♂ and ♀ from my collection. In the ♂ only spot 4 is completely narrowly circumscribed by yellowish white. Spot 3 is more or less rudimentary and more narrowly edged than spot 4, spot 2 has an outward narrow edge, the twin spot (5, 6) generally shows at spot 5 and below spot 6 traces of a circumscription, spots 1 and 2 a have no surround at all. In one ♂ of the series of types, spots 5 and 6 which are otherwise confluent, are almost separated; two ♂♂ have on the upperside of abdomen in the usual situation a very narrow, scarcely discernible red belt.

In the ♀ spots 1 and 2 outwardly are edged by yellow, spots 3 and 4 are conjoined with one another by yellow circumscriptions. Both more widely so than in the ♂ and the apical spot (5, 6) is completely surrounded by yellowish. Spot 2 a is separated by the yellow surround of the confluent spots 1 and 2. In comparison to *nobilis* ♂, *sliwenensis* ♂ shows a greater reduction in the spots and narrower edges to same. Spots 3 and 4 in *nobilis* ♂ are always separated by the ground colour whilst in *sliwenensis* ♂ the yellow circumscriptions merge. The *nobilis* ♀♀ which are exceedingly constant cannot be mistaken for *sliwenensis* ♀♀ which have only slightly reduced spot markings as compared to *sedī* ♀♀ and with which in general they are very similar.

#### 4. *fraxini* Group.

p. 22, line 10 from top. *Z. fraxini* Ménétr. The types (2 ♂♂) originate from around Lenkoran on the Caspian sea. The second area indicated "Persia" really referred to those territories of Transcaucasia, which at the time of the description belonged to Persia. The present day Persia was not intended. The author compares the species to *Z. olivieri* Bsd. As differentiating characteristics he mentions the steely blue ground colour of forewings, the absence of the red collar and the red abdominal belt. Thorax and abdomen are a nice glossy black. The two central spots (3 and 4) are completely encircled by yellowish white, the double apical spot (5 and 6) however is only edged in this way on its inner side. MÉNÉTRIÉS described the ♀ as if it were a separate species from *fraxini*. It differs from *scovitzii* ♂ and the ♀ specimen happened to have a carmine red abdominal belt on one segment that was indistinct on dorsum, but distinct ventrally. This *scovitzii* Mén. (= *scovitzii* Lederer) did not emanate from Ferghana, as has hitherto been erroneously presumed, but the ♀ type was also captured in the neighbourhood of Lenkoran. In regard to the second specimen mentioned in the original description as from Persia, refer to what was mentioned above under *fraxini*. The denomination *scovitzii* Mén. can only be utilised for ♀♀ of *fraxini* that have distinct red abdominal belts. It is assumed that the usual *fraxini* ♀ is without a red abdominal belt, but that it has a white collar and rather heavy yellowish white circumscriptions to the spots of forewings. Hindwings in both sexes have bluish black margins which are most pronounced at apex and inner angle.

Should the race of *fraxini* from Elisabethpol and Helenendorf prove to be different from the type race from Lenkoran, which I think likely, then it must be denominated var. **oribasus** H.-Schäff. The following are to be enumerated as synonyms: *carneolica* Freyer n. praeocc., *rognada* Bsd., *fraxini* H.-Schäff., *oribasus* Freyer, *fraxini* Seitz (Vol. 2, pl. 7 e). The var. *oribasus* H.-Schäff. is a transitional race to var. *perdita* Stgr. Specimens occur with spots 5 and 6 separated in ♂, other specimens have been found with very wide yellowish white circumscriptions to the spots and wider margins to hindwings. In this race ♀♀ with red abdominal belts, ab. **scovitzii** (Mén.) Stgr. are not rare. Transitions are fairly frequent. The denomination *scovitzii*. *cingulata* Shelj. is a synonym. — The ab. *confluens* Shelj. mentioned on p. 22, line 12 from top, belongs to *merzbacheri* Reiss not to *fraxini*.

p. 22, line 12 from top. The var. *perdita* Stgr. (16 l) originates from around Nucha in the southern Caucasus and was discovered by CHRISTOPH. In this form the apical spot 5 and 6 dissolves into two separated spots, in the ♂ spot 6 is fairly often quite absent, so that a five-spotted *Zygaena* is evolved. The whitish surrounds to the spots of forewing are much enlarged at the expense of the carmine rose spots which are thus reduced in size. The blue-black margin to hindwings is widened. There is occasionally a blue-black patch like a streak projecting from base towards the rather considerably enlarged bulge (dentation) of the margin of hindwings at inner angle. The ♀♀ have a faint whitish grey collar. The ♂ type ex STAUDINGER's collection is illustrated.



The *fraxini* population from the neighbourhood of Manglis, west of Tiflis, according to a ♂ before me ex the collection of STAUDINGER, has distinctly separated spots 5 and 6 of forewings, margins of hindwings are decidedly narrower. ROMANOFF also mentions, as localities for *Z. fraxini*: Borjom, S. E. of Kutai, Kasikoparan in Armenia (of these 1 specimen is ab. *scovitzii*) and Derbent, N. W. Baku on the coast. I have not been able to obtain definite confirmation of these localities.

#### 5. *sogdiana* Group.

*sogdiana*. **Z. sogdiana** Ersch. (= *scovitzii* Rbl.). The races of *sogdiana* differ in the main from the previous two groups by the red collar and red abdominal belt in both sexes, otherwise they have great similarity with the *fraxini* group. The occurrence of the red collar forces me to separate *sogdiana* from *fraxini*, for this is an analogous case to *carniolica* and *fausta*, which are also separated.

The types of *sogdiana* were captured end of May near the town of Tashkent. Antennae, head and body are black with deep red collar and fairly wide abdominal belt of the same shade. Ground colour of forewings is black with scarcely discernible green sheen, with six deep red spots, which are or more less surrounded with yellowish white and are situate about as in *fraxini*; hindwings are deep crimson red with wide black margins. On underside colouration and marking is as on upperside, only the spots of forewing have scarcely any yellowish white surround. A ♀ from Tashkent, sent to me by SHELJUZHKO, has additionally reddish scapulae and also that part of the head between the eyes is distinctly red. The abdominal belt in this specimen is laterally enwidened, covering 4 segments. Fringes are bluish black and this specimen therefore cannot at present be held to belong to the *erschoffi* group. This ♀ and a ♂ of *sogdiana* from Tashkent, also from the collection of SHELJUZHKO, are being illustrated (16 l).

Specimens labelled "Tura" as locality, differ from the type race. BURGEFF also mentions these trans-caspian specimens having normal spot markings, which are inclined to be carmine red and an abdominal belt covering one or two segments. Further there seems a tendency to the formation of a transverse band on hindwings, the black margin bulging widely upwards, almost forming a streak towards the centre of the wing from about the middle of the lower margin. From the costa of the hindwings some appressed black scales generally project towards this streak. Without however having exact particulars as to locality, these transcaspian specimens lose in value and are difficult to classify. Meanwhile they can be placed with the subsequent race (*margelanensis*) until the racial characteristics can be ascertained from a sufficiently uniform and numerous quantity of specimens. It seems to me as if in the higher altitudes of the mountains of Transcaspia, populations may occur like *separata* Stgr., and that the specimens so far submitted to me originate from the lower altitudes. For instance I was able to discern *separata* characteristics in a ♂ sent to me from the mountains around Samarkand.

Around Margelan (type race) and Namangan, at lower altitudes near Osh in Ferghana, a race occurs: *margelanensis* subsp. **margelanensis** Reiss (= *sogdiana* Stgr.) of which STAUDINGER already had a large number. It always has a double, attached carmine-rose apical spot (5 and 6) on forewings, which is generally almost completely and widely encircled by yellowish white. Also spots 1 and 2 are edged outwardly with yellowish white, whilst 3 and 4 are boldly encircled. Abdomen has a carmine-red belt, generally covering 2 segments. The specimens that were used for illustration in Vol. 2, pl. 7 e and denoted *scovitzii*, probably originated from Margelan or Osh and belong to this race.

p. 22, line 21 from top. The subsp. *separata* Stgr. seems to only occur in fairly high altitudes, for instance at Usgent (type race) and Goultsha, further at higher altitudes around Osh and in the Alexander mountains. In these the apical spot (5 and 6) is generally separated into 2 single spots, of which the upper (5) is the larger and roundish, whilst the outer and lower (6) is elongate and sometimes quite rudimentary. Further *separata* has a much wider black margin to hindwings, which expands in its centre inwardly in a black dentation. The ab. *ornata* Bgff. (p. 22, 16 l) described from a specimen from Turkestan, occurring among *separata* is not rare and STAUDINGER had already observed same without giving a special denomination. I am illustrating one of the original *separata* specimens ex the STAUDINGER collection and which shows at the same time the characteristics of *ornata* Bgff. (16 l). A further distinguishing feature of *separata* is the inclination towards the suppression of the red abdominal belt. In some specimens it is quite absent, in others it is only rudimentary, but always only faintly present. On the other hand the red collar becomes more or less reddish white. I assume that the original specimens of ab. *alba* Dziurz. and ab. *confluens* Dziurz. (p. 22, line 15 from top), which aberrations STAUDINGER had mentioned in his description of *separata*, without giving denominations, were also captured in the Alexander mountains. DZIURZYNSKI does not seem certain himself, whence the types originate, he illustrated as ab. *alba* a specimen that shows a combination of ab. *alba* and ab. *confluens*. In ab. *alba* the yellowish white circumscription of the spots of forewing are expanded to such an extent that it forms the predominant colour; in fact the entire inner surface is white and in same are situate the red spots, whilst the black ground colour is so suppressed that it is only visible at margin



of wings. I consider that all specimens of the *separata* populations having the spots of forewing more or less longitudinally confluent should be grouped under ab. *confluens* Dziurz. In my opinion the denomination *nigra* Dziurz. (p. 22), the original types of which came from the Alexander mountains, is superfluous, as these are distinctly specimens with characteristics of the *separata* races.

p. 22, line 7 from below. The var. *kohistana* Gr.-Grsh., which was mentioned under *kavrigini* on p. 22, is probably only a *separata* race from the Hissar mountains. GROUM-GRSHIMAILO describes it as a race of *Z. erschoffi* Stgr., but it cannot belong there, as *erschoffi* shows no tendency towards a reduction in the size of the spots of forewings and even at high altitudes it always has a complete red abdominal belt. Also the absence of yellow fringes indicates a lack of affinity with *erschoffi*. I presume that what was illustrated in Vol. 2, pl. 7 f and described on p. 28 as *erschoffi* Seitz, is actually *kohistana* or is closely allied to this *separata* race. This assumption seems to be confirmed by similar specimens in the Zoological Museum of the University of Berlin, labelled *kohistana* with locality Sarafshan, 2500 m, 12 July and captured by E. FUNKE. SEITZ did not have the genuine *erschoffi* before him. The hindwings of *kohistana* have narrower margins than *separata* Stgr., *margelanensis* Reiss and *altissima* Bgff. (p. 22) which should be classified here as a further race. I have specimens before me that are very like *altissima* both in size and otherwise and which come from Vyssokoje, Prov. Syr-Daja, captured in the 2nd half of June.

*Z. magiana* Stgr. (p. 31, line 18 from below) should certainly be placed here and not under Subgen. *Agrumenia* Hbn., as it has much more affinity to the *sogdiana* group. According to particulars supplied by GROUM-GRSHIMAILO, the type race was discovered by HABERHAUER Jr. near Maguian, high up in the mountains in the Province of Samarkand. Forewings have almost the same soft grey-black as *exulans* with 5 small rose spots, that are always circumscribed by white and completely separated from one another. Generally there is a sixth elongated pale red apical spot with white surround. This latter is often rudimentary and never so pronounced or distinct, as for instance in *carniolica*. Sometimes it is almost extinct, being merely hazy white; rarely it conjoins with spot 5 forming an axe-shaped mark as in *sogdiana*. The other two elongate basal spots (1 and 2) are always dissected by the subcostalis. The upper one is narrower and shorter than the lower spot. Of the central spots (3 and 4), spot 3 is always the smaller and sometimes it is minute. Both are always with wider white surrounds than the other spots, spot 4 is sometimes almost entirely white with a red pupil. Spot 5 is oval, sometimes almost reniform and always widely separated from spots 3 and 4. On underside the spots are similarly formed to those of upperside. In the 5-spotted specimens there are generally a few whitish scales near outer margin on underside of forewing indicating a 6th spot. Hindwings are rose with a narrow pale grey-black margin, which is rather bolder at apex and inner margin. Head, thorax and abdomen are black, the hairs are rather coarse. One of the ♀ types of STAUDINGER has a few reddish hairs admixed laterally on prothorax and a few further such hairs in the posterior part of 4th abdominal segment. The legs are pale impure buff on under (inner) side.

GROUM-GRSHIMAILO described the *hissariensis* (p. 31) from a few specimens, a year later than STAUDINGER, probably in ignorance of the description of *magiana* by STAUDINGER. According to the description the var. *hissariensis*, which was captured in the neighbourhood of Kizil-Gazy, below the summit of Liagar Mourda at a great altitude, has, in comparison with *magiana*, generally only 5 pale red spots with white surrounds; spot 6 is rarely discernible and never has a white surround. It appears unlikely that the specimen illustrated in Vol. 2, pl. 7 b as *hissariensis* was one of the original types of GROUM-GRSHIMAILO and therefore a typical *hissariensis*. To check whether *hissariensis* is actually different from *magiana*, will only be possible, when sufficient fresh material has been collected to enable a proper comparison.

#### 6. *erschoffi* Group.

p. 22, line 25 from below. *Z. erschoffi* Stgr. (161, m). The genuine *erschoffi* was neither before SEITZ nor before me when I dealt with same in the Supplementary Volume. Now I have in front of me the types from the STAUDINGER collection and can give the necessary particulars. STAUDINGER compares *erschoffi* with *olivieri*, presumably from the Caucasus. It occurs simultaneously with *sogdiana* near Usgent (the type race), Osh, Margelan, but whether on precisely the same localities is not definitely certain. The blue-black forewings have 4 spots, which have yellowish surrounds. The large basal spot (1 and 2) does not extend quite to the inner margin, which is therefore narrowly black. The central spots (3 and 4) conjoin through their yellow surrounds. Frequently however they are entirely separated by a strip of the blue-black ground colour. The apical spot (5 and 6) is deeply excised at lower end; it appears to consist of 2 contingent spots, although in their upper area they are widely merged together. The spot thus resembles that of *sogdiana*. Fringes are distinctly yellowish, whilst in *sogdiana* they are black. On underside the spots stand out clearly from the jet black ground colour. The red of the spots and hindwings is heavily admixed with yellow (brick-red) and quite different from the carmine of *margelanensis* and *separata*. Hindwings are more narrowly margined by blackish and the dentate projection in centre of margin is smaller than in *margelanensis*. Collar is brick-red, frequently only faintly present and sometimes admixed with grey in the ♀. The scapulae in the ♀ are more or less grey outwardly. The blue-black abdomen has a constant brick-red belt on one segment in the usual



situation. Sometimes in the ♀ the red extends dorsally over to a second segment. According to STAUDINGER *Z. erschoffi* also occurs in the Alexander mountains and I have had a ♀ with a label from this locality submitted to me. *Z. erschoffi* is on the wing mid July. It is a mountain insect, as is indicated by the late season when it emerges. I am illustrating the ♂ and ♀ types from Usgent ex the STAUDINGER collection. — I cannot subscribe to STAUDINGER's opinion that the specimens described by ERSCHOFF as *olivieri* var. *tashkentensis* Reiss (= *olivieri* var. *Ersch.*). The specimens were captured already at the end of May at Tashkent and in the Sarafshan valley between Jori and Dashty-Kazy. My opinion is that this is the lowland race of *Z. erschoffi*, which varies by the somewhat larger form, more brilliant colouration, somewhat enlarged spots, more apparent red collar and more extensive red admixture on scapulae. The abdominal belt, according to the description, is wider than in *olivieri* from Achalzich and therefore covering at least 3 segments. In the illustration of ERSCHOFF the pale fringes are distinctly represented.

*merzbacheri*. **C. merzbacheri** Reiss (16 m) is doubtless most closely related to *erschoffi*. It occurs in the Tien-shan (Naryn territory) and according to 2 specimens (♂♀) in the Zoological Museum of the University of Berlin, also in the eastern Altai. I take the mountains around Narynsk as the habitat of the type race. It appears to be very frequent in its localities. MERZBACHER discovered this *Zygaena* in July 1908 and brought back a number from his expedition. Ground colour is black with scarcely perceptible bluish, sometimes greenish sheen. The red is more fiery than that of *margelanensis* and *separata*, but not so yellowish as in *erschoffi*. Basal spot (1 and 2) of forewings in comparison with that of *sogdiana* and its races, is more or less increasingly white (generally in the ♀♀) or red towards the inner margin, however the inner margin itself remains narrowly black. The small spot 3 of forewings and the usually much larger spot 4 are situate as in *erschoffi*. They are generally close together and usually conjoined by a merging of their faint whitish surrounds. Occasionally these 2 spots are slightly separated in the ♂. Specimens also occur in which the red of spots 3 and 4 is confluent and this dual spot is circumscribed as a whole by whitish. Spot 5 is generally as widely surrounded by white as 3 and 4, whilst spot 6 which is always appended at its upper end to spot 5, is generally without whitish surround; only in a few specimens, mostly ♀♀, there are traces of whitish. One ♀ specimen before me has wider whitish edges to spots of forewings than any other specimen. Hindwings have only a very faint bluish black margination, in some specimens it is quite absent. Generally the margins of hindwings are scarcely as marked as in *erschoffi* and much narrower than in *kohistana* and *altissima*. Fringes in all specimens are blackish, those of forewings sometimes have a palish sheen. The brilliant red belt encircles the abdomen completely on one segment. The red collar is bolder in the ♀ than in the ♂, in which as in the *sogdiana* mountain races, occasionally merely traces of same are visible. Underside of both wings, as the upperside, only colouration is fainter. Antennae about like those of *erschoffi*, the ♀ generally has less robust antennae than the ♂. The ♀ type ex my collection is illustrated. — ab. *dealbata* Reiss denominates a ♂ ex my collection from the type series, that has no whitish surround to the spots. — ab. *confluens*. **confluens** Shelj. (= *rubescens* Bgff.) (p. 22) is described from a ♂ that was captured on 25th June in the Naryn region. The specimen is not a transition to *rubescens* Bgff., but is completely identical with same. *Z. merzbacheri* is a pronouncedly mountainous species, as are *sogdiana-separata*. In 10 specimens in the collection of DANIEL, Munich, the altitude of capture is stated as 2200 m. The specimens from the Altai have slightly wider margins to hindwings and the ♀ has whitish scapulae.

p. 22, line 23 from below. *Z. truchmena* Ev. This species is best classified here. Antennae, vertex and thorax are glossy steely blue; the head below the antennae, collar and abdomen are scarlet red, ventrally the colour is grey-black. Forewings are glossy steely blue. Basal spot of forewings (1 and 2) is rounded outwardly and edged with white, spots 3 and 4 are contingent in the type race from the southern Kirgisen steppes and are white, sometimes however with a larger or smaller red centre. Spots 5 and 6 are appended as in *erschoffi*. Spot 5 is white with red centre, spot 6 generally completely red. A dividing line between spots 3 and 4, as well as spots 5 and 6 is not especially rare. The somewhat paler red hindwings, which are hyaline in the disc with red scaled veins, have a narrow blue-black margin and similar fringes.

