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Steninae Collected by the Author in Indonesia 1975–1982

(Coleoptera, Staphylinidae)

10th Contribution to the Knowledge of Steninae

With 10 Figures

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This paper lists twenty four taxa, seven of which are new, obtained by occasional collecting in the course of many trips in Indonesia made by the author in the past eight years. Our knowledge of the stenine fauna of the Malesian ¹⁾ sub-region is still very fragmentary. L. BENICK made the principal contributions thereto in a series of papers published before the last world war based on the collections made by DRESCHER and others in the Greater Sunda Islands, mainly Java. BERNHAUER and CAMERON also contributed many articles on Staphylinidae from the same islands and from the Malaysian mainland which included the descriptions of a few Steninae; after the war SCHEERPELTZ described several species from the Lesser Sunda Islands, and more recently PUTHZ has added a number of taxa, mostly from old material. His works mostly cover wider fields, but include a revision of the Bornean species (1973) and supplement (1976) and an article dealing exclusively with the Steninae of (ex Portuguese) Timor. Lastly a recent study of new material from Borneo by HAMMOND & ROUGEMONT (in press) has added a number of endemic species to those already known from that island.

This paper adds further new species and data to our knowledge of five of the Indonesian islands. Although a revision of the Malesian stenine fauna is to be desired, too little material is yet available to make the project worthwhile. The Indonesian archipelago with its thousands of islands offers a most interesting field for the study of phylogeny and speciation, and it is to be hoped that entomologists with access to the lesser known islands will collect these inconspicuous insects. The division between the Oriental and Australasian insect faunas does not correspond to the Wallace line, the Oriental elements usually occupying all the area up to the Australasian continental shelf, but this has yet to be confirmed by the Steninae from islands such as Tanimbar, the Arus (probably of Australasian affinity) and the great Moluccan Isles: Halmahera, Ceram and Buru, whence only a single species is known, but which certainly harbour a rich endemic fauna. More surprisingly, the Malaysian mainland remains very poorly known, yet undoubtedly possesses, with the possible exception of Borneo, the richest Staphylinid fauna of the whole area. The author hopes for an early opportunity to prospect the highlands of the peninsula, and to assemble enough material to form the basis of a revision.

¹⁾ This spelling is used throughout this article to denote the zoogeographical sub-region, in order to avoid confusion with that which pertains to the modern state of Malaysia. This distinction was unnecessary at the time when the mainland states of that country were collectively known as Malaya.

Systematic report

Dianous striatellus (L. BENICK, 1932)

Stenus striatellus L. BENICK, 1932, Arch. Hydrobiol. Suppl. 11: 390.

Dianous striatellus, PUTHZ, 1981, Ent. Abh. Mus. Tierk. Dresden 44: 6.

Material: 21 exx.: C. JAVA: Kalasan, near Jogjakarta, on mossy boulders in river, 14. IV. 1980; 16 exx.: C. JAVA: Kaliurang, S. slope of Mt. Merapi, on boulders in stream, 24. II. 1981; 2 ♂♂ & 1 ♀: BALI: Gunung Kawi, on mossy boulders in stream, 26. VII. 1981.

This species was described from Bali and already recorded from Java; it is not known from any other island.

Dianous tonkinensis (PUTHZ, 1968)

Stenus tonkinensis PUTHZ, 1968, Dtsch. ent. Z. (N.F.) 15: 447

Dianous tonkinensis, PUTHZ, 1981, Ent. Abh. Mus. Tierk. Dresden 44: 6.

PUTHZ (1981) has already recorded my captures of this species at Locomata, Tanah Toraja, S. SULAWESI (Celebes), from which islands it had not previously been listed. Since then I have found it in many localities of Tanah Toraja, where it shows considerable morphological variation. It is not a species of the spray zones of cascades like most of its congeners, but is found running in open situations by the sides of streams, on clay banks etc.

Dianous baliensis sp. n.

A new species belonging to the *nigravirens* group (group 1, PUTHZ, 1981), with depressed frons, large 'stenoid' eyes, and all tarsi simple, closely resembling *D. yao* ROUGEMONT recently described from Thailand and Burma.

Length: 5.2–5.7 mm. Convex species, black, the fore-body and, to a lesser extent, abdomen with a dark greenish bronze reflex; antennae and palpi brown; legs rufous with knees and tarsi infusate. Forebody coarsely and rugosely punctate.

♂ Holotype: BALI: Lake Buayan, on rock wall at edge of lake, 27. VII. 1981; 2 ♂♂ & 4 ♀♀ Paratypes C. JAVA: Mt. Merapi, ca. 1500 m., under dead leaves on rock bed of tarried stream, 11. VII. 1982.

Head narrower than elytra (77:81); average distance between eyes: 39; vertex concave, but not deeply so, the depression much shallower posteriorly, the sides slightly raised between margins of eyes and median depression; puncturation very coarse, the diameter of punctures equal to that of second antennal segment, rugose, the interstices fine and sharp, tending to longitudinal confluence. Antennae long, overlapping the base of pronotum when reflexed; antennal segments: I:10; II:8; III:19; IV:14; V:12; VI:11; VII:10; VIII:9; IX:10; X:10; XI:11.

Pronotum elongate (67:59), with sides sinuate in posterior third; disc uneven, with a transverse, irregular depression just behind the middle, variable in extent in different exx., the puncturation equal in size and rugosity to that of head, but the rugae tending to be transverse.

Elytra slightly elongate (85:81; length of suture: 72), the surface regularly convex; puncturation of disc comparable to that of head and pronotum, the rugae slightly transversely confluent near suture, the puncturation relatively sparser on sides, forming broader, shiny interstices.

Abdomen cylindrical, scarcely tapered, the paratergites broad (Paratergite IV broader than second antennal segment) and densely punctate; tergites are also relatively coarsely and densely punctured, the punctures of basal segments about equal to eye-facets, those of distal segments finer, the interstices narrower than the diameter of punctures throughout. Length of metatibia: 75; length of metatarsi: 53; first tarsal segment about equal to the following three together; tarsal segments: I:20; II:9; III:6; IV:5; V:7 onychium inserted dorsally on fourth segment.

Male Sternites V and VI more sparsely and finely punctured, and with longer pubescence, in median area, but not apically emarginate; sternite VII with a broad rounded emargination limited externally by two keels, the concave depression thus formed finely and densely punctate and pubescent; sternite VIII with a broad shallow triangular emargination to $\frac{1}{8}$ th its length; sternite IX: fig. 1 B; aedeagus: fig. 1A.

