NOTES ON SOME EIGHTEENTH CENTURY BEES OF THE GENUS THYREUS PANZER, WITH DESCRIPTION OF A NEW SPECIES (HYMENOPTERA, APOIDEA)

BY

M. A. LIEFTINCK

Rijksmuseum van Natuurlijke Historie, Leiden

In the present paper an attempt has been made to redefine three imperfectly known members of the genus *Thyreus* Panz. (*Crocisa* olim), described in the 18th century by C. DE GEER and J. C. FABRICIUS. The discovery of topotypical males of *Nomada scutellaris* F., the type of the genus, and the recognition of the type of *Nomada histrio* F., are the most interesting results obtained; males of both species were dissected so as to remove any doubt about their identity and to enable future workers to fix the relation to other species. The finer structures of the type of *Apis albo-maculata* De Geer could not be examined, but it is my hope that the description and illustrations may facilitate the recognition of that species. A fourth species already known for a long time, but misidentified and insufficiently characterized by previous authors, required a new name and is here described and figured for the first time.

A summary of the synonymy of the species involved is given at the end of this paper.

The following abbreviations are used in designating the disposition of the types and other specimens examined: BM — British Museum (Natural History), London; MCG — Museo Civico di Storia Naturale, Genova; ML — Rijksmuseum van Natuurlijke Historie, Leiden; MT — Istituto e Museo di Zoologia, Torino; NMB — Natuurhistorisches Museum, Basel; NMW — Naturhistorisches Museum, Wien; NRS — Naturhistoriska Riksmuseum, Stockholm; ZMC — Universitetets Zoologiske Museum, Copenhagen.

My sincere thanks are due to Messrs. RENÉ MALAISE (NRS), for the loan of DE GEER's type of *Apis albo-maculata,* and to S. L. TUXEN and BØRGE PETERSEN (ZMC) for their permission to continue my studies of FABRICIUS' types of bees. I am obliged also to the following entomologists for helpful information and the loan of specimens under their care: — D. BAKER (Ewell, Surrey), M. BEIER (NMW), H. BYTINSKI-SALZ (Tel Aviv), Signorina DELFA GUIGLIA (MCG), ED. HANDSCHIN and F. KEISER (NMB), L. PARDI (MT), J. VAN DER VECHT (ML), and I. H. H. YARROW (BM).

I am particularly grateful to F. KEISER, of the Basle Museum, for permitting me to study a very interesting collection of bees made by him in 1953 during a collecting expedition to Ceylon.

Apis albo-maculata De Geer 1778 (pl. 1 and figs. 1—2).

1778. DE GEER, Mém. hist. Insect. 7, p. 607—608, T. 45 figs. 5 & 6.
1912. SCHULZ, Berlin. Entom. Zeitschr., 57, p. 62 (*Crocisa albomaculata* (Geer)).
1921. MEYER, Archiv f. Naturgesch. 87A, p. 106, 128—129 (key and references; author's species probably different) (*Crocisa albomaculata* Deg.).

The description of this bee is found in DE GEER's work under the heading "Insectes du cap-de-bonne-esperance. Abeilles", and is one of six bees probably all collected by M. SPARRMAN in the Cape Province. (See note on p. 614 of the original).

From the excellent description and figures the insect can be fairly easily recognized as a *Thyreus* (*Crocisa* olim), except that the apical fringe of white hairs ornamenting the mesothoracic scutellum is rather crudely depicted in DE GEER's fig. 5, showing an exaggerated outline so as to simulate a tubercular outgrowth. The status of this insect, accordingly, has always remained obscure, which accounts for its having been either neglected or wrongly interpreted, even by the most prolific among later authors dealing with the African bee fauna.

The original description of *albo-maculata* is as follows:

5. ABEILLE noire, à taches blanches aux côtés du ventre, à jambes blanches, à ailes supérieures brunes & les inférieures vitrées.

Apis (*albo-maculata*) nigra, abdominis lateribus maculis tibiisque albis, alis superioribus fuscis, inferioribus hyalinis.