#### 7. *olivieri* Group.

p. 23, line 27 from top. *Z. olivieri* Bsd. (16 m). The type race originates from Syria, whence the botanist LABILLARDIÈRE had first brought back specimens over 100 years ago. I assume that the type race occurs in the immediate neighbourhood of Beirut, as the specimens from there correspond most exactly to the description and illustration of BOISDUVAL. The denomination *cremonae* (Stgr. i. l.) Seitz is synonymous with *olivieri* Bsd. The wide margins of hindwings of the type race are striking in comparison to all other species and races of this group. As *cremonae* was given with rather too yellowish a colouring on pl. 7 a in Vol. 2, I am now illustrating a ♂ of the typical *olivieri* from the Zoological Museum of the University of Berlin. Ground colour is blue-black with 3 brilliant spots. The 1st spot (1 and 2) occupies the entire base from



costa to inner margin and has a vary narrow outward whitish yellow edge. The 2nd spot (3 and 4) seems to be an amalgamation of the two spots, spot 3 being the smaller and generally whitish with very narrow whitish yellow surround. The 3rd spot (5 and 6) is irregular and axe-shaped and only towards the base has a faintly yellowish white edge. However especially in the ♀ the circumscriptions of the spots of forewing can be rather more heavy than in the ♂. Hindwings are a brilliant red with relatively wide blue-black margins. Fringes of forewings are yellowish, those of hindwings blue-black. Head, palpi and scapulae are blue-black, collar and abdominal belt, which is scarcely visible ventrally, are a brilliant red. Here subsp. *libanicola* Bgff. (p. 23) is classified. It is a mountain race with rather heavier margins to hindwings.

The subsp. *laetifica* H.-Schäff. (16 m) originates according to a ♂ in my collection, captured by FUNKE, from Mesopotamia. I hold the locality of the type race to be around Mardin at the northern extremity of the great mesopotamian plains. HERRICH-SCHÄFFER did not indicate the origin when giving his description. I only dare to differ from STAUDINGER in regard to *laetifica*, as the ♂ in my collection, as well as the description and illustration of HERRICH-SCHÄFFER, indicate same to be the genuine *laetifica*, in fact this is perhaps the original specimen that was before HERRICH-SCHÄFFER when he made his description. Ground colour is bluish black. The red is somewhat paler and the antennae less robust than in *olivieri*. Collar, inner edge of scapulae and abdomen, except for the blue-black anal tip, are red. All margins of forewings are blue-black. Spots of forewings, especially 3 and 4, which are only attached by their yellowish surrounds, are reduced in size. Spots 1 and 2 are completely conjoined, equally long with yellowish edge towards the base in middle cell. Spot 3 is cordiform, point towards the base; spot 4 is almost quadrate, excurved towards base, both with yellowish surrounds. Spots 5 and 6 are quite conjoined, spot 5 is situate nearer the costa, an irregular square, spot 6 is nearer the anal angle and is vertically oblong. Legs are blue-black, tibiae outwardly yellow-grey. The red abdominal belt covers 5 segments on upperside, 3 on underside.

According to HERRICH-SCHÄFFER, who again gives no details of the original locality, *Z. ganymedes*, which I enumerate as a subspecies of *olivieri*, only differs from *laetifica* by the following characteristics: Scapulae are red, only yellowish at outer edge, spots of forewings much larger, forewings less pointed. The conjoined spots 1 and 2 extend to costal and inner margins, spots 3 and 4 are also conjoined, spot 4 fairly regularly quadrate, spot 3 extends to costa and is conjoined there to spot 1. Spots 5 and 6 as in *laetifica* but larger, spot 5 generally contingent at its lower inner angle with spot 4. In the ♂ only the 1st abdominal segment is black, in the ♀ the 1st and last. This diagnosis of HERRICH-SCHÄFFER and his illustrations correspond best to specimens from Zeitun submitted to me by the Zoological Museum of the University of Berlin and accepted by me as being typical *ganymedes* H.-Schäff. To complete the diagnosis the following particulars are given: Red with quite an admixture of cinnabar. Fringes of forewings yellowish, those of hindwings bluish black as the ground colour. Spots of forewings more or less confluent on underside. Ventrally the abdominal belt is not wider than in *laetifica*. Width of abdominal belt is not uniform; ♂ with wider belt. Under *ganymedes* all specimens captured in the Taurus and around Hadjin should be classified. Therefore *hebe* Seitz from Hadjin is synonymous with *ganymedes* H.-Schäff. The illustrations of *laetifica* Seitz and *hebe* Seitz in Vol. 2, pl. 7 g and h represent *ganymedes* H.-Schäff. It is necessary to correct here an obvious mistake of STAUDINGER, who held specimens from Amasia and Tokat to be *ganymedes* H.-Schäff. The variability of *ganymedes* from Zeitun must still be investigated. The subsp. *ganymedes* H.-Schäff. embraces generally speaking also the specimens mentioned by STAUDINGER from Armenia, chiefly from Kasikoparan. Also in these armenian specimens, which do not vary materially in size, colouration and formation of markings from *ganymedes* from Zeitun, an increased measure of red occasionally occurs on abdomen. Further in this race the red of collar and scapulae of the ♂ is often reduced, becoming whitish red, the latter sometimes being coloured bluish black. Circumscription of spots, as in *ganymedes*, narrowly yellowish, sometimes whitish, margins of hindwings equally narrow, often quite absent. Legs almost whitish yellow. *ab. confluens* Dziurz. belongs, in my opinion, to this race. It has all spots more or less closely and widely confluent and has a red abdomen. ROMANOFF mentions besides Kasikoparan, a further locality as Bechinag (on the road between Nakhitchévan and Istissou).

The armenian specimens mentioned above form a transition to subsp. *dsidsilia* Freyer, the type race *dsidsilia*, of which emanates from Elisabethpol and Helenendorf in Transcaucasia and broadly speaking as a subspecies from Achalzich, Borjom. In the ♂ the red collar and scapulae are absent or the red colouration is much suppressed and replaced by whitish. In the ♀ collar and scapulae are still red, although in the latter the red colouration is reduced and often the red, also of the collar, is intermixed with whitish. The red is somewhat paler, not so fiery and with less yellow admixture. Spots reduced in size, 3 and 4 are only narrowly conjoined through the yellowish surrounds. Margins of hindwings scarcely heavier than in *ganymedes*. The red abdominal belt covers 2 segments. On underside of forewings, in the spot area and also towards the inner margin there is more of a silky yellowish sheen than in *ganymedes*, the red spots, especially in the ♀ seem to more or less merge with one another. The illustrations in Vol. 2, pl. 7 h (*olivieri*) represent *dsidsilia* Freyer



*tricolor*. from Transcaucasia. The specimens illustrated probably were captured at Achalzieh. — ab. *tricolor* Reiss (16 m) from Helenendorf, the ♂ type of which ex the STAUDINGER Collection is illustrated here, shows on forewings the yellow blotches in the red and a general confluence of the spot area, edged by yellowish and with an equally narrow margin of blue-black ground colour at apex, outer and inner margins. Collar is faintly whitish, scapulae bluish black and there is a red abdominal belt on 2 segments. On underside of forewings the entire spot area is red.

*freyeriana*.

**C. freyeriana** Reiss (= *ganimedes* Freyer n. *praeocc.*, *ganymedes* Stgr., *ganymedes* Seitz, Vol. 2, p. 28). Type race from Amasia in Asia Minor. The illustration given by FREYER is well recognisable. FREYER compares same with *fausta* from Augsburg, both being of the same size. The most striking difference as compared with *ganymedes* H.-Schäff. is the grey-white colour of upperside of antennae \*). All specimens before me from Amasia are small, scarcely larger than the central german *fausta* with pointed narrow wings. The red is rather paler, especially that of the hindwings which is not so much admixed with cinnabar as in *ganymedes* H.-Schäff. from Zeitun. The double collar and scapulae are a nice carmine red. Scapulae generally with yellowish white tips. Abdomen usually pale carmine red with somewhat vermilion admixture right to the tip. Sometimes the usual 3 segments of abdomen are red and the other segments only faintly scaled with red dorsally, occasionally also the anal tip is bluish black. In one ♀ before me even the thorax has red scales. In well preserved specimens the head is more or less red between the eyes. The spots of forewings, which are situate as in *ganymedes* and adapted to the small size of the wings, have fairly bold yellowish white surrounds. Fringes of forewings are yellowish, on hindwings they are darker with faint yellow sheen. The latter have narrow dark margins. On underside colouration is paler, the spots are clearly discernible, the blackish ground colour in the spot area is frequently replaced by more or less yellowish, sometimes even reddish yellow scales. Legs are yellow. The illustration of *ganymedes* Seitz in Vol. 2, pl. 7 h represents a specimen that cannot be definitely identified as being actually from the Amasia locality, as the size, contour of wings, arrangement and margination of spots are not quite typical. STAUDINGER captured *freyeriana* at the end of June in Kerasdere and in July on the Caraman, where it was obtained up to well into August. The specimens from the Caraman vary fairly considerably according to the particulars supplied by STAUDINGER, especially in regard to the white circumscriptions of the red spots and the white dusting on the antennae. Also the abdomen, the upperside of which is almost always completely red, is sometimes black on upperside of the anterior segments, having only a red abdominal belt posteriorly on underside. LEDERER mentions Tokat, besides Amasia, as locality. — DZIURZYNSKI mentions in regard to ab. *algarvensis* that the locality was Algarve, later on he mentions Amasia. Further this aberration was first described as *algarviensis* with diffusing white circumscriptions to spots of forewings, then as *algarvensis* with white forewing spots. The type was not procurable. — The ab. *confluens* Dziurz. with more or less confluent spots to forewings is described from Amasia. — ZACH discovered small larvae early in June, while STAUDINGER obtained full grown larvae and cocoons at the end of June. The larva is described by STAUDINGER as being yellow-green with black head and two lateral black spots, the one behind the other on upper side and anterior part of each segment. In the joints there are dull dark transverse lines. The elongated cocoons are smooth, yellow and sometimes white.

Vol. 2, p. 26 *Z. haberhaueri* Led., is typical of the mountains of Hakynda, N. E. of Ordubad in Transcaucasia, further according to ROMANOFF it occurs at Hadji-Kherib, around Göktshasees (Sewanga), N. E. of Erivan, whilst OBERTHÜR mentions Berud-Dagh in the Taurus. It is apparently a widely distributed mountain insect. The illustration in Vol. 2, pl. 6 i is a good representation in regard to size and formation of spots, but the ground colour of the type race is very dull bluish black with glossy sheen and the red is a much less vivid pale carmine red. The antennae, especially of the ♂ are heavily clavate and these are not well depicted in the illustration, the head also is too broad. — *Z. haberhaueri* is the most widely distributed representative of the *olivieri* group having wide somewhat truncate wings. The basal spot of forewings (1 and 2) does not touch the inner margin along its entire length, there is an additional spot 2 a, as mentioned in *nobilis*; outwardly the basal spot has a very narrow, rudimentary whitish edge. Of the central spots, spot 3 is always the smaller and of oval shape, not extending to the costa; spot 4 is almost round to oval, both are either contingent or separated by the ground colour. Spot 3 has only traces of a whitish circumscription, whilst spot 4 has a complete surround. The apical spot (5 and 6) has the shape of a triangle standing on its apex and also has only rudiments of a narrow whitish edge. The circumscription of the spots of forewing is sometimes completely absent. In the ♀ there are only traces of a carmine collar, whilst in the ♂ same is still clearly discernible. Thorax, scapulae and abdomen are dull blue-black. Occasionally there are faint indications of a red abdominal belt. Especially in the ♂ the entire body is fairly heavily haired. Legs are an impure yellow. As I have no specimens from Hadji-Kherib before me, I cannot say whether that population has any special characteristics. OBERTHÜR illustrates a specimen from Berud-Dagh that has no cir-

\*) HERRICH-SCHÄFFER, who was very exact, would certainly have observed and mentioned this difference, had he had specimens from Amasia before him when he was describing his *ganymedes*.



cumscription to the spots and which I must deem to be an aberration, as I also have a ♀ in my collection from the Taurus without further details as to exact locality. This has faint surrounds to the spots and varies from the type race, of which there is a series in the Zoological Museum of the University of Berlin, by having denser scaling, somewhat more vivid carmine red and a faint blue green gloss on the body and the dark portions of the wings. A ♀ with similar characteristics, I observed in the collection of PRZEGENDZA, labelled "Caucasus", which is rather indefinite.

#### 8. *formosa* Group.

p. 22, line 16 from below. *Z. formosa* H.-Schäff. The type race from around Amasia in Asia Minor is well illustrated in Vol. 2, pl. 7 i. It is scarcely possible to mistake this pretty *Zygaena* for any other, as it is very constant. It has a rosy coloured collar, scapulae with yellowish outer edges, abdomen with a rosy belt on the usual 2 segments, occasionally being restricted to one segment and very rarely almost absent. STAUDINGER captured same on the 9th June near Kishlatshyk and a few days later on the Caraman, where it occurs relatively rarely to the beginning of July. It flies in the sunshine, generally skimming the ground in fairly rapid flight and is rarely found at rest on flowers. — STAUDINGER only found 2 specimens sitting on scabiosa flowers. — STAUDINGER also obtained a few specimens at Kerasdere. — The larvae were discovered by STAUDINGER in May on a species of vetch. It is green with black head and in contrast to the larva of *freyeriana* has but one black spot laterally on each segment and no dark striations in the joints. The cocoon is very similar to that of *freyeriana*. STAUDINGER also found one cocoon of green colouration. — As far as I know *formosa* has not been found in Syria as was stated by SEITZ in Vol. 2, p. 28. The nearest locality would be Malatia, where the subspecies *malatiana* Rbl. (*Stgr.* i. l.) — not *Stgr.-Reb.* — is found. It is larger and more densely scaled and has a warmer shade of red. The illustration in Vol. 2, pl. 7 h shows these differences quite well. However the collar is not white, as is shown in the illustration but rose.

The subspecies *rosinae* Korb from the mountains south of Kulp in Armenia, discovered early July 1901 by Mrs. ROSINE KORB, was classified as belonging to *formosa* following an examination of the genitalia by BURGEFF. It is rather larger in form than *formosa* and has a nice rosy red colouration. Besides the rosy red palpi that occur in both sexes of this subspecies, the ♂ also has a rosy red frons. The scapulae both of the ♂ and ♀ are rosy red. The central spots (3 and 4) are always separated from the apical spot (5 and 6) by the blackish ground colour, whilst in *formosa* the upper outer angle of spot 4 is always faintly contingent with the lower inner angle of spot 5. — Mr. and Mrs. KORB found the larvae at the end of May and early June on a species of vetch (*Coronilla*) with yellow blossoms growing on fairly bare, dry mountain slopes. It is described by KORB as being pale green with black dots on the anterior part of each segment. The elongated cocoons are, according to KORB, smooth, whitish, a few with green colouration. According to this the larvae and cocoon generally seem to be like those of *formosa*. In the early morning the imagines sat about on the blossoms of a scabiosa plant with small flowerheads.

#### 9. *mangeri* Group.

p. 22, line 13 from below. Next to *Z. mangeri* Bgff. one should classify *Z. rothschildi* Reiss (p. 22).

#### 10. *cocandica* Group.

p. 22, line 7 from below. *Z. kavrigini* Gr.-Grsh. (subsp.). Type race from Djilian-Tau and around Baldjouan (eastern Bokhara) in May at altitudes of 800—1200 m. Ground colour is blue-black. Scapulae, collar, in the ♀ sometimes the frons and a part of thorax are a vivid cinnabar-red. The abdomen is the same shade. Rarely in the ♂, more frequently in the ♀, the 2 first segments are not completely red. Wings have fairly wide yellowish fringes. The brilliant cinnabar-red spots of forewings have narrow yellowish edges, they are situate as shown in the illustration of *kavrigini* in Vol. 2, pl. 7 g. Hindwings have the same shade of red as the spots and a blue-black margin that varies in width and is scarcely different from that of *cocandica*. On underside the forewings are paler and the edges of the spots are less prominent. The size of the spots of forewings vary, as does the thickness of the yellow circumscription, which is sometimes quite absent. — It is very interesting to learn that HABERHAUER JR. discovered, according to a description by STAUDINGER, an almost identical population of this species at Samarkand at the end of May. STAUDINGER has named this *rhodogastra*, a name which at present may be deemed to be synonymous with *kavrigini*. Unless there is some mistake, the predominantly red *Z. kavrigini* is to be found on the lower spurs of the Hissar mountain chain at an altitude of 800—1200 m.



p. 22, line 5 from below. The var. *karategini* Gr.-Grsh. from around Obi-Garm, northwards of Baldjouan — on the lower slopes at abt. 1000—1400 m altitude, has a red tip to abdomen, its characteristics indicate an affinity with *cocandica*, although it is actually closer to *kavrigini*. According to GROUM-GRSHMAILLO specimens also occur in the Karategin that are like *kavrigini* with completely red spots to forewings and these he has named ab. *conserta*. After a careful study of the literature, I am meanwhile not adopting *conserta* as a subspecies name. According to the same author the ab. *conserta* is also found in Darwas, that is to say specimens with red colouration of collar and the spots. This form however is only frequent in the ♂♂, some of the ♂♂ and the ♀♀ seem to resemble *cocandica*.