Dianous baliensis sp. n. is the second *Dianous* recorded from Bali and only the fifth from the Sunda Islands (excluding Borneo whence nine species are now known). It most closely resembles *D. yao* ROUGEMONT from Burma and Thailand, differing by its slightly more slender build, paler legs, the vertex of head which is not evenly concave posteriorly as it is in *D. yao* (see PUTHZ' key, 1981, p. 108, couplets 80:81), much more coarsely punctured abdomen, and by the male sexual characters: In *D. yao* ROUGEMONT sternites V and VI are slightly depressed and densely punctate, and the concave depression and emargination of sternite VIII much deeper. The aedeagus of *D. baliensis* sp. n. does not show the ovoid inner sac characteristic of *D. yao*, this structure appearing as is more usual as a narrow tubular form.

***Stenus* (s. str. & *Nestus*) *puberulus insulindicus* subsp. n.**

This new taxon closely resembles *S. puberulus fukiensis* L. BENICK, and a comparison with that taxon is sufficient for its diagnosis.

♂ **Holotype**, 5 ♂♂ & 6 ♀♀ **Paratypes** BALI: Lembah Arca, running on volcanic rubble in stream bed, IV 1979. Holotype and 9 Paratypes in coll. ROUGEMONT; one Paratype each in colls. PUTHZ and BMNH.

Proportions of Holotype: Breadth of head: 63; average distance between eyes: 36; length of pronotum: 51; breadth of pronotum: 49; greatest length of elytra: 67; greatest breadth of elytra (situated about $\frac{2}{3}$ rds from anterior margin): 66; length of suture: 58; antennal segments: I:10; II:7; III:10; IV:8; V:7; VI:6; VII:5; VIII:4; IX:5; X:5; XI:7; length of metatibia: 60; metatarsal segments: I:12; II:10; III:6; IV:6; V:11.

Stenus puberulus insulindicus subsp. n. differs from two other members of this polytypic species, *S. puberulus puberulus* and *S. puberulus eurous* PUTHZ in the same way as does the third remaining member of the group, *S. puberulus fukiensis* L. BCK., by its greater size (and from *S. p. eurous* by denser puncturation) and the aedeagus. From *S. p. fukiensis*, to which it is closest, it may be distinguished by a proportionately narrower and more deeply depressed frons, proportionately narrower elytra, finer puncturation of abdominal tergites, and by the sexual characters: the apico-lateral teeth of the male ninth sternite and female valvifers are shorter and blunter in the new subspecies, and the outline of the aedeagus (fig. 2) is characteristic.

The distribution of this species which is related to the African and Mediterranean *mendicus* species complex, is unusual, occupying a North-South axis along the seaboard of East Asia from its Palearctic origin in the North far into the Oriental region in the South. The Type form has been found from Vladivostok through Korea and Japan as far South as Shanghai. In southern China and North Vietnam it is replaced by the subspecies *fukiensis* L. BCK., while an island race (*eurous* PUTHZ) represents it on Taiwan. The discovery of the new subspecies *insulindicus* in Bali is most remarkable, as it extends the known range of the species more than 3000 km, in an unexpected direction.

***Stenus* (s. str. & *Nestus*) *louwerensi* CAMERON, 1936**

Stenus louwerensi CAMERON, 1936, Proc. R. ent. Soc. Lond. (B) 5: 183.

Stenus louwerensi, PUTHZ, 1980, Reichenbachia Mus. Tierk. Dresden 18: 39.

Stenus louwerensi, PUTHZ, 1981, Reichenbachia Mus. Tierk. Dresden 19: 6.

Stenus louwerensi, ROUGEMONT (in press), Nat. Hist. Bull. Siam Soc., Bangkok, 31.

Material: 3 ♂♂ & 1 ♀: S. SULAWESI: Tanah Toraja, banks of R. Saadan near Makale, 16. VII. 1982.

Known from Vietnam, Laos, Thailand and Java; new to Sulawesi.

***Stenus* (s. str. & *Nestus*) *baliensis* sp. n.**

This new species belongs to the *rugicollis* group, and appears to be most closely related to *S. helleri* L. BCK. from Sulawesi.

Length: 4.3–4.6 mm. Black, coarsely and densely punctate; pubescence sparse and short on fore-body dense, short and recumbant on abdomen and ventral surfaces; all appendages rufous, the antennal clubs infusate.

♂ Holotype, 2 ♂♂ & 1 ♀ Paratypes BALI: Lake Buayan, climbing on vertical clay bank at edge of forest on lake shore, 27. VII. 1981. Holotype and one Paratype in coll. ROUGEMONT, other Paratypes in colls. PUTHZ and BMNH.

Head narrower than elytra at their greatest breadth (68:72), but broader than the latter between humeral angles (67); eyes large; vertex deeply depressed, bisulcate, with sharply raised median portion set well below the level of inner margins of eyes; average distance between eyes: 41; distance between inner margin of eye and frontal furrow: 13.5; breadth of raised median portion: 14; puncturation coarse, rugose, the diameter of punctures about equal to that of second antennal segment. Antennae short, when reflexed reaching only to about $\frac{3}{4}$ rds the length of pronotum; antennal segments: I:7; II:7; III:9; IV:8; V:7; VI:6; VII:6; VIII:4; IX:4.5; X:5 (4 wide); XI:6; antennal club furnished with long dense pubescence.

Pronotum evenly convex, elongate (58:50), the sides sinuate in posterior third; puncturation equal in coarseness and rugosity to that of head.

Elytra convex, subquadrate (maximum length: 71; maximum breadth: 72; length of suture: 58); sutural line strongly marked, the disc slightly impressed on either side anteriorly; puncturation marginally coarser than that of pronotum, with a tendency to transverse confluence, especially near suture.

The broad convex abdomen is fairly strongly tapered: breadth of segment III (from lateral margins of paratergites: 50; breadth of segment VII: 33; tergites coarsely and densely (but not rugosely) punctured, the diameter of punctures variable but greater than that of third antennal segment, the interstices narrow, shiny, without microsculpture on punctate surfaces; the microsculpture of anterior portions of tergites transversely reticulate; basal tergites with three strong keels, the median keel of tergite IV extending to $\frac{3}{4}$ rds the length of segment; paratergites broad (paratergite of segment IV:4.5), much broader than 2nd antennal segment, with a single row of 5 to 6 coarse punctures; tergite IX glabrous and impunctate; tergite X densely setose.

Legs robust; metatibia about $\frac{4}{5}$ rds the length of metatarsi; tarsal segments: I:18; II:8; III:6; IV:5; V:12; all fourth segments simple.