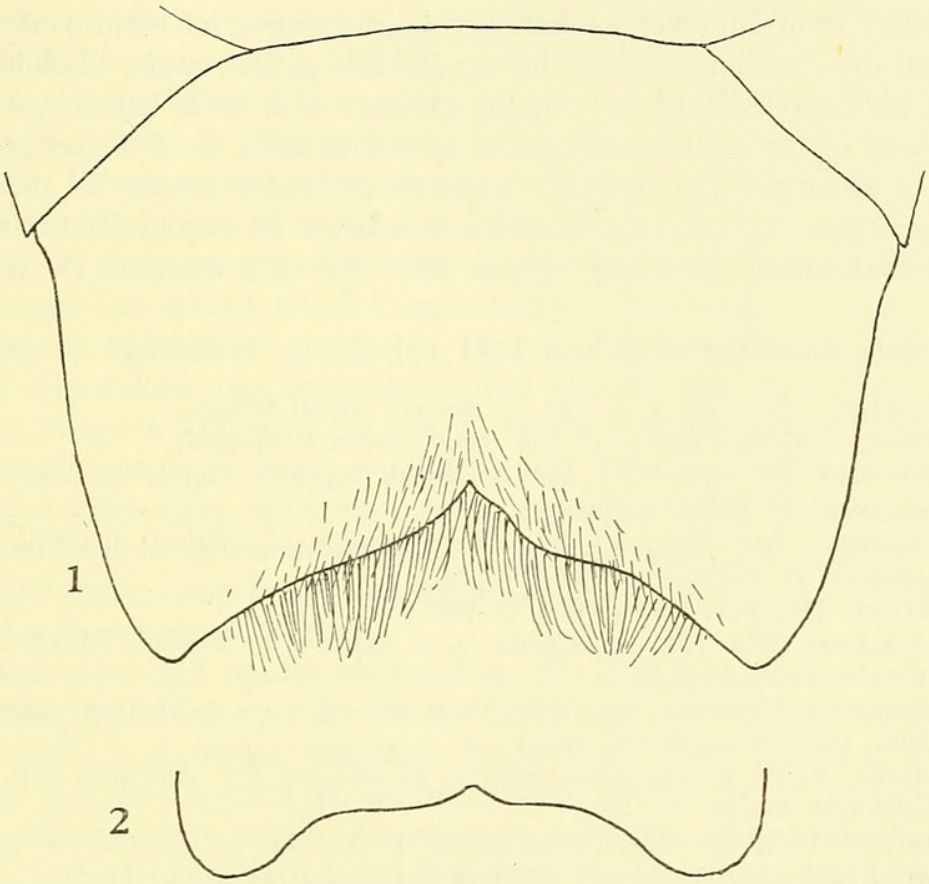
Cette petite jolie Abeille (Pl. 45. Fig. 5), qui n'est longue que de cinq & large de deux lignes, est très-bien distinguée de toutes les autres espèces connues; son ventre est conique au bout, & les antennes, qui sont noires, sont assez grosses, de la longueur de la tête & du corcelet pris ensemble. La couleur de tout le corps est noire, mais variée de plusieurs taches blanches, formées par des poils, qui servent d'un grand ornement à l'Insecte; il y en a dabord une touffe sur le devant de la tête & plusieurs assemblages de poils semblables sur le corcelet, qui y forment différentes taches; mais les deux côtés du ventre spécialement ornés chacun de six taches blanches (Fig. 6), dont une paire sur chaque anneau, formées de poils courts de cette couleur, qui sont couchés à plat sur la peau; enfin les jambes propres de toutes les pattes sont également blanches, ou couvertes en dessus de poils de cette même couleur. Le corcelet a cela de particulier, qu'il est terminé par une plaque écailleuse, refendue au bout & garnie de poils blancs. Les deux ailes supéreures sont d'un brun obscur, avec de petites taches transparentes à quelque distance de leur extrémité, mais les inférieures sont toutes transparentes & comme vitrées.

To the above description the following supplementary notes may prove of some utility.

Male (holotype), with two red labels: "Typus" and "No. 343/57", and "*Apis albomaculata* De Geer, Type", in Dr. R. MALAISE's handwriting (Mus. Stockholm).

Total length of body 10.5 mm approx., anterior wing 6.2 mm, gaster 6.8 mm approx. Antennae thick, 3rd segment about one-fourth longer than 4th and 5th, which are subequal in length to each other and to the succeeding segments.