*Z. cocandica* Ersch. (p. 23, line 8 from top) and the races that it forms which are as yet generally unknown, occur at greater altitudes than *kavrigini*, probably up to 2000 m in the mountain valleys of the Alai and the neighbouring chains of the Karategin and probably also in the Hissar range. It has yellow or more or less heavily red dusted yellow forewing spots, yellow or red collar, but always a constant narrow red abdominal belt. — Still higher in the mountains, as for instance in the Peter the Great mountains, there are populations with reduced spots and rudimentary collar, that often appears to be red instead of yellow, the abdominal belt is inclined to be absent, or is actually absent. — In the Pamir finally we have subsp. *pamira* Shelj. (p. 23, line 20 from top) having no abdominal belt. In order to demonstrate the variability of this group, I have commenced with the lower ranges of altitude and proceeded to the high mountains and thus started with subsp. *kavrigini* instead of the older name of *cocandica* which was the first given to this species. According to ERSCHOFF the typical *cocandica* was captured on 22nd July.

#### 11. *laeta* Group.

p. 23, line 15 from below *Z. laeta*. Hbn. ZHICHAROV captured some specimens near the village Grigorovka (in the district of Kieff) in the Ukraine, which apparently belong to typical *laeta*. It has also been found at Balçic on the coast of the Black Sea, in the southern Dobrudja. STAUDINGER captured what is probably *orientis* Bgff. in the Kerasdere and the Maidan in Asia Minor and MANN captured quite similar specimens at Brussa. PFEIFFER obtained 2 ♂♂ of the species in the cemetery on the Aintab road at Marash, which DANIEL has classified to subsp. *orientis*. In these specimens the collar and the entire anterior part of the thorax is red, similarly the abdomen to the base. The period of capture was 15—28th June. Probably these represent a race that varies.

#### X. Subgen. *Agrumenia* Hbn.

p. 24. *Z. hilaris* O. The types of HOFFMANNSEGG representing this species, which were sent to me, were said to have been captured at Algarve (Faro?) in S. Portugal. In my opinion they are closer to var. *aphrodisia* Bgff. than to subsp. *escorialensis* Oberth. Perhaps OBERTHÜR was right when he claimed that the andalusian race was the same as the type race of *hilaris* from Algarve.

p. 24, line 25 from below. *Z. fausta* L. (= *nicaeae* Stgr.). According to old records the type of *fausta* was captured in southern Europe (LINNÉ), ESPER stated that the species only occurred in S. France. The photograph of the type ex the LINNEAN Collection in London in my possession, shows a southern race with faint traces of yellow circumscription to the spots of forewings. The southern french *fausta* hitherto *nicaeae* Stgr., type race from Nice, is accepted as type race of *fausta*. It occurs along the seaboard of the Maritime Alps, Basses-Alpes and Bouches du Rhône and neighbouring country. The type race especially shows a vivid warm cinnabar-red colour of spots of forewings and hindwings. The spots generally are conjoined. Specimens in which spots 3, 4, 5 and 6 are separated by the black ground colour (Levens, Tenda) are denominated *segregata*. *segregata* (Blach.) Reiss. — The subsp. *fortunata* Rmb. shows a paler red colouration with admixture of carmine and has constant narrow whitish yellow circumscriptions to spots. The spots of forewings including their surrounds are not reduced in size as compared with the more southerly typical *fausta*, also the margin of hindwings is just the same width as in same. A population occurring around Le Rozier (Lozère) varies little and can be classified with *fortunata*. Also around Lyons *fausta* develops spot formation and marking just like *fortunata*, having also the narrow whitish yellow circumscriptions to the spots as this subspecies.

The subsp. *jucunda* Meissner from the alpine regions of W. Switzerland embraces the group of *fausta* that are mainly without the abdominal belt and have much reduced collar. There is a general inclination to a reduction in the size of the spots, spots 3, 4, 5 and 6 of forewings are not infrequently completely separated from one another. The var. *genevensis* Mill. (p. 24, line 15 from below) is cited as a race.

p. 24, line 11 from below. The larger *lacrymans* Bgff. is now stated to be a subspecies. FUESSLY claims "Pfeffers" as habitat and a very similar population to *lacrymans* occurs on the Canisfluh (Vorarlberg). — *monacensis*. DANIEL denominates the race from around Wolfratshausen in S. Bavaria as var. *monacensis* (Bgff. i. l.). It has a richly contrasting colouration, partial occultation of the red abdominal segments by the interspersions of black scales and a somewhat bolder, paler yellowish, sometimes even whitish circumscription to the spots of forewings. HÜBNER mentioned a german *fausta* in 1796 for the first time in entomological literature and at that time he gave Augsburg as the habitat. Further known localities are Teisenberg near Traunstein and



Elbigenalp in the Lechtal. The race to which the specimens from these 3 localities belong, has not yet been defined. At the moment they are classified with subsp. *lacrymans*. E. LINDNER discovered in August 1908 a *fausta* population on the Garchinger heath near Munich, which is now said to be extinct. According to DANIEL same was not as richly coloured as *monacensis* and represented a transition to the population of Regensburg.

p. 24, line 23 from below. The subsp. *suevica* Reiss now comprises all the populations of the Swabian Alps as well as those from Regensburg (Keilstein). The population from Eichstädt (Bavaria) probably also belongs to this group. The yellow aberration of *suevica* is named ab. **flava** Reiss (Blaubeuren). Specimens in my collection from Kirilein (moravian Karst) have, like *suevica*, a partially red streaked thorax, the yellow is more vivid. A specimen from the neighbourhood of Kletten, northwards of Zauchtel in N. E. Moravia has similar characteristics. The most easterly localities known at present are Jassina (Korösmezö in what was formerly known as Hungary), east Slovakia on the galician frontier.

It appears that a very local race occurs in Moravia and in eastern Slovakia that links up with subsp. *suevica* and which has affinities with the central german *fausta*.

The subspecies **agilis** Reiss, type race from around Jena (Kunitzburg) and also from Apolda and Arnstadt, almost certainly also occurs at other spots in Thuringia. According to BURGEFF it is found near Weimar. Further *agilis* has been ascertained to occur at Würzburg and at Wertheim. It always has distinctly visible pure pale yellow thoracic streaks, the ♀♀ show distinct pale yellow scales or short pale yellow hairs on last abdominal segment. In contrast to typical *fausta* and also to *fortunata*, it varies very little in regard to size and disposition of the spots. The relatively small brilliant red spots of forewing, which are always conjoined with one another by the wide vivid yellow circumscriptions, are almost always of the same shape and size. The yellow circumscription fairly frequently extends along the vein, at the level of spot 1, towards spot 3 and simultaneously at the level of spot 2, towards spot 4. On underside of forewings the bright yellow appears chiefly as an outer surround of spot 6. Along the inner margin on underside of forewings there seems to be a wide yellow silky glossy area that extends to the spots. Above this yellow silky patch, spots 1, 2 and 3, 4 often seem to be widely conjoined together by red scales. Along the costa on underside of forewings there is a red streak conjoining spots 1—3 often as far as spot 5, that part of same between spots 3 and 5 is often yellow. The yellow aberration is ab. **lugdunensis** (Mill.) Bgff. and specimens with brown spots and brown hindwings are named ab. **brunnea** (Oberth.) Bgff. The denomination ab. *lugdunensis* Mill. refers to yellow specimens of the races like *fortunata* from Lyons and ab. *brunnea* to those of the *fortunata* races. *lugdunensis*  
*brunnea*.

In conclusion I should like to mention that *fausta* also occurs in the S. Tyrol, which is not remarkable in conjunction with the occurrence of *lacrymans*. DANNEHL gives the Malser Heide as a further locality, while DANIEL has in his collection specimens from around the Klausen and Waidbruck.

*Z. faustina* O. (Vol. 2, p. 29) does not belong to *fausta*, but *faustina*, *baetica* and *murciensis* form a unit together. The only original specimen of *faustina* that is left and that certainly had been in OCHSENHEIMER's collection and is now in the collection of TREITSCHKE in the Hungarian National Museum, has supplied the necessary proof. The *faustina* illustrated by HÜBNER is the genuine type, RAMBUR had unfortunately taken a specimen of a spanish *fausta* race, that probably originated from Catalonia, when he described and illustrated the subsp. *baetica* of *faustina*. The genuine *faustina* emanates from Algarve in S. Portugal and is of the same size as *baetica* and *murciensis*. The specimens captured by KORB near Chiclana in S. Spain and designated as *baetica*, are actually more like *faustina* than *baetica*. SEITZ has cited in Vol. 2, p. 29 the main distinguishing characteristics of *faustina*. The abdomen is generally red on the 3 usual segments, ground colour is blackish green, the circumscriptions of the spots are fairly wide and nearly whitish yellow. The basal spots (1 and 2) are widely separated from costa and from the central spots (3 and 4) which are conjoined by their whitish yellow surrounds. Spot 3 also has a yellowish edge towards the constant blackish costa. The yellow thoracic streaks are absent. The illustration in Vol. 2, pl. 8 c does not represent *faustina*.

p. 25, line 27 from below. The subsp. *baetica* Rmb. is typical in the neighbourhood of Malaga. It has larger central spots that are confluent in the red with very narrow generally only rudimentary whitish yellow circumscriptions. The specimen illustrated by SEITZ in Vol. 2, pl. 8 b does not represent *baetica* according to the paratypes of RAMBUR submitted to me, as the spots are much too reduced in size. As however we know little about the variation of the spring and autumn forms and as also the degree of variability of *baetica* has not yet been thoroughly ascertained, the specimen in the illustration referred to may be considered aberrative.

p. 25, line 25 from below. subsp. *murciensis* Reiss is to be classified here.

p. 25, line 5 from below. *Z. marcuna* Oberth. (= *marcuna* Stgr. i. l.). The correct name is *marcuna* and not *marcouna*. The chief distinguishing feature from *algira* Dup. is that the basal spot (1 and 2) of forewings does not extend to the inner margin.



p. 26, line 9 from top. *Z. felix* Oberth. Already in 1887 STAUDINGER relegated the type race to the neighbourhood of Sebdou in the province of Oran, because OBERTHÜR had described both the generally unbelted, as well as the generally doubly belted race without any indication of the habitat and further had illustrated unbelted specimens as the types. In the year 1888 OBERTHÜR mentions Magenta, Sebdou, Lambessa as the locality of his *felix*. We must therefore take the type race from around Sebdou as typical. Only recently PRZEGENDZA has named afresh the population from Sebdou as *beatrice* and this name is therefore synonymous with *felix*. It is important however to observe that PRZEGENDZA has ascertained, like STAUDINGER had done previously, that the specimens from around Sebdou are nearly all without abdominal belts. Only the ♀ shows a distinct double white collar, in the ♂ same is often completely absent or only very rudimentary. Besides the ♀ has usually white-edged scapulae and occasionally the thorax has an interspersation of white scales. — On the other hand in the east of Algeria, near Constantine, a race occurs that almost exclusively has a double red abdominal belt and which STAUDINGER named var. *mauretanica* (p. 26 as ab.). Also specimens from Lambessa, Khenchela and Batna, which are generally rather more dainty than *felix*, usually have a pronounced abdominal belt, so that *mauretanica* can now be considered a subspecies. In the type race from Constantine the ♂ always has a fairly distinct white collar, but in this case only the prothorax is strikingly white, whilst the edge of the back of the head is at most only slightly admixed with grey. The ♀ is similar to that of the ♀ of *felix*. If the characteristics given by STAUDINGER for var. *faustula* (p. 26 as ab.) which occurs in the province of Constantine (namely heavy white surrounds to the forewing spots, whitish scaling of thorax, in the ♂ sometimes with abdominal belt limited to one segment) prove to refer to the great majority of the population of this district, then *faustula* should be held to be a race. As is usual in these *Zygaena*, belted specimens may occur in the *felix* populations = ab. **pseudomauretanica** n. ab., whilst specimens may occur among *mauretanica* populations having no belts = ab. **pseudofelix** n. ab., also specimens resembling *faustula* = **pseudofaustula** n. ab. among the *mauretanica* populations and apart from the type race of *faustula*, the locality of which is not yet defined and all of which may occur now and then, but as aberrations in a minority. Such specimens have frequently been mentioned in literature.

p. 27, line 26 from above. *Z. carniolica* Scop. PRZEGENDZA denominates as var. **menaggia** a race belonging to subsp. *hedysari* Hbn. from near Menaggio on Lake Como (200 m). It is a transition race, which also resembles subsp. *roccii* Vrtý. I have specimens from Calolzio near Lecco. Generally larger than *roccii* and with dark cinnabar-red spot markings. In a quarter of the ♂♂ markings like *pseudoberolinensis* occur, the remainder have the spots of forewings more or less delicately circumscribed by yellow. Spot 6 in most specimens is prominently marked. Spots of forewings are larger on an average than those of *roccii*. In 67% of the ♂♂ spots 3 and 4 are separated, in the rest they just touch. Among the population of Calolzio the ab. *apennina* (Trti.) Bgff. without spot 6, is very rare. PRZEGENDZA mentions having taken a transition form to this aberration at Menaggio. Although I have over 100 specimens from Calolzio, collected over a decade, I could not decide to publish a description, as the differences from *hedysari* seem to me too immaterial. — VORBRODT has given a series of denominations for aberrations of spot markings in *hedysari* from the Tessin, which I will not repeat here, as I consider such denominations are unnecessary. — In the Grisons (Filisur) SCHNEIDER of Elberfeld captured several ab. **flaveola** Esp. (nom. emend.) of the var. *rhaetica* Bgff.

A very interesting subspecies of the Alps, typical of Vanzone (700 m) on the Anzasca Valley at the foot of the Monte Rosa, VERITY has named **anzascana**. I have a few specimens of same also from Gondo and Iselle, S. E. of the Simplon. The variability is very slight, which is remarkable in a *carniolica* care. It is generally somewhat larger than *hedysari* with wide and truncate apex to forewing. The colours are vivid and bright. The brilliant red spots of forewings are larger, spot 6 in both sexes is well developed and always without whitish circumscription. The surrounds also of the other spots of forewing are extremely reduced. About half the specimens have no circumscriptions at all. This subspecies is to be classified after subsp. *valesiae* Bgff. (p. 27), which almost constantly shows bold circumscriptions to the spots and owing to this circumstance provides a nice contrast to *anzascana*.

As the original specimens that STAUDINGER described of ab. *amoena* belonged, according to HOLIK to the subsp. *onobrychis*, it is necessary to cite under subsp. *modesta* Bgff.: ab. **amoena** (Stgr.) Bgff. (= *eximia* Heyn. trans. philamoena Reiss trans.) \*. — Also ab. *vellayi* Aigner must be replaced by **vellayi** (Aigner) Bgff. The originals of ab. *weileri* Stgr. originate from around Karlsruhe and this aberration has not been found at any other German locality. The spots of forewings 1, 3 and 5 as well as 2 and 4 are confluent in their entire width

\*) HOLIK has recently published a very detailed treatise in regard to ab. *amoena* Stgr. In principle he groups all the subspecies mentioned by him on account of aberrations under one head and then denominates each form by the prior denomination given to same. These names are not all being enumerated in this Supplement, as often these are transition forms and such names can have no scientific value. I would like to point out here that each subspecies (main race) and each variety that represents the predominating number of individual specimens owing to some definite variation (race) (though hitherto known only from one locality and therefore not yet considered a subspecies) should have a separate denomination. It is a different thing with the many races, often only subraces, which depend almost solely on their locality for denomination and which in my opinion are not deserving of special names. The name of the subspecies in question could well have been utilised in such instances.



and the whole being faintly surrounded by whitish. The longitudinal spots created in this way are only separated from one another by their whitish circumscriptions, which vary in width. Spot 6 is always separated from the other spot area and has a narrower or wider whitish surround. HOLIK would prefer to see ab. *klapaleki* (which is spelt without a "c") *Joukl* classified under *modesta*, as the types originate from around Prague and that population belongs to *modesta*. According to the description the ab. *klapaleki* *Joukl* is only a transition to ab. *meteora* *Reiss* (p. 28) and cannot be held to be in the same rank as *meteora*. As HOLIK quite correctly says, the ab. *meteora* *Reiss* is half-way between the pure *amoena* (without confluence of spots) and *vellayi* and the same cannot be said of *klapaleki*.

p. 28, line 24 from below. GUHN denominates forms of subsp. *berolinensis* *Stgr.*: ab. **pseudoapennina**, *pseudo-*  
without spot 6 on forewings: very rare from Rüdersdorf; ab. **rubricosta**, spot 1 diffuses along costa, spots 1, *apennina.*  
3 and 5 are conjoined: rare; ab. **paupera**, daintily built specimens with blue-black ground colour, spot 4 of *rubricosta.*  
forewings is absent: from Rüdersdorf and ab. **pseudoleonhardi**, spots of forewings almost or completely without *paupera.*  
circumscriptions, i. e. typical, but spot 6 almost obsolete, only minute traces indicate same between the black *pseudoleon-*  
veins: Wusterhausen. — *cingulata* *Hannemann* is synonymous with ab. *cingulata* (*Dziurz.*) *Bgff.* and *pseudo-*  
*onobrychis* *Hannemann* with ab. *pseudocarniolica* *Bgff.*, as these were already described in advance with the *hardi.*  
subspecies. HANNEMANN had denominated the two preceding forms in var. *verrina* *Bgff.*, which seems superfluous. — A population occurs at Zauchtel in N. E. Moravia that is like *berolinensis*, but differs in the high percentage of belted specimens, their somewhat smaller size and paler red.

p. 28, line 18 from below. In front of subsp. *leonhardi* *Reiss*, the following should be classified: subsp. **viridis** *Przeg.*, type race from around Kieff in the Ukraine. It is easily recognisable by its striking sea-green *viridis.*  
ground colour and further by the strikingly small, well isolated, carmine-red spot markings of forewing. These have no circumscriptions or at best minute traces of white are visible. Almost without exception they have a narrow red abdominal belt. The body is blue-black. Forewings narrow, the curve of margin being regular to the apex and with very pale, well developed fringes. Hindwings with narrow black margin that expands at apex. — The var. **subviridis** *Holik* from E. Galicia (Dobrowlany near Zaleszczyki on the Dniester, *subviridis.*  
Lackie, westward of Zloczow, also Cracow and Opatow) is very like *viridis* being of the same size and having similar spot markings, but the red is a deeper shade. — The following forms of *viridis* *Przeg.* are described: ab. **pseudoberolinensis** (*Bgff.*) *Holik*, with no yellowish or whitish circumscriptions to spots and with no trace *pseudobero-*  
of an abdominal belt; ab. **azona** (*Wgn.*) *Holik* with distinct circumscriptions, but without abdominal belt; ab. *linensis.*  
**amoena** (*Stgr.*) *Holik* (only taken at Umanj); ab. **crassimaculata** *Holik* with enlarged spots, that partially *azona.*  
become contingent (also near Umanj); ab. **confluens** (*Dziurz.*) *Holik* with confluent spots 1 and 2 as well as *amoena.*  
3 and 4: rare; ab. **securigera** (*Bgff.*) *Holik* in which spot 5 is conjoined with spot 6 in the same way as in *crassimacu-*  
*fulvia*: at Umanj. *lata.*  
*confluens.*  
*securigera.*

p. 29, line 13 from below. The populations of subsp. *onobrychis* occur as far southwards as the roumanian Carpathians; also in the mountains of Pollow in S. Moravia a population occurs that must be counted as belonging to *onobrychis*. Similarly at Bojnice in Slovakia. According to records by HOLIK a population is also found in Podolia (Savince) that according to its appearance still belongs to *onobrychis*.