Male Sternite V with a shallow apico-median emargination, but homogenous puncturation; sternite VI without special characters; sternite VII finely and densely punctate and pubescent; Sternite VIII shallowly emarginate to less than $\frac{1}{6}$ th its length; sternite IX: fig. 3B; aedeagus: fig. 3A.

Because this species lacks the characteristic blueish reflex of *S. helleri* L. BCK. to which it is more closely related, it runs in PUTHZ' key to the *Stenus* s. str. & *Nestus* of the Orient (1980) to *S. rugicollis timoricus* PUTHZ, from which it is easily distinguished by its size and facies, darker legs, and by the aedeagus. It differs principally from *S. helleri* L. BCK. by its much greater size, colour, closer (rugose) puncturation of fore-body, coarser puncturation of abdominal tergites, and by the sexual characters.

Stenus (Parastenus) toraja sp. n.

This new immaculate species is the sister species of *S. nobilis* L. BCK. from the Philippine Islands.

Length: 6.2–6.6 mm. Black, shiny despite fine microsculpture, and sparsely pubescent; all appendages testaceous, the antennae gradually infusate to club.

♂ **Holotype** S. SULAWESI: Tanah Toraja, Batu Bulan, near Rante Pao, alt. ca. 1000 m., under rotten leaf-bases of fallen Arenga palm in montane forest, 8.IV.1981; 23 ♂♂ & 26 ♀♀ **Paratypes** S. SULAWESI: Tanah Toraja, 5 km. S. of Makale, in dead leaves on mud bank of stream and at roots of herbaceous plants, 15–16.VII.1982; 1 ♂ **Paratype**: Celeb., WALLACE (in BMNH); 1 ♂ **Paratype**: Celebes, Malino, August 1937, C. T. & B. B. BRUES (MCZH).

Head broader than elytra (104:101), with very large eyes; average distance between eyes: 50; sides of frons somewhat explanate, its margins slightly raised above the borders of eyes, the surface irregularly punctured, leaving a broad median impunctate area posteriorly, and two others behind the frontal tubercles, the impunctate areas finely microsculptured; diameter of punctures less than that of third antennal segment. Antennae short, reaching when reflexed to a little over two thirds the length of pronotum.

Pronotum elongate (79:73), constricted posteriorly, the surface uneven, with a transverse anterior impression, coarsely and rugosely punctured, the punctures larger than the diameter of third antennal segment, the interstices partially confluent.

Elytra transverse (101:89; length of suture: 63), the puncturation as coarse as but less rugose than that of pronotum, the interstices less sharp and not confluent.

Abdomen cylindrical, scarcely tapered, very finely bordered; all tergites and sternites sparsely punctured, the punctures about the same size as eye-facets, the interstices 1 to 2 times greater than the diameter of punctures, the whole surface transversely micro-reticulate; tergite VII with a membranous apical fringe; sternite IX (fig. 4B) apico-laterally produced into a long stout tooth; tergite X densely setose at apex.

Legs fairly long; all fourth tarsal segments strongly bilobed; length of metatibia: 103; metatarsal segments: I:23; II:11; III:7; IV (including lobes): 12; V:20; total length of tarsi disregarding overlapping parts: 66

Male Sternites IV–VII without sexual characters, save finer and denser puncturation and pubescence posteriorly on seventh segment; sternite VIII normally punctured, with a broad triangular emargination less than $\frac{1}{6}$ th the total length of sternite; aedeagus: fig. 4A.

Female Valvifers comensurate with male ninth sternite; no sclerotised spermatheca was found.

The combination of broad head, finely margined and sparsely punctured abdomen and single apico-lateral tooth on the ninth sternite isolate this new species from other immaculate SE Asian *Parastenus* of comparable size. Disregarding the absence of elytral spots, it would run in PUTHZ' key to the maculate species (1981) to *S. nobilis* L. BCK., an endemic of the Philippines. It differs from that species principally by its proportionately narrower head, denser (but still very sparse in comparison with other species) puncturation of head and abdomen, and by the aedeagus, which although of the same type, in *S. nobilis* has a less truncate apex of the median lobe, the sides of apex more concave, forming a more distinct mucron, and the apical angle more acute.

The ex. collected by WALLACE (probably at Maros) was not designated as Holotype, because at the time I found and described the species, that specimen was on loan from the BMNH to my friend Dr. PUTHZ. He had meanwhile recognised and described a new species, but after been shown a first draft of this paper kindly invited me to proceed with

the publication of my own description. The aedeagus of the WALLACE specimen is figured (PU THZ, in press) because already included in the plate illustrating his work, and may be compared with fig. 4A of this article.

***Stenus (Parastenus) henrii* sp. n.**

An immaculate relation of the Formosan species *S. arisanus* CAM.

Length: 6–6.5 mm. Black, dull due to dense microsculpture and rugose puncturation; palpi testaceous, densely pubescent, with terminal segments apically infusate; antennae testaceous, gradually infusate from second segment; legs testaceous, the knees progressively infusate from fore to hind legs. The insect is macropterous.

♂ **Holotype**, 2 ♂♂ & 3 ♀♀ **Paratypes**: BALI: Lake Bratan, 24.I.1981 and Lake Buayan, 27.VII.1981, in dead leaves at edge of forest. Holotype and 3 Paratypes in coll. ROUGEMONT; 1 Paratype in each of colls. PUTHZ and BMNH.

Head broader than elytra (99:96), the eyes large; vertex bi-sulcate, the median portion slightly raised, the explanate sides of frons sharply reflexed, forming a rim over the inner edges of eyes; puncturation coarse, the punctures about as large as the section of third antennal segment, even, the interstices about half the diameter of punctures. Antennae short, not reaching the base of pronotum when reflexed, and slender; antennal segments: I:12; II:8; III:26; IV:15; V:13; VI:9; VII:9; VIII:7; IX:7; X:7; XI:9.

Pronotum elongate (80:71), broadest before the middle, the sides sinuate for nearly half (7/16th) its length, the disc convex, evenly and rugosely punctured, the punctures as large as those of head, but closer, the interstices forming a honeycomb pattern.

The elytra appear superficially transverse, because the suture is very short, thus exposing much of the second tergite; maximum length of elytra: 95; maximum breadth of elytra (just behind the middle): 95; length of suture: 70; the surface is somewhat uneven, the puncturation similar to that of pronotum.

Abdomen cylindrical, slightly tapered, convex above the fine margins; paratergites IV nearly as broad as the (breadth of) second antennal segment, but appearing broader due to the lateral convexity of sternites which is visible from above; tergites coarsely punctured, the shallow punctures larger than eye-facets, the dull interstices a little wider than the diameter of punctures; puncturation of ventral surfaces finer and denser.