Thoracic mesoscutellum shaped as in fig. 1[1]), its surface rather shiny, finely superficially punctured, the punctures (even laterally) smaller than the interspaces. Armature of posterior two pairs of legs difficult of inspection owing to their tight folding together under the body; femur III apparently not toothed interiorly. Seventh gastral tergite (fig. 2) coarsely and very densely punctured, the interspaces indistinct; basal portion of the preceding 6th tergite also densely punctured, but surface of its apical part smooth and shiny, microscopically reticulate. Membrane of anterior wing greyish black, lighter along costal vein and marked with distinct subhyaline spots distal to *2Rs* and underlying cell; area posterior to vein *1A* as well as an anterior stripe running along that vein, also subhyaline. Posterior wing subhyaline, except a short dark costal streak in the radial cell.



Figs. 1—2. *Thyreus albomaculatus* (De Geer), ♂ holotype from the Cape. 1, dorsal view of scutellum and 2, apex of 7th gastral tergite. Pubescence shown in fig. 1 consists of white feathery hairs; tomentum in fig. 2 omitted

Pubescence black, markings pure white. White-haired areas of mesoscutum partly rubbed off and not sharply delimited, but scatteredly present on the disc and all round the border. Scutellum covered with short black tomentum except along posterior border; dorsal surface of the emargination with fairly broad /\-shaped band of backwardly directed white hairs, this arched band widest medially and tapering away laterally so as not to cover the lateral angles; and a similar

[1]) As will be seen from the figure, the sides of the apical incision are somewhat asymmetrical in the type.

fringe of white feathery hairs, about twice as long as the dorsal hairs, arising from beneath posterior border (pl. 1 and fig. 1). Legs black; tibiae II and III densely clothed externally with short white tomentum from base almost as far as the apex; a white hair-streak also along full length of outer surface of basitarsi II and III. Black pubescence of gastral tergites short, but the white lateral patches consist of rather long feathery hairs, especially the latero-basal ones on the 1st, which are longer than the rest; white patches isolated and widely distant, there being no white mid-basal hairs under the excavation of the scutellum; transverse hair-bands covering 2—6 well defined. Gastral sternites black, lacking white hair-spots.

This species, one of the earliest described African members of the genus, superficially resembles *histrionicus* (Ill.), but the male of that species is easily distinguished from DE GEER's insect, (1) by the absence of white posterior hair fringes on the scutellum, (2) by having the 6th gastral tergite black-haired instead of white-spotted, and (3), by the presence of a white hair-fringe on each side in front of the posterior margin of gastral sternites 2—4. It has probably a number of synonyms, but since the nomenclature and taxonomy of the African *Thyreus* are in a state of complete chaos, it will not be easy to foretell which of the numerous named forms corresponds with *Apis albo-maculata* De Geer.

Nomada scutellaris Fabricius 1781 (pl. 2, fig. 1 and figs. 3—8)

1781. FABRICIUS, Spec. Ins. 1, p. 487. — Sex not stated; Sibiria.
1787. FABRICIUS, Mant. Ins. 1, p. 306. (First sentence repeated).
1793. FABRICIUS, Ent. Syst. 2, p. 346. (Original diagnosis, slightly modified, repeated; indication "*D. Pallas*" omitted).
1804. FABRICIUS, Syst. Piez., p. 387. (First sentence of original diagnosis repeated; indication *D. Pallas* omitted) (*Melecta*).
1806. ILLIGER, Magaz. f. Insektenk. 5, p. 100 (*Melecta*).
?1841. LEPELETIER, Hist. Nat. Ins. Hymén. 2, p. 453. — ♀ "Bagdad, Turquie orientale" (*Crocisa scutellaris* F.).
?1890. MORAWITZ, Horae Soc. Ent. Ross. 24, p. 369—371. — ♂ Mongolia mer.: Schuan-Dshin (*Crocisa crassicornis* sp.n.).
?1921. MEYER, Archiv f. Naturgesch. 87A, p. 81—82. — ♂ ♀ Alexander Mts. (*Crocisa crassicornis* Mor.).
?1934. ALFKEN, Bull. Soc. Roy. Ent. d'Egypte, 18 (1—2), p. 166 (key ♀ *crassicornis* Mor.), 167 (key ♂, *idem*), 173 (note) (*Crocisa crassicornis* Mor.).
1939. DE BEAUMONT, Ann. Soc. ent. France, 108, p. 169 footnote (*Crocisa*).
1940. ALFKEN, Veröffentl. Deutsch. Kol.- u. Uebersee-Mus. Bremen, 3, p. 33—36 (*Crocisa*).
1958. LIEFTINCK, Nova Guinea, new ser., 9, p. 21—22 footnote (*Thyreus*).