A further race of *onobrychis*, var. **caliacrae** *Reiss* (subsp.?) is mentioned as occurring at Blacic on *caliacrae.*  
the roumanian Silver Coast in the southern Dobrudja. In general appearance it is nearest to *scorppina* *Bgff.*  
(p. 30). However the red is more vivid, admixed more or less with carmine or vermilion. The size varies between that of *scorppina* and *onobrychis*. Forewings have a faint blue or green gloss. In the majority of ♂♂ the spots of forewings, especially spot 6, have only rudimentary yellowish or whitish circumscriptions. Spot 6 in nearly half the ♂♂ is much reduced in size and is partially intersected by the black veins. In the ♀♀ this characteristic is less marked, generally also they have heavier and more regular yellow or yellowish white circumscriptions to spots of forewing. Margins of hindwing are normal. Usually a fiery red abdominal belt covers 3 segments. As in all the coastal races of *carniolica*, variability is large. In the majority of specimens spots 3 and 4 are confluent through a merging of their circumscriptions, but specimens occur with considerably enlarged spots 3, 4 and 5 and others with spots 3 and 4 confluent in the red. At the same time one finds specimens with spots 3 and 4 completely separated by the ground colour. Among others the following forms are denominated: ab. **securigera** (*Bgff.*) *Reiss*; ab. **latielavia** (*Bgff.*) *Reiss* with strikingly en- *securigera.*  
widened margins to hindwing; ab. **rubroabdominalis** *Reiss* with almost completely red abdomen dorsally *latielavia.*  
and ab. **azona** (*Wgn.*) *Reiss* without abdominal belt. Stress should be laid on the distinct affinity with *taurica* *rubroabdo-*  
*Stgr.* from the Taurus and with var. *europaea* from Therapia. *minalis.*  
*azona.*

p. 30, line 23 from below. The var. *amabilis* *Reiss* originates from around Kasikoparan. — The type race of subsp. *transiens* *Stgr.* (3 e) has its habitat at Shahkuh in N. Persia. It should be remarked that spot 6 of forewings of *transiens* is rarely quite devoid of red. The dark ground colour has a faint bluish sheen. The red is carmine rose. There is a fairly distinct carmine red abdominal belt on one segment, which however is not complete on underside. Also a narrow white collar is visible.



p. 30. line 7 from below. A population that belongs to subsp. *uralia* Bgff. (= *uralensis* Krul., *praeocc.*) was discovered by ERNST G. A. SCHNEIDER of Elberfeld at Kalkanowa, Borkoteja in the S. Urals, but unfortunately only a few specimens were obtained. The type specimens of *uralia* of KRULIKOWSKY from the central Urals, of which one ♂♀ is in the collection of SHELJUZHKO, were not available to me. In the 2 ♀♀ specimens from Kalkanowa which were submitted to me, spots of forewing have quite equally wide yellowish white circumscriptions as the typical *modesta* Bgff. from the central Rhine valley. The wing contour is rather narrower and more elongate than same. The red is pale carmine, paler than in *modesta*. In one ♀ spots 3 and 4 are fairly widely separated. Ground colour of forewings is a pronounced glossy bronze green. The dark margination of hindwings is very narrow in the only rather worn ♂ and 2 ♀♀. In the ♂ it is distinctly narrower than in *modesta* ♂. Collar and scapulae are only very faintly whitish. The distinct pale carmine red abdominal belt is open on underside and limited to one segment. The specimens of *uralensis* from the S. Urals are totally different from the typical *berolinensis*, with which KRULIKOWSKY had compared them, and they cannot be mistaken for one another. They differ from *viridis* from around Kieff in the Ukraine by the more distinct green gloss, paler almost rose coloured red and the fairly heavy circumscriptions to spots of forewings.

p. 31. line 1 at top. I have a specimen from Saissansk, Tarbagatai, Saur mountains, that belongs to subsp. *rueckbeili* Shelj.

*praematura.* p. 31, line 7 from top. *Z. occitanica* Vill. After *disjuncta* should be added: var. **praematura** Przeg. from around Ventimiglia, occurring at end of June. According to the description it is considerably larger than *disjuncta* Spul. from Alassio and Laigueglia and has more elongate forewings. Spots of forewings are throughout separated and reduced in size. The ♀ has enwidened white circumscriptions to spots. Hindwings have much wider margins that protrude in centre. It must be remarked that this race is on the wing at end of June, whilst the populations of Alassio and Laigueglia are still all in the larval stage at that time of the year. It is probable that subsp. *disjuncta* Spul., the type race of which has not been allocated at any one locality on the Riviera di ponente, does not originate from Ventimiglia.

#### IX. Subgen. *Thermophila* Hbn.

*quadrimaculata.* p. 31, line 15 from below. *Z. meliloti* Esp. GUHN describes ab. **quadrimaculata** from Damsbrück in the suburbs of Berlin, in which spot 3 is missing. According to GUHN all the other aberrations mentioned on p. 31 as occurring among typical *meliloti* with the exception of ab. *unimaculata* Vorbr. occur at Berlin. The ab. *sexpunctata* Tutt is described from english (New Forest) and german (Stettin) specimens. ab. *confluens* Tutt is only found among english series (New Forest). This latter denomination must eventually be adopted to cover the same variety found among the german populations of *meliloti*, as these form one group of subspecies with those of southern England. Similarly names established for aberrations of *meliloti* from german localities must apply to similar english forms. — The var. **anglica** Reiss from Lyndhurst, New Forest, S. England — TUTT mentions that this is restricted to the New Forest locality — is now extinct according to ROTHSCILD. It is smaller than the typical *meliloti* from the Upper Palatinate in Bavaria. Ground colour of ♂ almost devoid of gloss, a faint greeny gloss in ♀. Thorax and abdomen, especially in ♂, distinctly more heavily haired, rather narrower blackish margins of hindwing. Spot 4 of forewings generally rather larger in comparison to the size of the insect.

*sexpunctata.* p. 31. line 2 from below. Specimens from Rädmanö and Alfsjö in S. Sweden are similar to subsp. *nigrina*. Bgff. (Osterode). — ab. **sexpunctata** (Tutt) Reiss, the six-spotted form (spot 5 conjoined with 6) is found at Osterode in E. Prussia.

p. 32, line 9 from top. *Z. ehnerbergi* Reuter (Vol. 2, p. 25). The type race was discovered by EHNERBERG at Fagervik and Kuhmois in Finland.

*analielongata.* p. 32, line 10 from top. The denomination *cingulata* given by VORBRÖDT under subsp. *teriolensis* Speyer, is synonymous with ab. *decora* Led. VORBRÖDT has denominated the following spot aberrations from the Monte Generoso: ab. **analielongata**: spots 2 and 4 conjoined; ab. **apicaliconfluens**: spot 5 and 6 confluent; ab. **omniconfluens**: all spots confluent; ab. **parvimaculata**: Spots almost suppressed by the ground colour.

*parvimaculata.* p. 32, line 22 from top. To be added to the many denominations of aberrations of var. *italica* Car. we have to add: ab. **melas** Przeg. (16 m), captured at Voltri, which in place of the 5 red spots has black diffuse blotches emerging from the green-blue ground colour. Also the hindwings are completely black. — The type race of subsp. *dacica* Car. originates from around Targu Neamtu in Roumania.

*schneideri.* p. 32. line 12 from below. In the S. Urals (Kalkanowa in the Urguner forest, Utschaly) the easily distinguishable var. **schneideri** Reiss occurs. It can be differentiated by the more dainty build, narrower and more acutely pointed wings. There is a distinct green gloss in all specimens on forewings and also on body



and antennae, which is not shown by any other known *meliloti* race. The red is carmine rose. Generally on hindwings there is a more or less distinct yellowish antemargin between the red ground colour and the light margins. The dark and fairly long fringes contrast sharply from same. On underside of forewings the area beyond the spots is strikingly uniformly scaled with yellowish. Those specimens with the yellowish interposure on hindwings show this most markedly. In these cases the upperside of forewings also shows a heavier yellow gloss. This yellow scaling on underside of forewings is much more pronounced than in the typical races of *meliloti*. The yellowish interposure is also distinctly visible on underside of hindwings. Abdomen without red belt. Spots of forewings are arranged similarly to those of *meliloti* and are just as variable in size.

p. 32, line 11 from below. I possess the var. *mongolica* Rbl. (= *mongolica* Stgr. i. l.) from Urga in Mongolia and similar specimens from the Baikal mountains (Province of Irkutsk) captured in July. The latter closely resemble var. *dahurica* Bsd. from Daurien in eastern Siberia. The var. *dahurica*, according to the description, is one quarter larger than *meliloti* with heavier antennae, more rounded forewings with five spots, which resemble those of *meliloti*. It is also more densely scaled. Hindwings are somewhat paler red with wider black margins.

The subsp. *confusa* Stgr. that is typical of Ala-Tau (collected by HABERHAUER) occurs, according to LEDERER also in the Altai. I have received a few similar specimens from Saissansk, Saur mountains, Tarbagatai. A small number of some 200 specimens submitted to STAUDINGER for classification and description, looked like *meliloti*: ab. **pseudomeliloti** ab. nov. The majority however had confluent spots. Frequently only *pseudomeliloti*. spots 3 and 5 and then again spots 2 and 4 were confluent, rarely the spots of forewings were confluent approximately as in *brizae*.

p. 32, line 5 from below. *Z. niphona* Btlr. The distribution spreads from the Ussuri and Amur territories through Corea on the main land and over the entire Japan to Formosa. The type race originates from around Yokohama in Japan. Specimens that I have from Nagasaki correspond best to the description given. The populations of S. Japan will be the same as typical *niphona*, except for those that occur high up in the mountains. The northern Japanese populations appear to have greater resemblance to *christophi* Stgr. of the main land. The southern Japanese *niphona* nearly all show rather heavily enlarged spot markings on forewings, which become more or less confluent in pairs. The apex of forewings is rounded off. Ground colour is a dull metallic green. Spots 3 and 5 of forewings are finely conjoined along the vein. Spot 6 is small, inclined to be suppressed and is contingent to spot 5. Also spots 2 and 4 are more or less inclined to become confluent. On underside of forewings there is a pale yellowish silky gloss extending over the spot area and beyond same almost to apex of wing. On hindwings there is a blackish, often almost obsolete margin, which is widest at apex. In the ♀ this margin of hindwings is even less pronounced than in ♂. In contrast to the dark green thorax, the abdomen appears to be a deep blue with a delicate reddish sheen. It has a pale carmine red belt on 2—3 segments. In ab. **quinquemaculata** Reiss spot 6 of forewings is either *quinquemaculata*. completely absent, or only just visible on upperside.

The subsp. **christophi** Stgr., the type race of which is found at Raddefka in the Amur and Ussuri territories, differs materially from typical *niphona*. It has more pointed wings, a more pronounced blue and less green gloss on forewings and thorax. The reduction in size of spots 1 to 5 and their brilliantly contrasting red colour and further the distinct increase in size and prominence of spot 6, which only very rarely is absent, serve to distinguish same. Besides the margin of hindwings is rather heavier and certainly more distinct, especially in the ♂. — ab. **quinquemaculata** Reiss (see above) also occurs, as does — ab. **confluens** Reiss in *quinquemaculata*. *confluens*. which spots 2 and 4, as well as 3 and 5 become completely confluent. A rare form is when only one of these pairs is confluent longitudinally.

var. **coreana** Reiss denominates specimens captured end July to early August at Sei-shin in N. Corea. *coreana*. The main characteristic of this race is that spot 6 of forewings more or less diffuses and becomes rudimentary. Spots 3 and 4, as in *christophi*, are more or less distinctly separated. Spot 4 is cubiform, rarely as large as in *niphona*. Five-spotted specimens are not rare. Here also ab. *confluens* Reiss occurs. In very few specimens (generally ♂♂) spot 6 is more or less closely conjoined to spot 5, as occurs in the majority of typical *christophi*. This form is named: ab. **pseudochristophi** Reiss. *pseudochristophi*.

p. 32, line 3 from below. *Z. cilicica* Bgff. The specimen illustrated on pl. 3 h is a ♂. The types (2 ♂♂) of HERRICH-SCHÄFFER originated from around Amasia. Specimens from the Taurus, to which also the illustrated specimen belongs, appear more robust and seem to have wider wings than the type from Amasia figured by HERRICH-SCHÄFFER.

p. 33, line 13 from top. *Z. filipendulae* L. GUHN has denominates as *purpuraloides* specimens of subsp. *pulchrior* captured around Berlin having spots 3, 5 and 6 confluent. This seems to be synonymous with ab. *confluens* Oberth., the types of which originate from England. The form *pseudotutti* Guhn denotes a



transition to ab. *quinquemaculata* Vorbr. and therefore this denomination must be held to be synonymous to *sarothamni*. same. In ab. *sarothamni* Guhn spots of forewings are reduced in size, spot 4 is absent; it was found at Strausberg near Berlin. That spots 3 and 5 are confluent in the type is of secondary importance. It seems obvious that spot 3 or one of the other spots may occasionally be absent, or that spot 4 may be present or that even two or three spots be absent, but this does not justify a new denomination. The denominations of aberrations would know no limit, if such a procedure were adopted, as in the *Zygaena* scarcely one specimen is exactly like another. Also ab. *flava* Robson and ab. *chrysanthemi* Bkh. have been discovered by GUHN in the neighbourhood of Berlin, the latter at Rüdersdorf.

*lismorica*. The var. *lismorica* Reiss (ab?) from the Isle of Lismore in Scotland is denominated. It has almost bluish black glossy ground colour in the ♂ and a dull quite lustreless red. The red nebulous streak on underside of forewings is scarcely present. Margins of hindwings are fairly heavy, but irregular. The hairiness of body and abdomen is coarser, but in this characteristic it does not reach the same degree as that of the high alpine races. The typical *manni* H.-Schäff. from the Gross Glockner is also smaller and more thinly scaled.

*petsherskensis*. The subsp. *petsherskensis* Holik and Reiss, types from Kirillovskije ovragi near Kieff and in fact from all around Kieff, is distinctly different from *pulchrrior*. The scaling of thorax and abdomen is interspersed with short hairs, more so in ♂ than in ♀. Wing contour in ♀ is also narrow and pointed. In comparison to thorax, the abdomen of ♀ is remarkably heavy, whilst the wing expanse of ♀ is no larger than that of ♂. The ♀ therefore has a clumsy, heavy appearance. The scaling is dense. The superficial gloss is blue to blue-green, rather lighter in ♀, almost turning to green. The red is a brilliant carmine. On forewings spots 3 and 4 are closely approximated, only being separated by the intersecting vein, in some cases they become confluent. The red suffusion on underside of forewings is faint in ♂, often being scarcely perceptible, in ♀ it is very variable, being sometimes only faint, in others very heavy and in all stages of transition. Hindwings have fairly heavy margins, these expand at inner angle and apex. In the ♀ the margination is narrower, but never completely absent. According to SHELJUZHKO the insect is very common around Kieff. The size varies considerably. The following forms occur: *medioconfluens* (Vorbr.) Holik, *apicaliconfluens* (Vorbr.) Holik, *cytisi*, also *basiconfluens* + *medioconfluens*, all sorts of transition forms to ab. *cytisi* (Hbn.) Holik in which spots 1 and 2, 3 and 4, as well as 5 and 6 are confluent. Also ab. *confluens* (Oberth.) Holik occurs in all sorts of combinations of longitudinal confluence. All the details of these aberrations are based on notes supplied by SHELJUZHKO.

p. 34, line 7 from top. VERITY has denominated two further races of subsp. *ochsenheimeri* Z. The *frigidi-ochsenheimeri*. var. *frigidi-ochsenheimeri* from Sappada (Carnic Alps) at an altitude of 1300—1400 m is close to *micro-ochsenheimeri*. It is almost of the same size, wing contour and markings, but the spots of forewings, especially spot 5, are much enlarged in the great preponderance of individual specimens. The form in which spot 5 is oval, is named by VERITY ab. *oblongamacula*. Also the margins of hindwings are wider than in *micro-ochsenheimeri*. The colours are pale. — The var. *caerule-ochsenheimeri*. The var. *caerule-ochsenheimeri* is found at Vanzone (Anzasca valley) at 700 m altitude. It is almost always six-spotted and hindwings regularly have a relatively narrow margin. The colours are not as pale as in *frigidi-ochsenheimeri*, the red and ground colour are more glossy and further *caerule-ochsenheimeri* is frequently much larger. The form *medioconfluens* Vorbr. is a transition to ab. *biconjuncta* Vrtty., spots 3 and 4 being confluent. — *quinquemaculata* Vorbr. is synonymous with ab. *angelicaeformis* Vrtty. and *apicaliconfluens* Vorbr. with *apiceconjuncta* Vrtty., further *mediapicaliconfluens* Vorbr. with *biconjuncta* Vrtty.

p. 35, line 24 from below. Whilst in the type race of subsp. *ramburi* Led. from Antioch, specimens with heavily reddened forewings are rare, a population has now been discovered in damp localities around Marash, which is characterised by a heavy increase in the rosy colouration of markings. The denomination var. *rosa* Oberth. (Akbès) as a race is therefore justified. The rare form already mentioned by LEDERER and which has completely reddened forewings without blackish scales in the spot area, should in future be designated ab. *totirubra* ab. nov.