Legs stout, with all tibia thickly pubescent and all fourth tarsal segments deeply bi-lobed; length of metatibia: 90; length of metatarsi: 67; metatarsal segments: I:27; II:12; III:7; IV:10 (inclusive of lobes); V:16.

Male Sternites VI and VII each with a deep rounded impression limited apico-laterally by keels, more accused on sternite VII which is also slightly emarginate apically, the puncturation and pubescence fine and dense within these impressions; sternite VIII with a narrow apical excision to 1/7th its length; sternite IX (fig. 5B) with apico-lateral denticulation external to the main apico-lateral tooth; aedeagus: fig. 5A.

Female Valvifers apico-laterally denticulate like the male ninth sternite; no sclerotised spermatheca was observed.

Stenus henrii sp. n. is akin to a number of archipelagian species, but quite distinct. Of the immaculate species it most closely resembles *S. peninsularis* CAM. which however is smaller, has proportionately shorter legs, more convex elytra and a more prominent median portion of frons. The puncturation of the two species is similar, but the aedeagus of each is of course characteristic. *S. henrii* sp. n. is larger than other similar immaculate species, which include the unnamed female exx. from Borneo cited as "*S. cf. peninsularis*" in HAMMOND & ROUGEMONT (in press), which show a more deeply bi-sulcate head, ampler elytra, paler legs and sparser abdominal puncturation. *S. palawanensis* WENDELER is much smaller, with narrower, posteriorly divergent elytra, more prominent frons,

narrower abdominal borders and transversely rugose pronotum. *S. henrii* seems to be most closely related to the maculate species *S. arisanus* CAM., although the former is larger and more robust, has proportionately larger eyes and is less shiny; the puncturation of the pronotum is more even, and there is no median furrow, the clytra are shorter, their puncturation much closer, rugose, the puncturation of the abdomen is finer, and lastly it lacks the conspicuous clytral spots of *S. arisanus* CAM.

***Stenus (Parastenus) gestroi submaculatus* BERNHAUER, 1915**

Stenus submaculatus BERNHAUER, 1915, Tijdschr. Ent. 58: 217

Stenus submaculatus, L. BENICK, 1938, Stett. Ent. Ztg. 99: 17.

Stenus drescheri L. BENICK, 1938, Stett. Ent. Ztg. 99: 18.

Stenus submaculatus, PUTHZ, 1970, Mitt. Zool. Mus. Berlin 46: 307

Stenus gestroi submaculatus, PUTHZ, 1981, Entomol. Blätter 76: 146.

Material: 5 ♂♂ & 9 ♀♀: BALI: several localities in the mountain lakes region: Candi Kuning, Lake Buayan, Lake Bratan, in dead leaves at the edge of forest, 14. IV. & 27. VII. 1981; 2 ♂♂ & 2 ♀♀: C. JAVA: Mt. Merapi, South slope, ca. 1500 m., under dead leaves in stone river bed, 11. VII. 1982; 3 ♂♂ & 3 ♀♀: W. SUMATRA: Lembah Landir, ca. 1000 m., at roots of grasses in shaded stream valley, 8. VII. 1982.

This taxon is recorded from Java and Flores; it is new to Bali and to Sumatra. Exx. from Bali are sometimes clearly maculate, although the size of the spots is much reduced compared with other subspecies; in some cases the spot is heavily obscured, only visible in translucence, while the series from Java and Sumatra do not show any trace of the spots.

***Stenus (Parastenus) bicolon javanicus* BERNHAUER, 1915**

Stenus javanicus BERNHAUER, 1915, Tijdschr. Ent. 58: 216.

Stenus bernhaueri CAMERON, 1925, Treubia 6: 177.

Stenus bicolon javanicus, PUTHZ, 1981, Entomol. Blätter 76: 152.

Material: 5 ♂♂ & 3 ♀♀: BALI: data as for preceding species.

This taxon has already been recorded from both Java and Bali.

***Stenus (Parastenus) abdominalis unicus* BERNHAUER, 1915**

Stenus unicus BERNHAUER, 1915, Tijdschr. Ent. 58: 217.

Stenus abdominalis unicus, PUTHZ, 1970, Ent. Mon. Mag. 107: 17

Stenus abdominalis unicus, PUTHZ, 1981, Entomol. Blätter 76: 152.

Material: 2 ♂♂ & 3 ♀♀: BALI: data as for preceding two taxa; 7 ♂♂ & 5 ♀♀: C. JAVA: Mt. Merapi, S. slope, under dead leaves in dry stone bed of stream, 11. VII. 1982.

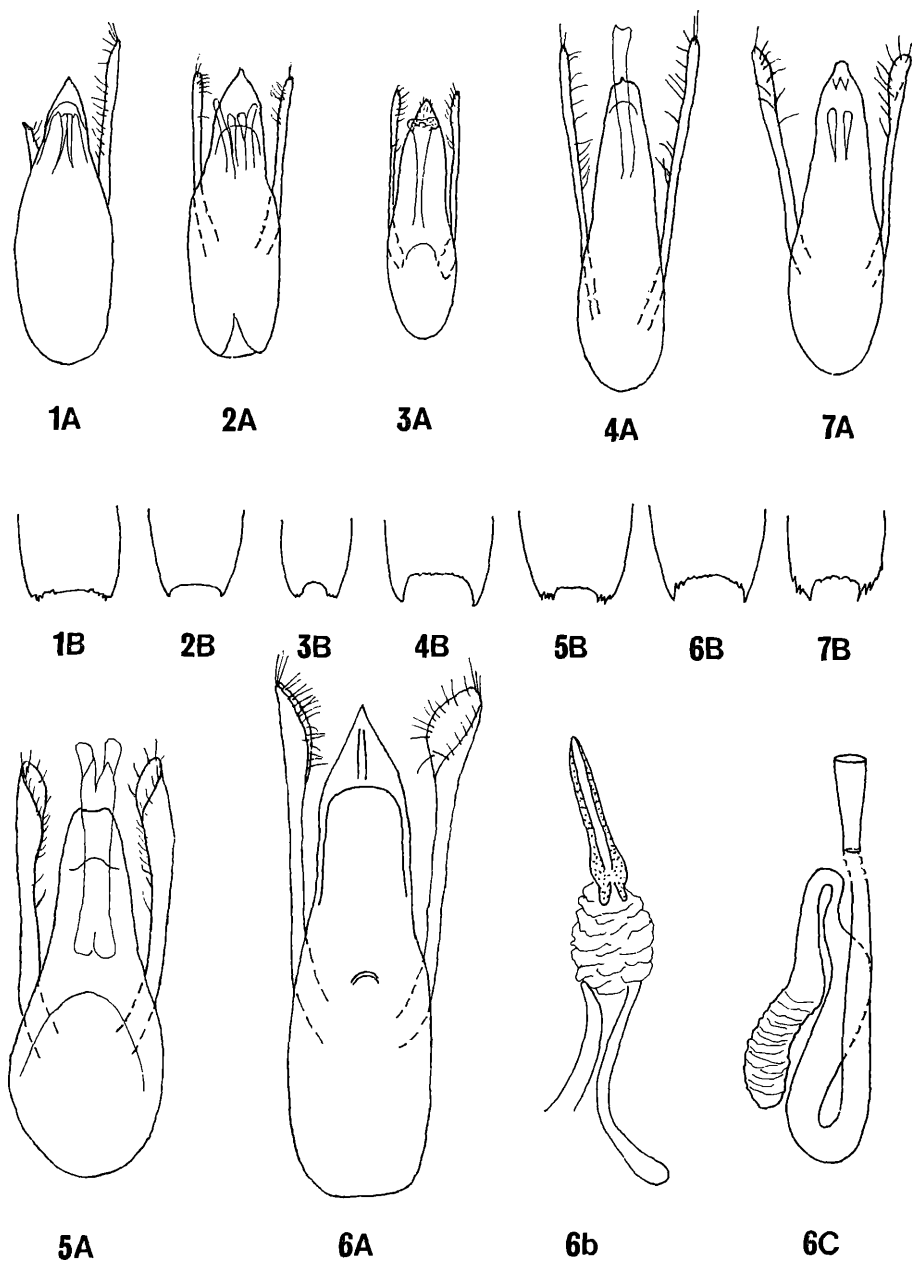
This taxon, one of two archipelagian vicariants of a complex otherwise represented in Thailand and Burma, is known from Sumatra, Java and Bali.

***Stenus (Parastenus) rafflesi* sp. n.**

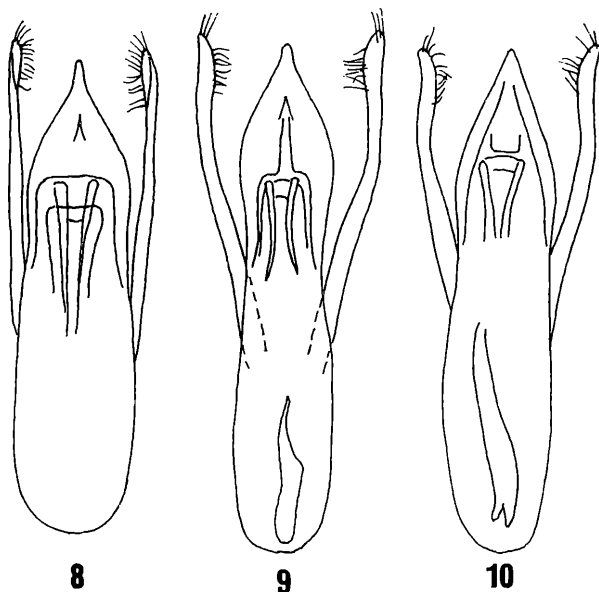
This new species is akin to members of the *abdominalis* group and to *S. leileri* PUTHZ; a detailed comparison with these taxa follows the description.

Length: 6–6.5 mm. Black with a brassy tinge; each elytron with a large (sometimes obscure) orange spot; all appendages testaceous, the knees and antennae brownish. The puncturation is rugose on fore-body, dense on abdomen, the whole surface covered by strong micro-reticulation, the short recumbant pubescence scarcely discernable on dorsal surfaces, except on apical tergites. The insect is micropterous, with reduced humeral angles.

♂ Holotype, 4 ♂♂ & 1 ♀ Paratypes C. JAVA, Mt. Merapi, S. slope, ca. 1500 m., under dead leaves on dry stone bed of stream, 11. VII. 1982. Holotype and 3 Paratypes in coll. Rougemont; one Paratype each in colls. PUTHZ and BMNH.



Figs. 1-7. A: Ventral view of aedeagus of: *Dianous baliensis* sp. n. (1); *Stenus puberulus insulindicus* subsp. n. (2); *S. baliensis* sp. n. (3); *S. toraja* sp. n. (4); *S. henrii* sp. n. (5); *S. rafflesi* sp. n. (6); *S. vulcanus* sp. n. (7). - B: Corresponding outlines of apices of male 9th sternites. - 6b: Everted inner sac of aedeagus of *S. rafflesi* sp. n. - 6c: Spermatheca of *S. rafflesi* sp. n.



Figs. 8-10. Ventral view of aedeagus of: *Stenus crinitus* L. BCK. from Tanah Toraja (8); *Stenus velocipes* FV. from Tanah Toraja (9); *Stenus corporaali* BNH. from Lombok (10).

Head broader than the elytra (89:85), the frons broad (53), bi-sulcate, the median portion prominent and broader than the spaces between furrows and eyes. The punctuation is moderate, the diameter of punctures about equal to the section of third antennal segment, the interstices much narrower, but scarcely rugose, the punctuation homogenous on the whole surface. The antennae are long and slender, overlapping the base of pronotum by half the penultimate segment, the last three segments forming a distinct club, the penultimate two elongate and pyriform.

Pronotum elongate (80:65), broadest at middle, the sides sinuate in posterior half, the surface slightly and assymetrically uneven, without trace of a median furrow; the punctuation is marginally finer than that of head, and rugose.

Elytra transverse (85:78), their greatest breadth $\frac{5}{8}$ ths from the base of suture, the humeral angles rounded and constricted (distance between angles 60), the suture short (55); the surface is a little irregular but the punctuation is homogenous, similar to that of pronotum, and not forming a vorticose pattern around the elytral spot. The short oval or round spot is large, covering most of the distal half of the disc of each elytron; in some exx. it is very clear to the naked eye, but in some it is heavily obscured, although not reduced in size, and always clearly visible in translucence.

The abdomen is moderately tapered, the tergites convex, and the abdominal borders fairly broad (average breadth of paratergite IV:5); the punctuation is coarse and very dense on both tergites and paratergites, comparable to that of *S. abdominalis* spp. Tergite IX is impunctate excepting a few apical punctures, its apical border shallowly emarginate; tergite X with a few large punctures, its apical border with a median declivity. The isodiametrical micro-reticulation is very strong on the whole abdomen, although shallower and with more transverse meshes on the ninth tergite; sternite IX (and valvifers) with a stout apico-lateral tooth, the apical border very finely denticulate.