SHELJUZHKO in his collection has a few specimens of a population that belongs to *ramburi* and emanates from Armenia from the territory between Olty and Baiburt. There is insufficient material as yet to justify a subdivision.

p. 36, line 5 from top. Z. *huguenimi* Stgr. The type race of this very interesting *Zygaena* originates from Usgent (Ferghana) at the end of June, whence STAUDINGER obtained the majority of his specimens that had been collected there by HABERHAUER Jr. STAUDINGER received one specimen each from Margelan (captured late May) and Osh. The locality mentioned in Vol. 2, p. 26 as "Pamir" cannot be confirmed. The blue-black forewings have 4 or 3 pale red spots; the first at base (1 and 2) only partially extending to inner margin, the second (3 and 4) in centre and which are almost always contingent, spot 3 being only about half as large as spot 4. In the ♀ especially these central spots have completely merged forming one large spot, which often is faintly conjoined with spot 1. The large irregular quadrate (cuneiform) apical spot (5 and 6) is sometimes conjoined with the central spots at top and in centre. Underside of forewings is predominantly



red. The hindwings have an almost uniformly wide narrow blackish margin. The two submedian nervures are distinctly dusted with black. Head, thorax and abdomen are blue-black. A complete red abdominal belt is always present on one segment, in the ♀ it sometimes expands covering a second segment. In the ♀ there is a grey-white collar. The illustrations in Vol. 2, pl. 6 i are much too bright a red.

p. 36, line 6 from top. *Z. trifolii* Esp. GUHN adds to the innumerable aberrations still ab. **tripuncta** *tripuncta*. from around Berlin. Spots 1 and 2 are confluent, spots 3 and 4 are united in an almost round spot, so that forewings have only 3 spots.

PRZEGENDZA found at Lubine and Le Mont in the Vosges a dull black race with short antennae, which he has named var. **vogesiaca**. The hindwings vary in width, but forewings are uniformly wide and with rounded apex. Spots of forewings are dull red, on an average somewhat smaller than those of the central german populations and with a general inclination for spots 3 and 4, as well as 3 and 5 to become confluent. — PRZEGENDZA bred an autumn form of var. *australis* Oberth. that emerged end September to mid October. It was bred from ova obtained from the May brood from Batna, Algeria and is distinguishable from same by its somewhat paler red and smaller size.

p. 37, line 18 from top. *Z. lonicerae* Schev. In the Ukraine, around Kieff var. **ukraina** Przeg. occurs. *ukraina*. It has densely scaled forewings and a brilliant superficial gloss. Ground colour is dark steely blue and spots of forewings are small and carmoisin red. Margin of hindwings is double as wide as in typical *lonicerae*. Antennae are long and bold, forewings elongate and moderately broad, body not very hairy and glossy blue-black.

VERITY describes a var. **lusitaniaemixta** from Sierra da Estrella in Portugal, captured mid June to mid July at altitudes of 800—1500 m. It can scarcely be differentiated from *intermixta* Vrtz. and is relatively rare among *trifolii* occurring there.

I denominated as subsp. **kalkanensis** some specimens captured end July and early August in the S. Urals (around Kalkanowa, 800—900 m) which form a readily distinguishable race. Its dainty form, narrower more elongate wings and distinctly duller paler red (carmine rose) are typical. Ground colour of forewings is dull with very faint greenish blue sheen. Margination of hindwings is fairly wide, dull bluish black with distinct jet black fringes. Body of ♂ fairly densely haired, that of ♀ shows occasionally a dull blue-green gloss on abdomen. It is very interesting to observe that spots 3 and 4 of forewing are fairly often in juxtaposition with an inclination to become confluent. In one ♀ they are completely confluent. — ab. **citrina** (Speyer) Reiss, *citrina*. the yellow form, is also found there.

At Kansk on the Kan in Siberia and near Saissansk in the Tarbagatai (at 1860 m altitude) similar carmine rose *lonicerae* populations to *kalkanensis* occur, according to single specimens from these districts in my collection. These also have similar margins to hindwings and show an inclination towards confluence of spots. Although these specimens come from localities that are so widely apart and of such different altitude, it would appear that a subspecies occurs in these regions that has a confluence of spots comparable to that of subsp. *confusa* Stgr. of *meliloti*, which I also possess in specimens collected in the Tarbagatai.

p. 38, line 18 from below. PRZEGENDZA re-denominates “*burgeffi*” (nom. praeocc.) by hybr. **peucedano-loniceroides** (16 m as *burgeffi*). It denotes a hybrid of *lonicerae* ♂ and *epialtes* subsp. *borealis* ♀. The type ex the collection of PRZEGENDZA is illustrated as “*burgeffi*”.

p. 40, line 17 from top. *Z. transalpina* Esp. A new denomination ab. **paradoxa** Michalk has been given. It occurs on the western slopes of the Burgberg near Mittenwald (Upper Bavaria). It is classified under subsp. *alpina* Bsd. Spot 1 is slightly reduced, spot 2 only faintly indicated, spots 3, 4 and 5 are completely absent. Spot 6 is present and of normal size. Underside of forewings shows a slight reduction of the wide red nebulous streak.

p. 42, line 25 from below. *Z. angelicae* O. In his recent work regarding the butterflies of Tessin and Misox, VORBRODT states that as far as he knows this species does not occur in Switzerland.

The subsp. **sheljuzhkoiana** Holik & Reiss from the Ukraine in the immediate and more distant surroundings of Kieff, varies distinctly from the type race. The specimens are scarcely larger than the type race from Vienna and have remarkably long abdomens with a more sleek and pointed wing contour. The scaling is denser, the red darker carmine. Forewings are throughout with blue gloss and spots are smaller. Hindwings have wider margins and black scales extend from same along the veins towards the centre of wing. Especially along the submedian fold the veins are frequently completely covered with black scales. According to SHELJUZHKO, who has also given the following particulars in regard to aberrations, this race is widely distributed and common in the district of Kieff. The aberrations are: ab. **doleschalli** (Rühl) Holik from



*privata*. Kirillovskije ovragi, yellow; ab. **privata** Holik with reduced spots to forewings, spot 4 completely absent, from the same localities; ab. **costalielongata** Holik with a ray-like extension of spot 1 along the costa, extending half the length of same, from the same localities; ab. **confluens** Holik with spots of forewing more or less confluent, especially spots 2 and 4 are widely conjoined, this form is rare from Svjatoshino and Kirillovskije ovragi.

*kiewensis*. p. 43, line 25 from top. *Z. ephialtes* L. To be added to subsp. *borealis* Bgff.: var. **kiewensis** Reiss from around Kieff in the Ukraine and var. **podolica** Holik from the neighbourhood of Rakulowa in Podolia. The first race is almost exclusively peucedanoid, somewhat larger than *borealis* from Magdeburg, more heavily built and with wider wings, partially with smaller spots to forewings, especially spot 4 is reduced. Whilst in the typical *borealis* population the form *athamanthae* Esp. is of rare occurrence, in *kiewensis* the ♂ is predominantly five-spotted. Rarely a 6th spot is indicated and more rarely still it is fully developed. The same characteristics occur in the ♀. Spots 3 and 4, as well as 5 and 6 (where the latter is indicated) are more widely separated than in *borealis*. Spot 4 is occasionally partially very faintly circumscribed by whitish scales and these sometimes are interspersed in the spot itself. Margins of hindwings are wider than in *borealis*, diffusing inwards. Specimens that resemble *metzgeri* are not rare. In this race specimens like *medusa* are met with singly and rarely. According to SHELJUZHKO the var. *kiewensis* is generally distributed all around Kieff and is mostly common. The var. *podolica*, according to the description, is ephialtoid to the extent of one-half and the remainder being peucedanoid. Almost always five-spotted, sometimes spot 6 is indicated. The spots are reduced in size as in *kiewensis*. In the ephialtoid specimens the basal spots (1 and 2) are completely or nearly completely filled with red, the other spots of forewings are occasionally fairly heavily tinged with red. Hindwings in the peucedanoid specimens are often exceedingly dusky with distinct discal spot. They have a very wide blackish margin that diffuses inwardly. As the description is based on a few, possibly specially selected specimens in the Museum at Cracow, it will be best to wait for confirmation of the particulars of the diagnosis based on more numerous and freshly captured material.

p. 44, line 4 from top. *Z. araratica* Stgr. I have in my collection 1 ♂♀ *araratica* ex coll. STAUDFUSS with locality Kasikoparan, mid August. In a casual examination of these specimens one might take them for bleached *transalpina* from Mid or Southern Italy with completely black hindwings. The blackish colour has a blue-green sheen, there is no trace of an abdominal belt. Both specimens, contrary to the very brief description of STAUDINGER are five-spotted, only in the ♀ spot 6 is visible on underside. The small spots of forewing are faintly tinged with reddish in the ♂, also at base and in cell of hindwings there are a few reddish scales. The ♀ shows no trace of this reddish tinge, the spots being whitish. Spot 1 of forewings is completely shaded over in ♂, in ♀ it is shaded at base, so that only a minute speck is left. Spot 2 is shaded at base both in ♂ and ♀ and also otherwise in consequence of the interspersion of dark scales, especially in ♂, it is barely visible. Spots 3 and 4 are widely separated, spot 5 is smaller than spot 4. Underside of forewings in the ♂ is as the upper side, hindwings are scaled with red in ray-like formation (proceeding from base). In front of the cell of hindwings towards the upper angle, there is a clearly visible, minute whitish red spot. Underside of forewing of ♀ is the same as the upperside (there is no trace of a nebulous streak). Hindwings show a barely visible whitish spot situate as in the ♂. The ♂ seems to indicate a faint transition to a *Zygaena* with red forewing spots and hindwings. Head, antennae and legs are as the ground colour. As I hold the red abdominal belt of *dorycnii* O. to be very constant, I cannot bring myself to believe that *dorycnii* and *araratica* are one and the same species. Only when transition forms have been found either among *dorycnii* inclining towards *araratica* or among *araratica* inclining towards *dorycnii*, having thus a rudimentary abdominal belt, will this become thinkable. The illustrations in Vol. 2, pl. 5 k show the bodies and heads too heavily depicted and the antennae are too long and especially in the ♂ too coarse. The antennae of *araratica* are generally not so sharply pointed as is shown in the illustration on pl. 5 k.

### 3. Family: Syntomidae.

#### 1. Genus: **Syntomis** O.

*divisa*. **S. divisa** Wkr. (Vol. 10, p. 70, pl. 9 d). This species should be classified after *perixanthia* Hmps. in Main Vol. 2, p. 39. It occurs in N. China, Province of Chihli, in Shantung and Kiaochoh.

*handel-mazzettii*. **S. handel-mazzettii** Zerny. A large and fine species that should be placed next to *dichotoma* Leech (Vol. 2, p. 39, pl. 9 e). It differs from same by the yellow spotted scapulae, mesothorax and a yellow abdominal belt on 5th segment. It has wider wings and the black margins to wings are distinctly narrower. Apex of hindwings is also not so widely black. Wing expanse: 21—23 mm. W. China, Szechuan Province (Mouli) at an altitude of abt 2400 m.



**S. anatolica** Zerny (= phegea Rbl.) (Suppl. Vol. 2, p. 55) should be classified before *aequipuncta* Trti. *anatolica*. (5 a). Wings like *aequipuncta* with slightly bulging margin and faint metallic gloss. Spots of forewings of medium size, spots 4 and 5 are almost of equal size, fairly long, spot 3 quadrate. On hindwings basal spot is not separated, spot 2 only slightly smaller. In ♀ the spots are larger, they become confluent covering almost the entire wing. Tip of antennae white. Abdominal belt open ventrally. A smaller species than *aequipuncta*, differing from *nigricornis* by the white tips to antennae. Length of forewings: 14—17 mm. Amasia; Erdshias Dag; around Angora.

#### 4. Genus: **Dysauxes** Hbn.

p. 58, line 16 from top.

*punctata* F. — In regard to *hyalina* Frr. (Vol. 2, p. 41, pl. 9 i). I repeat here what REBEL and ZERNY *hyalina*. state in their Lep. Fauna of Albania, p. 119: "According to information supplied by Mr. A. NAUFOCK (Linz) the male genitalia of *D. punctata* F. and *hyalina* Frr. show constant differences, which justify a specific separation of the two forms. The first (with *servula* Berce and *separata* B.-H.) seems to be restricted in its distribution to the western Mediterranean, not occurring east of the Adriatic. On the other hand *hyalina* is an eastern species that penetrates westwards as far as Italy (including Sicily). *famula* Frr. is a form of *hyalina*, which is predominant in Dalmatia and Sicily."

#### 4. Family: **Arctiidae**.

##### 2. Group: *Lithosiinae*.

#### 11. Genus: **Miltochrista** Hbn.

p. 65. Please insert before *miniata* Forst.:

**M. flavicollis** Mr. (Vol. 10, p. 135, pl. 18 a). This species, besides occurring at Sikkim, is also found *flavicollis*. at Simla (Punjab) on Mount Kufri at 2500 m altitude and therefore probably also occurs on palaearctic territory. There are 3 specimens in the collection of Dr. REICH, Berlin.

#### 22. Genus: **Agrisius** Wkr.

Vol. 2, p. 63. Behind *fuliginosus* Moore, please add:

**A. guttivata** Wkr. (Vol. 10, p. 197, pl. 15 k). This occurs on palaearctic territory in Szechuan and *guttivata*. Chengtu.

#### 28. Genus: **Lithosia** F.

Vol. 2, p. 69, line 15 from top. Please insert after *fumidisca* Hmps.:

**L. nigripes** Hmps. (Vol. 10, p. 210, pl. 15 d). According to information kindly supplied by Dr. REICH, *nigripes*. Berlin, he has 1 ♀ specimen in his collection from W. China, Ta-tsien-lu.

Suppl. Vol. 2, p. 69, line 10 from top. Please insert after *predotae* Schaw.:

**L. ambrosiana** (Fdz. i. l.) sp. n. Through the kindness of the Rev. A. FERNANDEZ, Madrid, 3 ♂♂ *ambrosiana*. specimens of this species are before me for description. It is somewhat related to *predotae* and is of about the same size as same, the wings being perhaps slightly broader. Forewings blackish grey with a faintly yellowish hue and with a narrower orange-yellow costal streak that extends to apex. Fringes are also grey with slight yellowish admixture at the tips. Hindwings not darker than forewings, at most slightly duskier at apex, with long reddish yellow fringes. Head bright orange-yellow, frons somewhat brownish, palpi orange; collar slightly greyer, thorax of the same shade as the wings. Abdomen almost completely reddish yellow also on upperside, but with slight grey admixture at base. Legs pale orange-yellow, femora and tibiae grey outwardly. Antennae orange-yellow on upperside, blackish underneath, slightly setose ciliate, each joint with an exceedingly fine bristle, about as long as double the width of the shaft and with extremely fine cilia, very different from the very finely pectinated antennae of *predotae*. Wing expanse: 21 to 23 mm. It occurs from La Vid to Burgos. Type in the collection of A. FERNANDEZ, Cotypes in the Coll. DRAUDT.

##### 4. Group: *Micrarctiinae*.

#### 32. Genus: **Coscinia** Hbn.

p. 72, line 31 from top:



*romeii*.

In regard to the biology of *C. romeii* Sagarra the following fresh particulars can now be given. The imagines emerge in September. Soon after the ova have been deposited, the small larvae emerge and feed up on *Poa annua*. The larvae go on feeding throughout the winter until April, they then rest in a fully fed and quiescent state until August, when they again become active and spin up. (SCHREIBER, MEINICKE).

40. Genus: **Ocnogyna** Led.

Vol. 2, p. 78, line 15 from top. After *bellieri-banghaasi* should be added:

*sordida*.

*O. banghaasi* — f. *sordida* Igel is uniformly suffused with grey-brown, so that the 3 whitish transverse stripes are obscured. Jenitze (the southernmost station of the anatolian railway). Captured at the beginning of April.

Vol. 2, p. 78 and also p. 74 of this Supplement, read:

41. Genus: **Chelis** Rbr.

instead of *Cletis*, which was an error.

46. Genus: **Parasemia** Hbn.

p. 77, line 5 from top:

*P. plantaginis* L. — To be added to *interrupta* Schaw. is the reference to plate 6 g as "*bosniensis*"; the name *bosniensis* was printed on the plate in error, the specimens sent for illustration having been erroneously marked with this name and the correction was not made in time. There is no "*bosniensis*".

49. Genus: **Micrarctia** Sz.*nebulosa*.

p. 79, line 2 from top. *M. glaphyra* Ev.: — *nebulosa* Reich has dull white wings, finely dusted with black and with obscure, diffuse markings. Marginal band of hindwings complete. It occurs in the Rohtang Pass, Kangra, N. India at an altitude of 4053 m.

*lochmatteri*.

*M. lochmatteri* Reich seems to stand about halfway between *M. glaphyra gratiosa* ab. *flava* and *Phragmatobia wagneri* Pglr. Forewings deep brown with roundish black spots in centre and at end of cell, in centre of inner margin and at outer margin at apex and at anal angle. The reduced central band only extends as far as the white submedian nervure, also the outer band is much reduced and sharply angulated. All the light markings are obscured by blackish dust. Hindwings pale yellowish with a discal spot and a continuous marginal band of 2 mm width. Body dorsally black, laterally and ventrally yellow. Palpi black with orange-yellow tip. Wing expanse: 31 mm. It occurs at the Shyok valley, Karakorum at 4700 m altitude and is named after the Swiss guide FRANZ LOCHMATTER who lost his life in the Dutch Karakorum Expedition.

50. Genus: **Spilarectia** Btlr.*nigrodorsata*.

p. 80, line 4 from below. *S. nigrodorsata* Reich reminds one of *S. comma* Wkr. (Vol. 2, p. 86, pl. 15 d). Forewing creamy yellow with black band arising at apex and proceeding to inner margin; small striations above, thicker ones below and with a heavy black inner marginal streak that stops short just before base and inner angle; at base a black spot. The first third of costa has a black margin and from where this ceases an angulated band of spots extends, running finally parallel to the first band; at outer margin there are 3—4 black dots. Hindwings creamy yellow, transparent in disc, with a black dot at upper angle of cell and a second one near the margin on 2. radialis. Head and thorax pale yellow, similarly the first segments of abdomen, then rosy red with a heavy deep black dorsal stripe from head to tip of abdomen that is yellowish. Underside of abdomen yellowish white, with black spots laterally and sublaterally. From 1 ♀ from the northern slopes of the Nan Shan mountain range at an altitude of 2500 m.

56a. Genus: **Estigmene** Hbn.

This Genus should be classified after *Cretonotus* Hbn. (Vol. 2, p. 90). We also refer to what was written in Vol. 10, p. 253.

*perrotteti*.