Legs moderate, the metatarsi $\frac{2}{3}$ rds the length of tibia (95:65); tarsal segments: I:26; II:13; III:8; IV:10 (inclusive of lobes); V:15.

Male Meso- and metatibia with a small preapical spur. Abdominal sternites III–VI unaltered; sternite VII impressed on median axis between two slight longitudinal ridges in apical third, its apical margin very shallowly emarginate, and the puncturation and pubescence fine and dense in the impression; sternite VIII with a shallow arcuate apico+ median emargination. Aedeagus: fig. 6A

Female Spermatheca: fig. 6C.

Stenus rafflesi sp. n. should be inserted in PUTHZ' key to the spotted *Parastenus* of the Orient (1981) after *S. abdominalis maculosus* L. BCK. It differs from that insect, as also from *S. leileri* PUTHZ and the immaculate *S. fruhstorferi* L. BCK. by its matter appearance due to finer puncturation of the whole body, especially the pronotum and elytra, and the strong microsculpture of the fore-body, and by the much denser abdominal puncturation. The acute apex of the median lobe of the aedeagus, with straight sides, resembles that of *S. fruhstorferi*, but the apex is longer and narrower. In this respect it is also similar to *S. subthoracicus* PUTHZ. That insect is also more shiny, with much coarser puncturation and broader elytra with more prominent humeral angles, and proportionately much smaller aedeagus. The presence of spurs on the middle and hind tibia sets *S. rafflesi* sp. n. apart from all these species except *S. leileri* PUTHZ, but apart from the differences in puncturation already mentioned, that species has much broader elytra, and its aedeagus more closely resembles those of *S. abdominalis* spp.

***Stenus (Parastenus) pilicornis* FAUVEL, 1895**

Stenus pilicornis FAUVEL, 1895, Rev. d'Ent. 14: 208.

Stenus seriatipennis L. BENICK, 1929, Dtsch. ent. Z.: 96.

Stenus plumbellus L. BENICK, 1929, Dtsch. ent. Z.: 97

Stenus jacobsoni CAMERON, 1930, Tijdschr. Ent. 73: 329.

Stenus limbatus L. BENICK, 1938, Stett. Ent. Ztg. 99: 25.

Stenus meracus L. BENICK, 1942, Ark. Zool. 33A, 17: 32.

Stenus pilicornis, PUTHZ, 1983, Reichenbachia Mus. Tierk. Dresden 21: 11.

Material: 8 ♂♂ & 9 ♀♀: BALI: Candi Kuning, Lake Buayan & Lake Bratan, 14. IV. & 27. VII. 1981; 1 ♂: C. JAVA: Mt. Merapi, South slope, ca. 1500 m., 11. VII. 1982.

This widespread Oriental species is extremely variable, which accounts for its numerous synonyms. The most extreme form yet encountered is the example from Mt. Merapi, much smaller than typical ex., micropterous, with very reduced elytra, and looking like a quite different species. PUTHZ (1983) quotes a similar ex. from the Dieng Plateau, also in central Java: too little material is yet available to judge whether these montane micropterous individuals have a common phyletic origin or whether they have evolved independantly on separate highlands. In any case the form appears to be peculiar to Java, as ex. from higher elevations on the Asian mainland do not show such extreme modifications.

***Stenus (Parastenus) vulcanus* sp. n.**

This small montane *Parastenus* is of the size and build of the micropterous form of *S. pilicornis* cited above and of the two Bornean species *S. dajak* PUTHZ and *S. meyeri* L. BCK. It is phylogenetically very close to *S. dajak*.

Length: 4–4.6 mm. Black, the anterior edge of clypeus, palpi and legs testaceous, the latter scarcely darkened at knees; antennae brown, the first one to three segments pale. A micropterous insect, very coarsely punctate, without evident pubescence; microsculpture coarse and shallow, evident mainly on abdomen.

♂ **Holotype** & 4 ♀♀ **Paratypes** C. JAVA: Mt. Merapi, S. slope, ca. 1500 m., in dead leaves on stone bed of tarried river, 11. VII. 1982. Holotype and 2 Paratypes in coll. ROUGEMONT; other Paratypes in colls. PUTHZ and BMNH.

Head much broader than the clytra (77:66), with very large eyes; the broad (average distance between eyes: 38) frons is clearly bi-sulcate, the lateral portions explanate and sloping upwards from the furrows to the eyes, the median portion (breadth: 17) flattened, not raised even in posterior part; the whole surface is covered in large punctures, the average diameter of punctures greater than the section of third, but less than that of first or second antennal segments, these punctures slightly larger and tending to become elongate in the median portion, slightly closer and rounder in lateral portions. The antennae are fairly long, overlapping the base of pronotum by terminal segment; third segment 2.5 times as long as the second, the club pilose, the penultimate segments elongate, obconical, the last segment fusiform.

Pronotum no longer than its breadth (43), broadest just before the middle, sinuate in posterior half, the surface fairly even and homogeneously punctured; puncturation as coarse as that of head, but a little closer.

Elytra trapezoidal, narrower than head at their broadest point which is situated $\frac{1}{8}$ th from the postero-lateral angles, the sides almost straight from the humeral angles (distance between these: ca. 55) to the broadest point, and slightly constricted in posterior sixth; the suture is short (44), the posterior edge of elytra leaving a large part of the second abdominal sternite exposed; the surface of disc is depressed, slightly concave, leaving the suture sharply raised, in appearance like a twin keel, above the surface of disc; the surface is even, the puncturation similar to that of pronotum albeit slightly coarser.

The abdomen is not strongly tapered, with fine but distinct borders; paratergites are a little narrower than antennal segments IV to VII, and only the four first (corresponding to segments III–V) each bear from one to three small punctures; tergites are coarsely punctured, the punctures larger than eye-facets of segments II to V, thereafter becoming finer, the interstices about the same size as the diameter of punctures, except on sternites where the puncturation is a little finer and sparser; sternite IX and valvifers with three or four sharp inwardly curving teeth on apico-lateral angles, and a few minute denticles on the arcuate posterior margin.

Legs moderate, the metatarsi $\frac{5}{7}$ ths the length of tibia, the first tarsal segment as long as the following three together, including the lobes of fourth segment; all fourth tarsal segments broadly bi-lobed.

Male Abdominal sternites IV to VII with progressively larger flattened apico-median areas which are micropunctate and pubescent; sternite VIII with a triangular apical emargination a little more than one seventh the length of sternite; aedeagus: fig. 7A.

Stenus vulcanus sp. n. can at once be separated from *S. pilicornis* FV. and a number of other similar species by the conformation of the apico-lateral angles of the ninth sternite which bear several teeth instead of a single large tooth. It is very close to *S. dajak* PUTHZ and to *S. meyeri* L. BCK., both from Borneo, but differs by its smaller and differently shaped elytra (but this in itself cannot be relied on as a specific character: see above, the variability of *S. pilicornis* FV.), by the flat median part of frons, which is distinctly raised in other species, and by the ninth sternite: all three species have several teeth on the apicolateral angles²⁾, but the angles are more prominent and the teeth larger in the new species. The aedeagus is very similar to that of *S. dajak*; only the apex of the median lobe is slightly broader. This similarity of the aedeagus would point to *S. vulcanus* entering

²⁾ In this detail PUTHZ' key to the *Steninae* of Borneo (1973) is misleading: *S. meyeri* is not furnished with a single acute tooth; the right valvifer of the Holotype bears three blunt denticles, the left valvifer is damaged.

the range of variability of *S. dajak* PUTHZ, notwithstanding the shape of the head, were it not that these two montane insects were isolated geographically.

***Stenus (Hypostenus) cursorius* L. BENICK, 1921**

Stenus planifrons FAUVEL, 1889, Rev. d'Ent. 8: 253.

Stenus cursorius L. BENICK, 1921 (nom. nov.), Ent. Mitt. 10: 193.

Stenus cursorius, PUTHZ, 1969, Bull. Inst. r. Sci. nat. Belg. 45, 9: 26.

Stenus cursorius, ROUGEMONT, 1981, Ann. Mus. Civ. Stor. Nat. Genova 83: 338.

Material: 22 exx.: LOMBOK: 15 kms. N. of Mataram, gravel banks of stream, 21. VII. 1982.

This is one of the most widely distributed Oriental *Stenus* species, found from the Indian subcontinent to Australia and New Caledonia. It is new to Lombok, where another member of the group, *S. lombokensis* PUTHZ has been found.

***Stenus (Hypostenus) simulans* L. BENICK, 1929**

Stenus simulans L. BENICK, 1929, Dtsch. Ent. Z.: 270.

Material: 3 ♂♂ & 1 ♀: S. SULAWESI: Tanah Toraja, Makale, 18. VII. 1982.

Known from Sumatra and the Philippines; although not previously recorded from Celebes, the BMNH possess a male taken on the island by WALLACE.

***Stenus (Hypostenus) piliferus* MOTSCHULSKY, 1857**

Stenus piliferus MOTSCHULSKY, 1857, Bull. Soc. Imp. Nat. Mosc. 30: 514.

Material: 1 ♀: S. SULAWESI: Tanah Toraja, near Rante Pao, 17 I. 1978; 1 ♂ & 1 ♀: ibid., near Makale, 18. VII. 1982.

Stenus piliferus MOTSCH. is widely distributed in the Oriental region, with several subspecies described from the Philippines, Indonesia and Australia, while the variability of mainland forms has yet to be studied. These Celebesian examples are relatively large and sparsely punctured, and are not *S. piliferus sulawesicus* PUTHZ, described from Bantimurung, about 250 kms. to the South Tanah Toraja. They are without that taxons characteristic abdominal microsculpture, and the aedeagus is different, the parameres being as long as the median lobe. These two forms may be allopatric, highland and lowland races, or distinct species.

***Stenus (Hypostenus) pustulatus* BERNHAUER, 1914**

Stenus pustulatus BERNHAUER, 1914, W. Z. B. 64: 95.

Stenus pustulatus, ROUGEMONT, 1981, Ann. Mus. Civ. Stor. Nat. Genova 83: 333.

Stenus pustulatus, ROUGEMONT (in press), Nat. Hist. Bull. Siam Soc. 31:

Stenus adnexus L. BENICK, 1933, Wien. ent. Ztg. 50: 112.

Stenus pustulatus var. *adnexus*, HAMMOND & ROUGEMONT (in press), Sarawak Mus. J. 13. IV. 1980.

The synonymy of *S. adnexus* L. BCK. was established when males were discovered in Borneo, proving that this taxon is merely an immaculate archipelagian vicariant of a species which is very common in Burma and Thailand. The normal spotted form has been found as far South as Singapore: 1 ♂, Dr. BAUM, 1929, in Mus. Prague (personal communication from Dr. PUTHZ).

***Stenus (Hypostenus) sondaicus* BERNHAUER, 1911**

Stenus sondaicus BERNHAUER, 1911, Ent. Bl. 7: 5.

Stenus plicatus BERNHAUER, 1926, Ent. Mitt. 15: 127.

Stenus gibbifrons L. BENICK, 1928, Sarawak Mus. J. 3: 459.

Stenus prahocensis L. BENICK, 1938, Stett. Ent. Ztg. 99: 41.

Stenus sondaicus, PUTHZ, 1970, Mitt. Zool. Mus. Berlin 46, 2: 306.

Material: 4 ♂♂ & 5 ♀♀: BALI: Lake Bratan, 24. I. 1981 and Lake Buayan, 28. VII. 1981, by sweeping.

This species is known from the Greater Sunda Islands, Sumatra, Java and Borneo; it is new to Bali.

***Stenus (Hypostenus) malignus* L. BENICK, 1926**

Stenus malignus L. BENICK, 1926, Ent. Mitt. Berlin 15: 270.

Stenus malignus, PUTHZ, 1966, Mem. Estud. Mus. Zool. Univ. Coimbra 296: 10.

Stenus malignus, PUTHZ, 1969, Ent. Mon. Mag. 105: 68.

Material: 1 ♂: LOMBOK, Sesaut, by sweeping near river bank in forest, 12. IV. 1981.

This specimen agrees in every respect with *S. malignus* L. BCK. described from the neighbouring islands of Sumbawa, and not with *S. malignus vicarius* PUTHZ, 1969 from Lombok. The subspecies should probably therefore be erected to full specific status, unless it can be shown that it enters the range of variability of the nominate form. More material from the area should be examined before a stand be taken on the issue.

***Stenus (Hypostenus) arachnoides* BERNHAUER, 1915**

Stenus arachnoides BERNHAUER, 1915, Tijdschr. Ent. 63: 218.

Stenus arachnoides, L. BENICK, 1938, Stett. Ent. Z. 99: 41.

Material: 2 ♂♂ & 3 ♀♀: C. JAVA: Kaliurang, S. slope of Mt. Merapi, ca. 1000 m., by sweeping near stream, 11. VII. 1982.