*E. perrotteti* Guér. (Vol. 10, p. 253, pl. 24 d). A species that occurs in India proper. Forewings black with white longitudinal band and rose coloured hindwings with 3 black submarginal spots having yellow surrounds. According to information kindly supplied by Dr. REICH, Berlin, same occurs on Mount Kufri, Simla, Punjab, and therefore also probably penetrates into palaearctic territory.

*imbuta*.

*E. imbuta* Wkr. (Vol. 10, p. 254, pl. 24 c). The same remarks apply to this species as to the preceding one. Its usual habitat is N. W. India and a form of same occurs at Sikkim. It is now also known to occur on Mount Kufri, Simla.



60. Genus: **Rhyparia** Hbn.

*R. purpurata* L. (p. 82) — ab. **extrema** Bandermann has pale light yellow forewings with scarcely *extrema*. discernible shaded spots, hindwings faintly suffused with pale rose and with grey spots. — subsp. **callunae** Mantz *callunae*. denotes the small north german heath form with richly coloured ochreous forewings with a faint reddish hue. Spots are small, dark grey-brown to black. Hindwings intensively red including the fringes with enlarged black spots. This form is said to differ from *obscura* Rehb., which is stated to be an aberration of this subspecies with black spots. For reasons of priority this heath race (not subspecies!) should be named *obscura* Rehb., *callunae* being at the best an insignificant form of same with paler spots.

64. Genus: **Pericallia** Hbn.

**P. picta** Wkr. (Vol. 10, p. 255, pl. 24 e). According to information kindly supplied by Dr. REICH, *picta*. this species, that has hitherto only be known to occur in S. China, is also found at Simla, Punjab and therefore not very far from the palaearctic boundary. It should be classified after *matronula*.

68. Genus: **Preparetia** Hmps.

To be added to *P. buddenbrocki* Kotzsch. (Suppl. Vol. 2, p. 85): — **biedermanni** O. B.-H. This form *biedermanni*. has hindwings and abdomen red instead of yellow; spots of hindwings are larger and there is a narrow transverse band behind the central cell spot. S. W. Kansu, Minshan, captured in July at an altitude of 3000 m.

69. Genus: **Arctia** Schrk.

*A. villica* L. (p. 87) — ab. **wambachi** Goltz denominates a specimen that is normal on right side, but *wambachi*. left side is unicolourous sooty black and thus a pathological form.

71. Genus: **Callimorpha** Latr.

**C. dominula** L. (Vol. 2, p. 101). — Dr. REICH describes a genuine melanic specimen, that has no *dominula*. metallic sheen and which looks somewhat like a small *Axiopoena maura*. It is of normal size and markings are entirely obscured. It was captured in nature in E. Prussia and the specimen is now in his collection and will very shortly be described and illustrated.

*C. principalis* Koll. (Vol. 2, p. 102, pl. 18 g) — **ladakensis** Reich is of the same size and form as *ladakensis*. *equitalis*, forewings faintly metallic green, spots ivory white. Hindwings bright yellow with orange suffusion, the black spots fainter and more widely separated, the veins only very faintly dusted with black. Abdomen more extensively red, scarcely any black spots. From Leh (Ladak), captured by the dutch Karakorum expedition in July at an altitude of 3700 m.

71a. Genus: **Neochelonia** Draes.

p. 89, line 4 from below. *N. bieti* Oberth. — **minschani** O. B.-H. Forewings with larger white apical *minschani*. spot, hindwings with much reduced markings, discal spot almost extinct and marginal markings quite absent. In the ♂ bands of forewings are separated. Minshan in Kansu, July. — **hoenei** O. B.-H. Band of forewings is *hoenei*. not conjoined with outer marginal band, spots of hindwings are wider and bolder. Chekiang, Hangchow, in May at an altitude of 1500 m.

Additionally we have to mention the Genus *Asota*, that had hitherto not been found in palaearctic territory:

Genus: **Asota** Hbn. (Vol. 10, p. 227)

**A. paliura** Swh. (Vol. 10, p. 231, pl. 28 c). According to information from Dr. REICH he has in his *paliura*. collection 3 palaearctic specimens of this species, 2 of same from Szechuan and 1 from the Watusi Pass in Thibet.

*A. plana* **lacteata** Btlr. (Vol. 10, p. 233, pl. 28 g) Dr. REICH also has 1 palaearctic specimen of this *lacteata*. species from the Punjab.

On plate 6 f we are still giving an illustration of *Eucharhia casta* **lutea** Schultz (with the designation *lutea*. “*flava*”), which was mentioned in Vol. 2, p. 80 and of which unfortunately the illustration was omitted there.



Family: **Lymantriidae.**3. Genus: **Dasychira** Steph.

Vol. 2, p. 113. *D. pudibunda* L. The denomination *arakawae* Mats. is probably synonymous. it denotes a dwarf specimen, described from Shikoku.

*karafutonis.*

p. 95, line 6 from top. *D. fascelina* L. A ♂ from Saghalin described as *karafutonis* Mats. has the inner and outer lines only clearly marked above the median nervure. Hindwings are of the same colour as forewings, such as is the case in the ♀. As the colour is subject to variation this does not imply much. A ♂ with grey-white colour, only slightly darker than *nivalis* Stgr., which is in the PÜNGELER collection, also has the bands only retained in the anterior half. It was captured at Bérisal.

p. 96, line 16 from top. *D. aurifera* Scriba. The author himself withdraws the denomination *suzukii* Mats. (p. 96) as it is synonymous.

*D. trimacula* Scriba (p. 96). This name may eventually be withdrawn in favour of *nachiensis* Mar., which is the older name and if the latter is not exclusively described in Japanese. — In regard to establishing the identity of these two names, MATSUMURA also mentions the species *flava* Mats., which we have hitherto omitted from this Supplement, as no description was available. It differs from *trimacula* ♀ (pl. 8 a) merely by having a complete band on hindwings, that is wide near inner margin and then suddenly contracts, in a corresponding way to the decrease in size of the isolated spots of *trimacula*. Described from Kyoto.

*nagoyana.*

p. 97, line 5 from top. **D. nagoyana** Mats. ♀ grey-white. Forewings peppered with dark scales, faintly marked. A somewhat interrupted dark outer band and submarginal band, both parallel to one another and becoming indistinct towards inner margin. The space between same is whitish. Separated from the two bands and before same on costa, there are 2 dark spots. Hindwings somewhat darker than forewings. The submarginal band is rather wider than on forewings, only distinct at anal angle. Both wings have a faint spot at disco-cellular, fringes black and white checked. ♀ 46 mm. Honsho (Japan).

*sachalinensis.*

**D. sachalinensis** Mats. Probably very similar to *abietis* Schiff. (Vol. 2, p. 113, pl. 19 g). In ♂ forewings are grey-white with black markings. Basal line undulate, not dentate. Inner line incurved at costa, not so straight as in *abietis*. Anterior to same on inner margin there is a "e" shaped spot. The lunule at disco-cellular nervure and the outer line are about as in *abietis*. The submarginal line is dentate, grey-white outwardly and without the dentation inwardly above vein 2. Fringes with black spots. Hindwings dark brown. In the ♀ the forewing is grey and the marking of the lines varies somewhat. The inner line is angulated below the costa as in *abietis*, thence more obliquely to inner margin. The subbasal line is parallel to the inner line. Spot on disco-cellular as in *abietis*. The outer line is double, both with outer grey-white edge. The inner branch protrudes to centre of disco-cellular nervure, otherwise it is undulate and about parallel to outer margin. Margin is dark brown. Hindwings grey-white, a spot is indicated on disco-cellular. 42—55 mm. Saghalin. The larva feeds on *Abies* and *Picea* plants and does considerable damage.

*D. pseudabietis* Btlr. In Vol. 2, p. 113 *argentata* Btlr. from Japan is enumerated as a form of this species. According to MATSUMURA *argentata* should be classified with *pudibunda* L.

*D. nigra* Hmps. is dealt with in Vol. 10, p. 294, pl. 38 e, but besides occurring in India, it is reported from Japan in Hokkaido and Honsho. The Genus *Chibidokuga* Mats. has been created for this species.

5. Genus: **Orgyia** O.

*manchurica.*

p. 97, line 23 from top. *O. antiqua* L. The form *manchurica* Mats. is said to differ from the type form by the absence of the white spot on the outer line near inner margin. The illustration, which is not satisfactory, shows a white spot even though same is reduced in size. Besides the spot at disco-cellular nervure is more distinct and hindwings are darker than forewings. Described from 2 ♂♂ from Manchuria.

7. Genus: **Aroa** Wkr.

*coreana.*

p. 99, line 18 from top. **A. coreana** Mats. Very similar to *jankowskii* Oberth. (Vol. 2, pl. 19 d) and probably only a form of same. The subbasal band does not vary. The inner band has a white-grey edge on both sides and if the original illustration is correct, it is more boldly incurved above the median nervure to costa. The dash at disco-cellular nervure is distinct. The outer and submarginal lines are formed as in *jankowskii*, but here the former is also dark and the space between same is darkly dusted. Besides there is a dark marginal line, which is not so spotted as in the original illustration of *jankowskii*, where in fact same may be quite absent. Hindwings black-brown. 33 mm. Described from 1 ♂ from Corea.



*A. jankowskii* Oberth. should be classified in this Genus and not in *Cifuna* (Vol. 2, p. 121). *Aroa nigrofascia* Wilem. (Vol. 10, pl. 42 g) from Formosa is said to be the same species.

### 9. Genus: **Laelia** Steph.

**L. suzukii** Mats. Thorax and forewings pale brownish white. Hindwings and abdomen grey-white. *suzukii*. Forewings without gloss and devoid of markings. ♀ 39 mm. Kyoto.

### 16. Genus: **Numenes** Wkr.

*N. disparilis* Stgr. (Vol. 2, p. 126, pl. 20 c). The form *hayashii* Mats. is synonymous with *biseparata* Strd.

### 18. Genus: **Lymantria** Hbn.

p. 100, line 4 from below. *L. dispar* L. (Vol. 2, p. 127, pl. 20 d). Under this species in Vol. 2, the form *jumida* Btlr. was mentioned. According to MATSUMURA this is a genuine species, as the larva is of quite a different appearance. It is not rare around Tokio, but rather local in its distribution. As in Vol. 2 only the original description was given and as through the kindness of Messrs STAUDINGER and BANG-HAAS a large number of specimens from Yokohama has been submitted to me, I am now giving a fresh description: ♀ differs from *dispar* by the faint red edges to segments of abdomen and the ovipositor. Thorax and forewings grey-brown. The dark inner line commencing at one-quarter of length of costa proceeds straightly obliquely outwards to the submedian fold, there it is angulated and extends in an arc to inner margin, the terminal spot being below the angle. The disco-cellular mark is black. The dusky outer line commences at three-quarters of length of costa runs obliquely outwards to vein 5, thence parallel to outer margin, projecting widely on the veins. Posterior to same 2—3 blackish spots extending obliquely inwards from near apex and pointing towards the outer line. Beyond same there are large white lunules and black spots commencing at vein 2. A dark marginal band on deep buff hindwings. The ♂♂ which are not in such a perfect condition, have smoky dusky brown forewings. Only a blackish discal lunule and a boldly dentate white outer line are distinct. The latter has a blackish outer edge behind the cell and above the inner margin. Hindwings and abdomen darker than in ♀. 38—64 mm.

p. 101, line 15 from top. **L. bantaisana** Mats. Body grey, forewings rather more darkly dusted, ground *bantaisana*. colour probably grey-white (this is not mentioned) markings dusky brown. Inner line slightly undulate, somewhat obliquely outwards, straight. It is intersected by a black dash, that extends to below base of vein 2. At disco-cellular nervure there are only black dots, such as occasionally also occur in *L. dispar*. Outer line delicately marked in ♂ projecting in dentations on veins. The curves below and above vein 2 and above vein 5 are rather more pronounced. In the ♀ the outer line is diffuse, undulate, widely edged with white outwardly. Submarginal line indicated by diffuse patches in ♂ and ♀. Hindwings in ♂ with wide diffuse submarginal band; hindwings of ♀ dark but rather paler towards base. 50—68 mm. Honsho. The species is said to be similar to *D. obsoleta* Wkr. from Formosa (Vol. 10, p. 321, pl. 41 d).

*L. destituta* Stgr. (Vol. 2, p. 129, pl. 21 a). The form **maraschi** Dan. from turkish Syria (S. E. Asia *maraschi*. Minor) is much more darkly suffused with dark grey, so that the transverse bands are very indistinct and hindwings are dusky buff with a 2 mm wide dark band extending over the entire length of the outer margin. This band is also visible on underside and is the characteristic of this form. 33—48 mm. It occurs in 2 generations, in the summer brood the marginal band is narrower. — *lapidicola* H.-Schäff. and its forms are very similar to *destituta*, but in the latter the abdomen is always yellow-grey and without the reddish colouration of the *lapidicola* forms.

**L. minomonis** Mats. Pale grey with red patagia. Forewings with black-brown markings. The sub- *minomonis*. basal, inner, outer and submarginal lines all very dentate. The outer line double, this however is not visible in the original illustration. Submarginal line is the boldest. The inner line, cell spot and lunular spot about as in *L. monacha*. The dentations of the outer line are less pronounced than those of inner line. The dentations extend along veins 3 and 4 equally far outwards. The arc behind the lunular spot only slightly ex-curved. On submarginal only the arcs between veins 4 and 6 extend further inwards, the one over vein 7 being less deep. The black marginal spots are small. Hindwings with diffuse narrow dark band. ♂ 44 mm. Osaka.

**L. takamukui** Nag. All that can be said of this species is that it is like the preceding. The outer *takamukui*. and submarginal lines are less dentate and the dentations are more regular. Only one arc of the outer line projects fairly far inwards on the submedian fold. ♂ 52 mm. Honsho.

Vol. 2, p. 133. After the Genus *Albarracina* Stgr. should be entered:

### (21a). Genus: **Maimaia** Mats.

Similar to *Lymantria*. In forewings veins 5 and 6 are bent downwards, further 7 + 10 × 8 × 9 are stalked. In hindwings vein 5 arises very far forwards. Palpi long and thin.



*furva*.

**M. furva** *Leech*. (Vol. 2, pl. 21 b ♂). Forewings of ♀ brownish white with black transverse lines. The inner line commences at  $\frac{1}{3}$ rd length of costa and is slightly curved to the submedian fold below base of vein 2, proceeding then straight and obliquely inwards. The outer line from  $\frac{4}{5}$ ths of costa obliquely outwards to vein 6, then dentate to vein 4, diffusing below same and with a sharply marked deep dart inwards with white inner edge on the submedian fold. Hindwings and abdomen brown. Both wings very transparent. The ♂ is reddish brown on both wings, only grey on forewings below base of cell. Of the inner line only the angle and opposite same the dart of the outer line are retained and besides there are a few black scales at vein 6. 28—36 mm. Japan. China.

#### 24. Genus: **Porthesia** *Steph.*

Vol. 2, p. 134, line 15 from below. *P. similis* *Fuessl.* (Vol. 2, pl. 21 i). Additionally to the aberrations *coreacola*, already enumerated, we have still *coreacola* *Mats.* As frequently occurs in asiatic ♂♂ the abdomen is golden yellow except for the base. The entire underside of forewings is blackened. Described from 1 ♂ from Corea.

*xanthocampa*.

**P. xanthocampa** *Dyar*. This species only differs from *similis* in the larval stage. The larva is orange-yellow. The warts on 4th and 7th segments laterally and dorsally are black. It occurs in Honsho, but not in Hokkaido.

#### 25. Genus: **Euproctis** *Hbn.*

*kan*.

**Eu. kan** *Mats.* Forewings dusky brown with darker spot at disco-cellular nervure. Veins, marginal line and fringes yellow. Hindwings yellow with brownish band before the outer margin. Body yellow, duskily dusted on abdomen. ♀ 40 mm. Corea.

*kuronis*.

**Eu. nipponis** *Btlr.* (Vol. 2, p. 136, pl. 21 f). **kuronis** *Mats.* is a ♂ in which the forewings are completely duskily suffused and the dark spot on disco-cellular is consequently extinct. Only the fringes of both wings are predominantly yellow. Also the underside is dark brown.

### Family: **Lasciocampidae**.

#### 2. Genus: **Malacosoma** *Hbn.*

p. 110, line 14 from below. *M. neustria* *L.* To be added to the forms already enumerated on p. 110, there is still an east asiatic form: *coreana* *Mats.* described from a ♂. This has almost the same reddish brown ground colour as the ♀ and the transverse lines are pale yellow. No band on hindwings. A form that occurs everywhere. — Also *takamukui* *Mats.* described from a ♀ from Kyushu, which also for instance occurs at Aix-la-Chapelle. On forewings basal and marginal areas are pale yellow, on hindwings only the outer one-third. The form *interrupta* dealt with on p. 110 was described by MATSUMURA before this was done by LE CHARLES. The forms are probably identical. Also in Formosa a *neustria* form is to be found. It is pale grey with wider lines (*formosana* *Mats.*).

#### 5. Genus: **Eriogaster** *Germ.*

*pfeifferi*.

p. 112, line 5 from below. **E. pfeifferi** *Daniel*. The wing contour reminds one of that of *Lasciocampa* species. Forewings pale brownish yellow, rather darker in basal half and on costa. At disco-cellular nervure a fine white dot. At  $\frac{5}{8}$ ths length of forewing a brown transverse line extends that does not quite reach to the inner margin and which in exceptional cases can be absent. Hindwings paler than forewings and rather thinly scaled. ♂ 28—30 mm. Marash. S. E. Asia Minor.

#### Genus: **Somadasys** *Gaede* (p. 112).

p. 112, line 16 from below. *S. yatsugadakensis* *Mats.* In the description of this species on p. 112, it was mentioned that a specimen ex the PÜNGELER collection had been selected for illustrative purposes and that it was classified there as *argenteomaculatus* *Btlr.* This was due to a mistake of PÜNGELER, as the author is BARTEL (Entom. Nachr. 25, p. 353). An older name for this species however is (*Chrostogastria*) *brevivenis* *Btlr.* There seems very little doubt about it that *yatsugadakensis* and *brevivenis* are one and the same species.

#### 12. Genus: **Selenephora** *Rmb.*

p. 117, line 8 from below. *S. lunigera* *Esp.* To the many forms already mentioned we still have to add: *sachalinensis* *Mats.*, the inner one of the outer lunular lines is widely white. The form probably differs little from *seitzi* *O. B.-H.* Saghalin.



Genus: **Seitzia** *Scriba.*

On p. 111 the question was raised as to whether *Crinocraspeda miyakei* Wilem. might possibly be identical with *Seitzia plumigera* (p. 118). According to MATSUMURA this is actually the case. The Genus should be named *Takanea* Nag. and *miyakei* retained as the specific name, as it is the older. Its correct classification is next to the *Selenephora*.