This species, which is difficult to distinguish on external characters from many other Oriental *Hypostenus* species, is well defined by the aedeagus, figured by BENICK. It has not been found outside Java.

***Stenus (Hypostenus) crinitus* L. BENICK, 1926**

Stenus crinitus L. BENICK, 1926, Ent. Mitt. Berlin 15: 269.

Material: 1 ♂ & 1 ♀: S. SULAWESI: Tanah Toraja, near Makale, 15. VII. 1982.

S. crinitus was described from Java and is also known from Sumbawa and, more surprisingly, from New Guinea; it is new to Celebes.

***Stenus (Hypostenus) velocipes* FAUVEL, 1886**

Stenus velocipes FAUVEL, 1886, Rev. d'Ent. 5: 146.

Stenus velocipes, L. BENICK, 1929, Dtsch. ent. Z.: 225.

Stenus velocipes, PUTHZ, 1969, Bull. Inst. r. Sci. nat. Belg. 45, 9: 29.

Material: 9 ♂♂ & 14 ♀♀: S. SULAWESI: various localities in Tanah Toraja, VII. 1976, 17. XI. 1978 and 15–16. VII. 1982; 1 ♀: BALI: Lake Buayan, at roots of grasses by a boulder on lake shore, 27. VII. 1981.

The single female from Bali can only doubtfully be ascribed to this species, because although well characterised by the aedeagus, the species closely resembles many others in SE. Asia. It is new both to Celebes and to Bali. The aedeagus of an ex. from Celebes is figured: 9.

***Stenus (Hypostenus) corporaali* BERNHAUER, 1918**

Stenus corporaali BERNHAUER, 1918, Arch. Naturg. Abt. A 84: 178.

Stenus lautus L. BENICK, 1932, Arch. Hydrobiol. Suppl. 11: 395.

Stenus corporaali, PUTHZ, 1968, Ent. Bl. Biol. Syst. Käfer 64: 46.

Material: 6 ♂♂ & 8 ♀♀: LOMBOK: Sesaut, under vegetation on rock face of river bank, 12. IV. 1981; 3 ♂♂ & 4 ♀♀: LOMBOK: ca. 15 kms. N. of Mataram, riverside vegetation, 21. VII. 1982.

These exx. agree very well with the Type from Java, and would seem to confirm that the two forms from Borneo cited by HAMMOND & ROUGEMONT (in press) and the ex. collected by MJÖBERG cited in the same paper belong to different species. The aedeagus of one of the Lombok insects is figured: 10.

Additional observations

With one exception, *Stenus puberulus insulindicus* sp. n., the faunal composition of the collection studied in this paper offers no surprises: all the new taxa belong to groups which originated in or are well represented in the Malesian, Indochinese or Philippine subregions.

The study of this material in conjunction with recent work on Steninae from the Indochinese subregion (Thailand and Burma) has forced my attention on the fact that a very large proportion of species or species-groups which have spotted elytra in the Indochinese areas have reduced or obsolescent spots, or are totally immaculate, in the Indonesian archipelago. The following species mentioned in this paper may be cited as examples:

Indonesia	Mainland, or other islands
<i>S. pustulatus (adnexus)</i>	cf. <i>S. pustulatus</i>
<i>S. velocipes</i> group & <i>S. aneomus</i>	cf. <i>S. amoenus</i> group
<i>S. toraja</i>	cf. <i>S. nobilis</i>
<i>S. henrii</i>	cf. <i>S. arisanus</i>
<i>S. gestroi submaculatus</i>	cf. <i>S. gestroi</i> spp.
<i>S. abdominalis unicus</i>	cf. <i>S. abdominalis</i> s. str.
<i>S. abdominalis maculosus</i>	cf. <i>S. abdominalis</i> s. str.
<i>S. bicolon japonicus</i>	cf. <i>S. bicolon posticus</i>

This list could be considerably expanded, however it is beyond the scope of this taxonomic paper to analyse all available material.³⁾ Elytral spots are a common ornamentation not only in different phyletic groups of Steninae but also in other subfamilies of Staphylinidae; in the area under discussion I have observed the same preponderance of melanic or immaculate forms in the paederine genus *Stiliderus* MOTSCH.⁴⁾ in Indonesia. Since the centre of genesis of these phyletic groups is undoubtedly the Himalaya and the mountains of SE. Asia, it is clear that elytra spots were not evolved in response to local factors on the mainland from immaculate forms migrating from the archipelago, nor is it likely, considering the vast range of the continental forms, that elytral spots were evolved much later, after the present distributional pattern was established.

Clearly the preponderance of immaculate forms in Indonesia answers a positive local evolutionary trend. The obfuscation of the elytral spot without a reduction in its size in species such as *S. abdominalis maculosus* L. BCK. and *S. rafflesi* sp. n. supports the hypothesis of reversed evolutionary trend, while providing an instance of how an acquired character may be discarded by the operation of a different evolutionary process.

An analogous problem is presented by the metallic colour of *Dianous* spp. In the Himalayan foothills and Assam, where species are most numerous, green predominates, while in Thailand, Indochina, the Philippines and the Malesian subregion the overwhelming majority of species are blue. Some authors have attempted to explain the metallic colours of beetles, in particular of carabids, by the mineral composition of soils; this hypothesis, unconvincing in itself, must be rejected where *Dianous* are concerned, as the range of each colour group covers a vast area of diverse geological composition.

It is hard to attribute these cases other than to a complex phenomenon of mimicry between species living in large numbers in the same biotopes. A further example is provided by New Guinea and the Australasian region where Staphylinidae of many subfamilies including the different phyletic groups of *Stenus* have acquired a brilliant metallic body

³⁾ I have recorded (1981, Rev. Zool. afr. 95, pp. 77–79) a similar phenomenon in the highlands of Ethiopia, where highly pigmented forms predominate not only in the Genus *Stenus* but also in other classes of animals.

⁴⁾ At present under revision by the author.

colour, often accompanied by a reduction of puncturation which increases the effect of brilliance. Of course the hypothesis of mimicry cannot account for the origin of these trends, but does eliminate the supposition of a common environmental factor. I suggested in an earlier paper that the coarse rugose sculpture of *Dianous* species, combined with the brilliant surface, which can also be seen in *Stenus guynemeri* which lives in similar situations in Europe, helps to conceal the insect among the reflections from water droplets on moss and the wet surfaces on which it lives. This fairly obvious conclusion was supported by observations made in the field, but it is difficult to imagine a functional origin of elytral spots or of rutilant body surface.

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