15. Genus: **Gastropacha** *O.*

p. 119, line 5 from top. *G. quercifolia* L. **luteobasalis** Niep. is almost as dark on upperside as the form *luteobasalis* *alnifolia* O. and the transverse lines are very distinct. On hindwings however the base, almost to centre of wing is orange-yellow and very sharply outlined. This form was obtained in a number of bred specimens.

p. 119, line 14 from top. *G. populifolia* Esp. The form **japanica** Mats. differs from typical specimens by *japanica*. having bolder rows of dots. Also the central dorsal line of thorax is wider. Described from one ♀ from Shikoku.

17. Genus: **Odonestis** *Germ.*

*O. brevivenis* Btlr. (Vol. 2, p. 170, pl. 27 f). According to MATSUMURA the description and illustration of this species in Vol. 2, p. 170. pl. 27 f, refers to some *Arguda* species.

18. Genus: **Dendrolimus** *Germ.*

p. 122, line 21 from below. Of *D. pini* L. so far only european-asiatic forms have been known. **atlantica** *Le Cerf* from the Central Atlas is remarkable merely on account of its foodplant. The larvae feed on Cedars, as no Pinus trees grow in that district. Forewings grey-white, dusted with black, central line finely drawn and indistinct; the next line also fine, but more distinct. Marginal line very dentate on veins, reduced in size and forming black lunules between veins 4 and 5 and between vein 2 and inner margin. The colour between this line and the preceding one, above and below the projecting angle of the outer line, is chocolate brown. A black basal streak,  $1\frac{1}{2}$ —2 mm wide, proceeds from base over the white cell spot to the second transverse line. Outer margin black-brown. The ground is palest between the first and second transverse lines, intersected by dusky brown scales along the veins. Hindwings deep reddish brown.

19. Genus: **Pachypasa** *Wkr.*

p. 123, line 11 from below: *P. otus* Drury (Vol. 2, p. 174, pl. 28 e, f). **fulvescens** Kotsch denotes a few *fulvescens*. single syrian specimens ♂ and ♀ that are larger. Forewings are darker, hindwings more reddish, thorax without the lighter patch in centre. One can therefore say that in this new form, both sexes resemble large dalmatian ♀♀.

8. Family: **Lemoniidae.**1. Genus: **Lemonia** *Hbn.*

p. 127. *L. sacrosancta* Pnglr. (Vol. 2, p. 182) is described from Palestine. Specimens from Marash (S. E. Asia Minor) vary slightly. The marginal area is often paler than the basal area. Central spot is dark brown and occasionally enlarged and always with pale circumscription.

*L. balcanica* H.-Schäff. (Vol. 2, p. 182. pl. 30 a). The form **anatolica** Wagner from Akshehir (Asia *anatolica*. Minor) has a triangular or trapeziform central spot on forewings, no lunular mark like european specimens. Among the specimens submitted to me were 2 specimens in which the inner area was paler, the marginal area pale chestnut brown. These are named **brunneomarginata** Wagner. *brunneo-marginata.*

p. 127, line 12 from below. **L. peilei** Rothsch. Similar to *pia* Pnglr. (pl. 10 f) but larger, the wings *peilei.* more elongate. Body dark yellow-brown. Forewings pointed with protruding apex. Costa indented, brilliant reddish yellow. Ground colour pale chocolate brown. A dark brown spot in cell, with paler reddish circumscription. Submarginal band with dentation inwards, yellowish. Hindwings pale chocolate brown. Central band, margin and fringes yellow. Mesopotamia.



## Family: Sphingidae.

By B. GEHLEN.

p. 138, line 19 from top: *eburnea* is an aberration of *increta* and not of *menephron*.

p. 150, line 17 from below. Under *Cel. euphorbiae* ab. *rühlii* (not *rühili*) Bdm. it was stated that ab. *clossi* Hann. was synonymous to this form. This is not the case, ab. *clossi* is a separate aberration that varies symmetrically and not merely one-sided as stated on p. 150. The mistake arose through the illustration in the "Systematic list of the Macrolepidoptera of the Berlin District" by A. CLOSS and E. HANNEMANN (Berlin-Dahlem 1917, Verl. Deutsch. Entomol. Ges.). In ab. *clossi* the bar between the transverse oblique band and basal spot on forewings is much wider than in ab. *rühlii*; it almost extends in width to the large costal spot and contrary to the form ab. *rühlii* it is wider at basal spot than at oblique band.

p. 155, line 22 from top. As the differences of the palaearctic *acteus* from the indian specimens, seem to be purely individual, a separate subspecies is not justified.

## 17. Family: Notodontidae.

By M. GAEDE.

We are now able to give an illustration of *Wilemania (Stauropus) bidentatus* Wil. described in Vol. 2, p. 290 (14 f).

## 27. Genus: **Odontosia** Hbn.

*O. carmelita* Esp. In Vol. 2, p. 306 *nordlandica* Strd. is enumerated as a subform of this species. Whilst the description was correct, it should have been placed with *Loph. camelina*, as was done by STRAND. PÜNGLER seems to have made a further mistake, as in his collection under *nordlandica* he has classified a specimen *nocturnalis*. in his *carmelita* series, that is actually *nocturnalis* Stich. Through this incorrect classification I was misled to consider *nocturnalis* as synonymous with *nordlandica* and the denomination of the specimen in Suppl. Vol. 2, pl. 14 e was incorrectly given as *nordlandica* instead of *nocturnalis*. There are therefore two quite separate forms in Norway: *camelina-nordlandica* and *carmelita-nocturnalis*.

## 18. Family: Cymatophoridae.

By Dr. A. SEITZ.

## 9. Genus: **Polyploca** Hbn.

*medionigra*. p. 192, line 20 from top. Under *flavicornis* L. we still have to enumerate ab. *medionigra* Höf. from Bisamberg near Vienna, denominating a ♂ that has a widely dark central area.

*hoerbuergeri*. p. 192, line 17 from below. *P. hoerbuergeri* Schaw. is close to *flavicornis*, but the two stigmata are absent. Colouration of forewings is a violet-grey, the basal area of costa is silvery white, the black transverse lines are sharply marked but delicate, the anterior one has a faintly projecting dentation. The intersecting dash at apex is faint. Abdomen paler than in *flavicornis*. On underside the transverse stripe, that in *flavicornis* is only faintly marked on forewings, is equally well developed on both wings. From 2 ♂♂ from Vladivostock.

## Family: Psychidae.

By Dr. E. WEHRLI.

## Subfamily Fumeinae.

p. 224, line 15 from top. After *syriaca* Rbl. should be added:

*libanotica*. *F. libanotica* Zerny. Very close to *F. syriaca* Rbl. in its dusky brown wing colouration and the denseness of the scaling, but differs by the smaller size (wing expanse 9.5 mm) and by the smaller number of pectinations to antennae of ♂ (12—13 as against 18 in *syriaca*). Body black-brown, wings with faint



metallic gloss, legs somewhat paler. Sac small, decorated with grass stalks, not differing much from those of allied species. On the wing at end of June. Bjarre, Lebanon. Probably only a mountain form of the preceding species.

## 24. Family: Aegeriidae.

### 6. Genus: **Synanthedon** Hbn.

**S. talischensis** Brtl. (16 f). We are now able to give an illustration of this species that was newly described in Vol. 2, p. 386. — Further we are in a position to give a picture of *S. melliniformis* Lasp. (16 i).

### 7. Genus: **Dipsosphecia** Splr.

We are also glad to be able to give an illustration of the species *D. roseiventris* Brtl. which was first described in Vol. 2, p. 393 (16 f). — Similarly of *D. barbara* Brtl. (16 h).

### 8. Genus: **Chamaesphecia** Splr.

The illustration of this Genus in Vol. 2 can now be amplified by the illustration of *Ch. icteropus unicolor* Rag. (16 i). See Vol. 2, p. 398.

## 25. Family: Cossidae.

### 2. Genus: **Cossus** F.

**C. osthelderi** Daniel. Wing contour wider, apex more truncate than in *C. cossus*. Body and forewings pale, abdomen sleek, collar merely as a black fringe, without yellow edge. Markings vary exceedingly, all striations also on hindwings, more distinct owing to the paler ground colour, central area of forewings more richly striated with black. 50—55 mm. North Amanus.

**C. tablai** Dumont. Not compared by the author to any known species. Thorax black, abdomen ochreous brown, only the 2 first segments whitish. Forewings pale grey with black striations that are particularly dense at base, at inner margin and to half-way along costa. From there to apex striations are still more prominent as they stand out on whiter ground. Ground colour consists of irregular patches of white to ochreous red. The largest patches are above the inner part of vein 1, in the cell and around the base of vein 2, where there is one patch on either side. A large white patch from vein 6 to costa, beyond same there are 5 more to the apex. There are black spots on costa from which the reticular lines spread, these are most dense over the centre of the inner margin, least dense in outer marginal area. Except for the white subcostal nervure, all the veins are blackish. Base and anal angle whitish. Hindwings unicolourous grey, paler at base. ♂ 64 mm. Tahla (Morocco). The larva feeds in a species of Acacia.

## Alphabetical List

with references to the original descriptions of the forms mentioned in the Addenda of Supplementary Volume 2.

\* indicates that the form is also illustrated in the place cited.

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*amoena* Zyg. (*modesta*) *Bgff.* Mitt. Münch. Ent. Ges. 1914, p. 59.

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*analielongata* Zyg. (*exulans*) *Vorbr.* Tessin. u. Mis. Schmett. 1931, p. 380.

*analielongata* Zyg. (*teriolensis*) *Vorbr.* Tessin. u. Mis. Schmett. 1931, p. 381.

*anatolica* Sem. *Wgn.* Int. Ent. Ztschr. 25, p. 367.

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*anglica* Zyg. *Reiss* Int. Ent. Ztschr. 1931, p. 344, 359.

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- apicaliconfluens Zyg. (teriolensis) *Vorbr. Tessiner und Mis. Schm. 1931*, p. 381.
- apicalielongata Zyg. (exulans) *Vorbr. Tessin. u. Mis. Schm. 1931*, p. 380.
- azona Zyg. (viridis) *Holik Iris 1932*, p. 121.
- azona Zyg. (caliacrae) *Reiss Int. Ent. Ztschr. 1931*, p. 99.
- bantaisana Lym. *Mats. Insecta Matsumur. 7*, p. 134. \*
- biedermanni Prep. *O. B.-H. Ent. Ztschr. 46 (1932)*, p. 263.
- brunnea Zyg. *Bgff. Mitt. Münch. Ent. Ges. 1914*, p. 53.
- brunneomarginata Lem. *Wgn. Int. Ent. Ztschr. 25*, p. 367.
- caeruleochsenheimeri Zyg. *Vrty. Mem. Soc. Ent. Ital., Vol. IX, 1930, VIII*, p. 22.
- caledonensis Zyg. *Reiss Int. Ent. Ztschr. 1931*, p. 341, 359. \*
- caledoniae Zyg. *Vrty. Mem. Soc. Ent. Ital., Vol. IX, 1930, VIII*, p. 20.
- caledonica Zyg. *Reiss Int. Ent. Ztschr. 1931*, p. 341, 359. \*
- caliacrae Zyg. *Reiss Int. Ent. Ztschr. 1931*, p. 98.
- caliacrensis Zyg. *Reiss Int. Ent. Ztschr. 1931*, p. 97.
- callunae Rhyp. *Mautz Int. Ent. Ztschr. 27 (1933)*, p. 49.
- carnea Zyg. *Vrty. Mem. Soc. Ent. Ital., Vol. IX, 1930, VIII*, p. 11.
- centralgeria Zyg. *Reiss, Seitz Macrolep. Suppl. 2*, p. 255.
- christophi Zyg. *Stgr. Rom. Mém. Lép. III, 1887*, p. 173. \*
- cicaleti Zyg. *Vrty. Mem. Soc. Ent. Ital., Vol. IX, 1930, VIII*, p. 18.
- cingulata Zyg. (caliacrensis) *Reiss Int. Ent. Ztschr. 1931*, p. 98.
- cingulata Zyg. (kijevana) *Holik Iris 1932*, p. 113.
- cingulata Zyg. (stauderi) *Holik Iris 1932*, p. 119.
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- confluens Zyg. (merzbacheri) *Shelj. Revue Russe Ent. 1909*, p. 385.
- confluens Zyg. (petsherskensis) *Holik Iris 1932*, p. 126.
- confluens Zyg. (sheljuzhkoiana) *Holik Iris 1932*, p. 128.
- confluens Zyg. (stauderi) *Holik Iris 1932*, p. 119.
- confluens Zyg. (sylvana) *Holik Iris 1932*, p. 116.
- confluens Zyg. (viridis) *Holik Iris 1932*, p. 121.
- confluenta Zyg. *Reiss Int. Ent. Ztschr. 1927*, p. 200.
- coreacola Porth. *Mats. Insect. Matsumur. 7*, p. 148.
- coreana Ar. *Mats. Insect. Matsumur. 7*, p. 111.
- coreana Mal. *Mats. Insect. Matsumur. 7*, p. 49.
- coreana Zyg. *Reiss Int. Ent. Ztschr. 1931*, p. 358. \*
- costalielongata Zyg. (sheljuzhkoiana) *Holik Iris 1932*, p. 128.
- costalielongata Zyg. (exulans) *Vorbr. B'flies of Switz. 1913*, p. 257.
- craeviensis Zyg. *Holik Iris 1932*, p. 111. \*
- crassimaenulata Zyg. (viridis) *Holik Iris 1932*, p. 121.
- cytisi Zyg. (petsherskensis) *Holik Iris 1932*, p. 126.
- dealbata Zyg. *Reiss Ent. Rundschau 1933*, p. 170.
- doleschalli Zyg. (sheljuzhkoiana) *Holik Iris 1932*, p. 128.
- dsidsilia Zyg. *Frr. Neue Beiträge VI*, p. 136. \*
- erythroides Zyg. *Przeg. Ent. Ztschr. 1932*, p. 112. \*
- excelsior Zyg. *Vrty. Mem. Soc. Ent. Ital., Vol. IX, 1930*, p. 11.
- extrema Rhyp. *Bdm. Int. Ent. Ztschr. 27 (1932)*, p. 99.
- falleriana Zyg. *Reiss Int. Ent. Ztschr. 1931*, p. 111. \*
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- flava Zyg. (stauderi) *Holik Iris 1932*, p. 119.
- flava Zyg. (suevica) *Reiss, Reiss Zyg. Deutschlands 1926*, p. 34.
- flaveola Zyg. (thaeticola) *Reiss, Seitz Macrolep. Suppl. 2*, p. 272.
- flavopraetexta Zyg. (stauderi) *Holik Iris 1932*, p. 119.
- freyeriana Zyg. *Reiss Ent. Rundschau 1933*, p. 221. \*
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- fulvia Zyg. *F. Gener. Insect. 1777*, p. 275.
- furva Maim. *Leech Proc. Zool. Soc. Lond. 1888*, p. 631. \*
- hadjinensis Zyg. *Reiss Int. Ent. Ztschr. 1931*, p. 342, 359. \*
- handel-mazzettii Synt. *Zerny Iris 45 (1931)*, p. 2.
- hibernica Zyg. *Reiss, Seitz Macrolep. Suppl. 2*, p. 249.
- hoenei Neoch. *O. B.-H. Entom. Ztschr. 46 (1932)*, p. 263.
- irpenjensis Zyg. *Holik & Reiss Iris 1932*, p. 114. \*
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- japonica Gastr. *Mals. Ins. Matsumur. 7*, p. 44.
- kalkanensis Zyg. *Reiss Entom. Rundsch. 1932*, p. 166. \*
- kan Eupr. *Mats. Ins. Matsumur. 7*, p. 126. \*
- karafutonis Das. *Mals. Ins. Matsumur. 7*, p. 116.
- kiewensis Zyg. *Reiss Iris 1932*, p. 130.
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- kolbi Zyg. *Reiss, Seitz Macrolep. Suppl. 2*, p. 255.
- kricheldorfii Zyg. *Reiss, Seitz Macrolep. Suppl. 2*, p. 252.
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- lismorica Zyg. *Reiss Int. Ent. Ztschr. 1931*, p. 345, 359. \*
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- lutescens Zyg. (hibernica) *Tull. Brit. Lep. I, 1899*, p. 434.
- manchurica Org. *Mats. Ins. Matsumur. 7*, p. 142. \*
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- margelanensis Zyg. *Reiss Ent. Rundschau 1933*, p. 151. \*
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- menaggia Zyg. *Przeg. Ent. Ztschr. 1932*, p. 113. \*
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- minsehani Neoch. *O. B.-H. Ent. Ztschr. 46 (1932)*, p. 263.
- monacensis Zyg. *Dan. Osthelder's Schm. Südb. (1932)*, 1, p. 577. \*
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- oribasis Zyg. *H.-Schäff. Schm. Eur. 2*, p. 46. \*
- osthelderi Coss. *Dan. Mitt. Münch. Ent. Ges. 22*, p. 95.
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- petsherskensis Zyg. *Holik & Reiss Iris 1932*, p. 126. \*
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- pfeifferi Er. *Dan. Mitt. Münch. Ent. Ges. 22*, p. 15.
- pfeifferi Zyg. *Reiss Int. Ent. Ztschr. 1932*, p. 273. \*
- pimpinellae Zyg. *Guhn Krancher's Ent. Jahrb. 1932*, p. 89.
- podoleia Zyg. *Holik Iris 1932*, p. 132. \*
- polonia Zyg. *Przeg. Ent. Ztschr. 1933*, p. 27. \*
- praematura Zyg. *Przeg. Ent. Ztschr. 1932*, p. 116. \*
- privata Zyg. (sheljuzhkoiana) *Holik Iris 1932*, p. 128.
- pseudoapennina Zyg. (berolinensis) *Guhn Krancher's Ent. Jahrb. 1932*, p. 96.
- pseudoberolinensis Zyg. (viridis) *Holik Iris 1932*, p. 121.
- pseudocambysea Zyg. *Reiss Int. Ent. Ztschr. 1932*, p. 276. \*
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- pseudofanstula Zyg. *Reiss, Seitz Macrolep. Suppl. 2*, p. 272.
- pseudofelix Zyg. *Reiss, Seitz Macrolep. Suppl. 2*, p. 272.
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*pseudomeliloti* Zyg. *Reiss*, *Seitz Macrolep. Suppl.* 2, p. 275.  
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*sarothamui* Zyg. *Guhn*, *Krancher's Ent. Jahrb.* 1932, p. 92.  
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*schmidtii* Zyg. *Reiss* *Int. Ent. Ztschr.* 1931, p. 112. \*  
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*sebdouensis* Zyg. *Przeg. Ent. Ztschr.* 1932, p. 117. \*  
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*segregata* Zyg. (fausta) *Reiss* *Int. Ent. Ztschr.* 1932, p. 124.  
*sexmaeculata* Zyg. (rebeli) *Reiss* *Int. Ent. Ztschr.* 1932, p. 274. \*
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*stauderi* Zyg. *Holik & Reiss* *Iris* 1932, p. 118. \*  
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*suzukii* *Lael. Mats. Ins. Matsumur.* 7, p. 134.  
*sylvana* Zyg. *Przeg. Ent. Ztschr.* 1932, p. 112. \*
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*takamukui* *Mal. Mats. Ins. Matsumur.* 7, p. 49.  
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*tashkentensis* Zyg. *Reiss* *Int. Ent. Ztschr.* 1932, p. 125, 230. \*  
*taurinatorum* Zyg. *Vrly. Mem. Soc. Ent. Ital., Vol. IX,* 1930, VIII, p. 14.  
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*trieolor* Zyg. (dsidsilia) *Reiss* *Ent. Rundschau* 1933, p. 208. \*  
*tripuncta* Zyg. (trifolii) *Guhn*, *Krancher's Ent. Jahrb.* 1932, p. 91.  
*turkmeniea* Zyg. *Reiss* *Int. Ent. Ztschr.* 1932, p. 490. \*  
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- ukraina* Zyg. *Przeg. Ent. Z.* 1932, p. 117. \*  
*uralensis* Zyg. *H.-Schäff. Schmett. Eur.* II, p. 34. \*
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## Corrections & Additions:

- P. 9, line 29 from top, read *serpyllum* instead of *serphyllum*.  
P. 9, line 8 from below, read ♀ instead of ♂.  
P. 11, line 19 from top, read *transapennina* for *transappenmina*.  
P. 12, line 19 from below, read *exsiliens* instead of *exiliens*.  
P. 22, line 4 from top, delete the word "only".  
P. 37, line 13 from top, read **fletcheri** instead of **fletscheri**.  
P. 43, line 23 from below, insert plate numbers, thus: *prinzi* (4 l), *aeacus* (4 k).  
P. 43, line 22 from below, insert plate numbers, thus: *herrich-schäfferi* (4 k), *metzgeri*, *günneri* (4 k).  
P. 61, line 12 from below, read p. 62, pl. 8 c as major, instead of p. 52, pl. 8 c as magna.  
P. 65, line 13 from below, read *conjuncta* *Stgr.* instead of *conjuncta* *Shzo.*  
P. 72, line 12 from top, read (Vol. 2, pl. 13 i) instead of (pl. 13 i).  
P. 77, line 5 from top, add plate reference to **interrupta** *Schaw.* (6 g, as *bosniensis*).  
P. 96, line 19 from below, after **relictus** *O. B.-H.* add plate reference (9 b, 10 b).  
P. 112, line 20 from below, read *argenteomaculatus* *Brtl.* instead of *argenteomaculatus* *Btlr.*  
P. 123, line 20 from below, delete plate reference (10 d) after *alfieri* *Andr. & Seitz* and insert same after *bufo* *Led.*  
P. 151, line 16 from below, insert plate reference (13 e) after **nigra** *Gehlen.*  
P. 151, line 5 from below, read "forewings" instead of hindwings.  
P. 171, line 6 from below, read **moratoria** instead of **morataria**.  
P. 172, line 6 from below, read *Nat. Hist.* (6) 19, p. 185, instead of *Nat. Hist.* (4) 20, p. 401.  
P. 176, line 8 from below, read **albida** *Daniel* instead of **albida** *Pfeiffer.*  
P. 178, line 12 from below, after **gelukpa** add: (14 d as "*gelupka*").  
P. 191, line 17 from top, the paragraph commencing: — "Some irish specimens ..." to line 27: (vide Vol. 6) should be deleted and inserted after "*albingensis*" on line 14.  
P. 214, line 1 at top, read *P. asiatica* instead of *C. asiatica*.  
P. 225, line 9 from top (righthand column), read *helvetica* instead of *hetvetica*.



### Misprints on plates:

- Pl. 1 h read adanensis ♀ instead of adanensis ♂.
- Pl. 6 a read interpositella instead of interposita.
- Pl. 6 f read lutea instead of flava.
- Pl. 6 h read pseudoliturata ♀ instead of falloui ♀.
- Pl. 7 b read nehallenia instead of lewisi.
- Pl. 8 b read aboleta instead of obsoleta.
- Pl. 10 b read relictus instead of relict.
- Pl. 10 c read sibiricus instead of sibirica.
- Pl. 10 g read filipjevi instead of filipjeri.
- Pl. 11 e read punctovenalia instead of punctorenalis.
- Pl. 14 d read gelukpa instead of gelupka.
- Pl. 14 e read nocturnalis instead of nordlandica.
- Pl. 14 f read hoenei instead of hoeheini.
- Pl. 15 e read hectica instead of hectina.
- Pl. 15 f read suzukii instead of susrukii.
- Pl. 16 f read ducellieri instead of ducillieri.
- Pl. 16 i read turkmenica instead of turkmena.

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### Annotation:

1. The illustration of a Noctuid (topseuti) on pl. 15 g (2) was inserted in error.
2. The illustration on pl. 15 d (6) as "houlberti" is without a doubt merely a variety of *Kerala macroptera* Oberth., which has already been figured twice in this work. In Vol. 2, p. 75, the grey form (illustrated on pl. 13 i), was dealt with under the *Lithosiinae* and mention was made that its classification there appeared to be incorrect. Later WARREN enumerated it (Vol. 3, p. 299) under its older name in the Noctuids as *K. decipiens* Btlr. and it was illustrated from a specimen from W. China and classified in its correct position on pl. 52 d. — Attention was drawn to its affinity with the *Cymatophoridae* in Vol. 2. The species is not mentioned in the text of the Supplementary Volume.



# Index.

The number immediately behind the name indicates the page. The names with a capital initial are those of Genera; names in italics are synonyms or have been incidentally mentioned.

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EDITED BY

DR. ADALBERT SEITZ, PROFESSOR



DIVISION I: FAUNA PALAEARCTICA VOL. 1—4  
WITH SUPPLEMENT — VOL. 1—4

DIVISION II: FAUNA EXOTICA VOL. 5—16  
PALAEONTOLOGY, MORPHOLOGY, BIOLOGY AND GEOGRAPHY  
OF THE MACROLEPIDOPTERA — VOL. 17



SUPPLEMENT TO VOL. 2.

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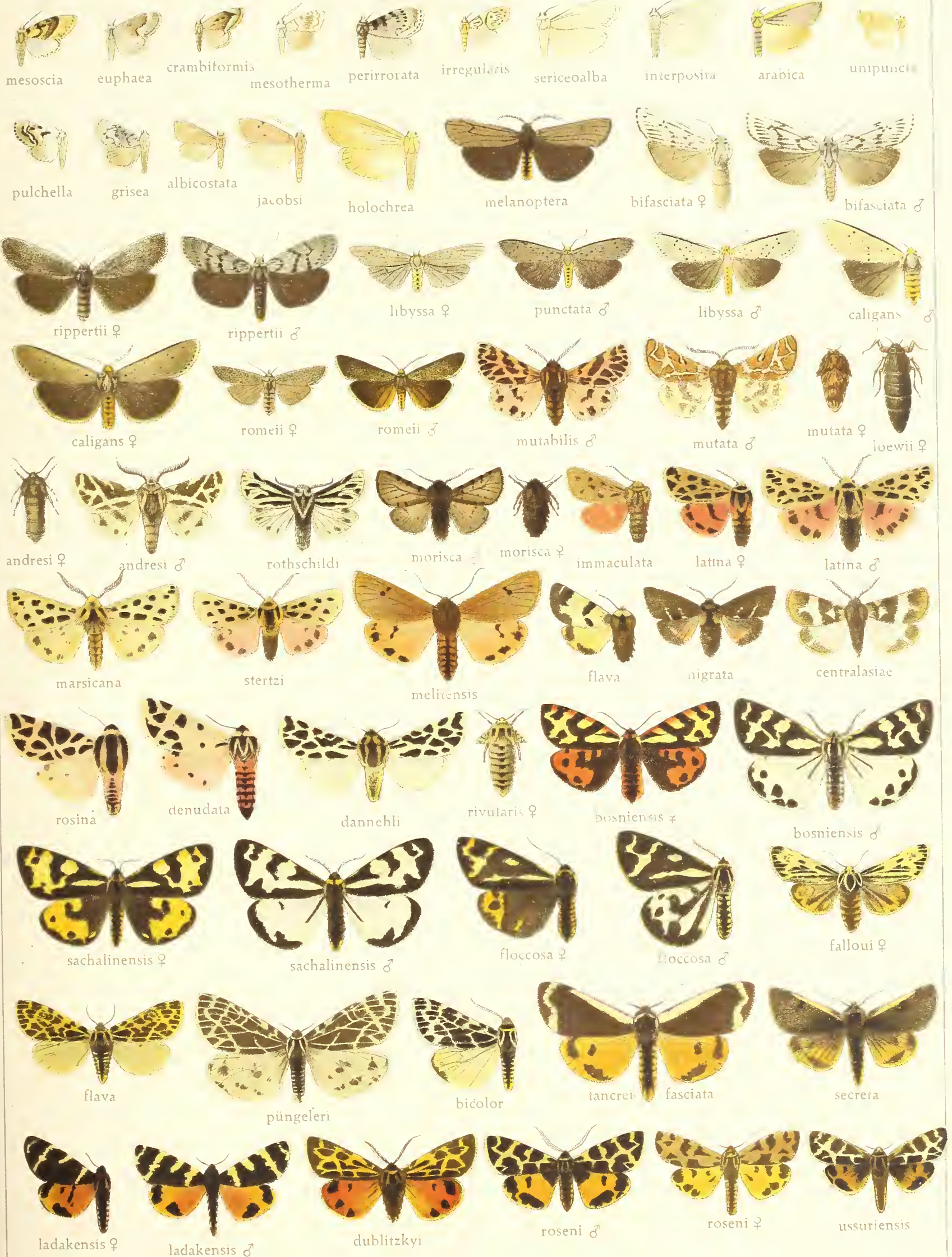
















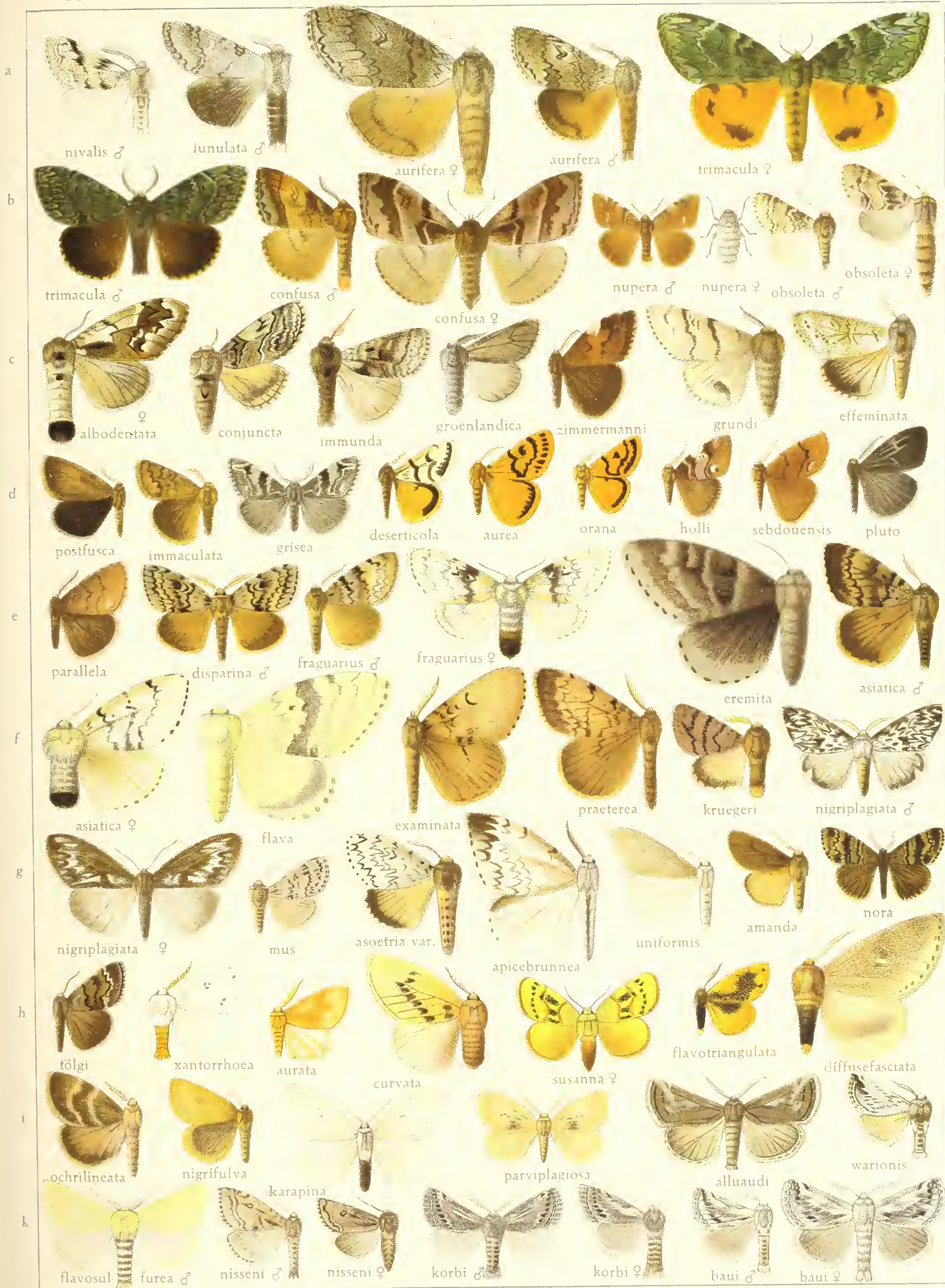


















































a



*meridionalis*

*stollei*

b



*livopenor*

*saharæ*

*hybridus*

c



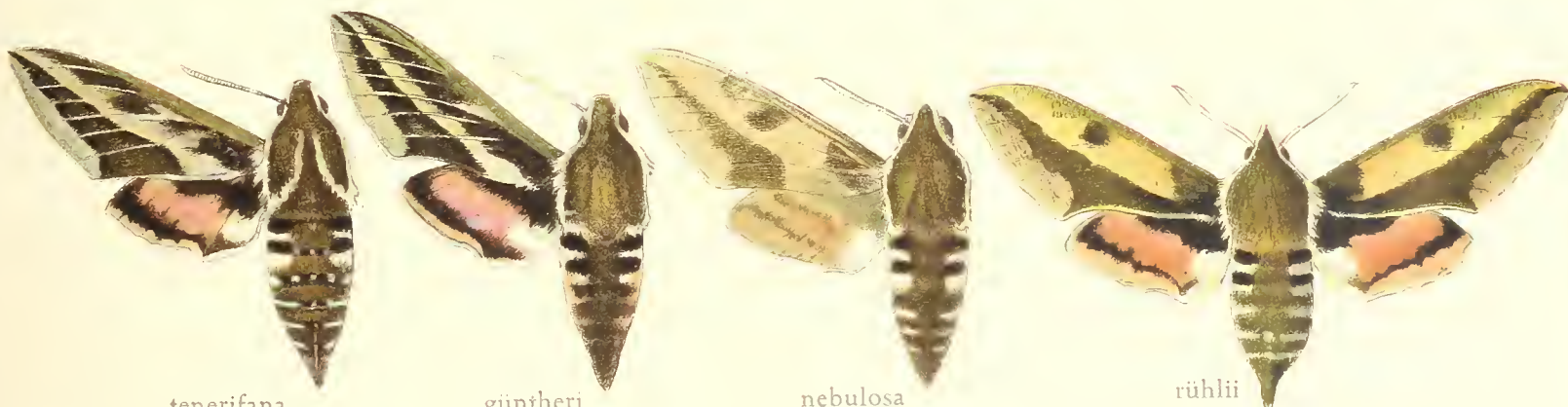
*chamyla*

*transcaspica*

*euphothymali*

*euphorbiaella*

d



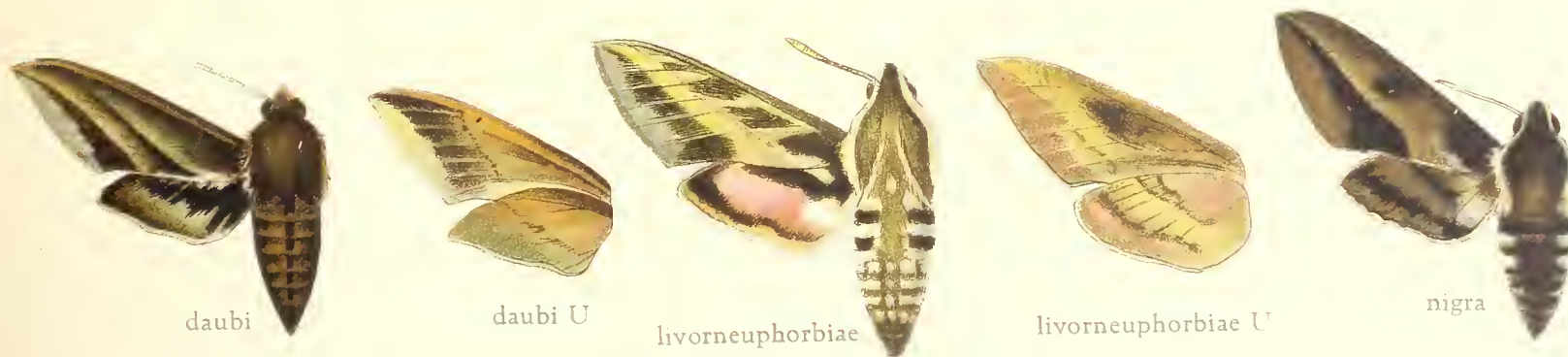
*tenerifana*

*güntheri*

*nebulosa*

*rühlii*

e



*daubi*

*daubi U*

*livorneuphorbiae*

*livorneuphorbiae U*

*nigra*