Original description. — "N. nigra cinereo villosa, abdomine atro, utrinque albo punctato, scutello porrecto bidentato.

Habitat in Sibiria. *D. Pallas. Mus. Dom. Banks.*

Praecedente [*histrio*] minor. Caput nigrum fronte albo pubescente. Thorax niger antice cinereo pubescens. Scutellum postice productum emarginato bidentatum. Abdomen totum glabrum, atrum, segmento 1. punctis utrinque duobus, reliquis utrinque unico albis. Pedes nigri tibiis macula magna alba. Alae anticae fuscae litura marginali alba."

Material. — There is only one fragmentary specimen over this name in the Kiel collection. It bears an old label "*scutellata*" in FABRICIUS' own handwriting and consists merely of the anterior portion of the thoracic segments, including the wings and trochanters of the posterior pair of legs, the rest missing. These body parts are clearly of a male and agree in every detail with those of examples of that sex in the Leiden Museum, two of which are from West Siberia and are described below. No females are yet available for study.

In a paper entitled "Versuch, die *Crocisa* (*Nomada*) *scutellaris* F. zu deuten", ALFKEN (1940, l.c. supra) has made it perfectly clear that FABRICIUS' insect is not the same species as *scutellaris* auct. Both ALFKEN and DE BEAUMONT (1939, l.c. supra) have pointed out that the latter is identical with *Crocisa orbata* Lep., i.e., the most widely distributed species among its European congeners, which should now bear the name *Thyreus orbatus* (Lep.). ALFKEN was the first to examine the remains of FABRICIUS' type and stressed the point that the original locality "Sibiria" was in all probability correct, FABRICIUS' bee originating from P. S. PALLAS' collection of Siberian insects which also contained a second specimen described by ILLIGER in 1806 under the same name. According to ALFKEN, the only species known to him which exactly resembled *scutellaris*, was *crassicornis* F. Mor., described from Mongolia, and although the type of that species could not actually be compared with FABRICIUS' insect, ALFKEN pronounced both species to be the same, an opinion which I am unable to share because our specimens do not entirely fit MORAWITZ' description. However, ALFKEN was probably right in referring to *scutellaris* the specimens he had himself seen from Egypt and the Alexander Range in Turkestan (ex coll. R. MEYER). In this connexion it must be noted that the species is easily confounded with other Mediterranean and West Asiatic species belonging to the same group and extreme care is necessary to keep them apart. In any case, the availability of two near topotypical *scutellaris* enables me to characterize anew FABRICIUS' species and to point out the differences as compared with *crassicornis* F. Mor.

The description and figures are based on the following specimens: — 2 ♂, one of these plesiotype by present designation, Siberia occ., Altai, STAUDINGER vend.; 1 ♂, Persia, Schahkah, STAUDINGER vend. (ML); 1 ♂, Israël, Jerusalem, June 1—15, 1939, H. BYTINSKI-SALZ, in coll. Dr. H. BYTINSKI-SALZ.

♂. — Measurements: length of anterior wing 7.8 mm (FABRICIUS's fragment); length of body (approx.) 10.8, anterior wing 8.0 mm (plesiotype); 9.5—11.4 and 7.8—8.9 mm, respectively (3 remaining males).

Integument black; mandibles apically and tarsal claws reddish; sternal plates of gastral segments, inner surface of femora and tibiae, and apical tarsal segments partially, brownish black. Maxillary palpi absent (rudimentary). Labrum subcordate, slightly concave, its surface uneven and swollen on either side of a shallow median longitudinal depression, the elevated parts most conspicuous at base, surface laterally rugose, striato-punctate, in the middle smooth and shiny. Anterior and dorsal surface of head closely punctured, the triangular naked anterior area of clypeus more finely so, free margin of the latter narrowly impunctate and glossy. Supraclypeal keel with keeled frontal line strongly developed, extending upwards towards median ocellus about half-way the distance. Antennae thick, segm. 5—13 distinctly keeled anteriorly; scape markedly curved; segm. 3

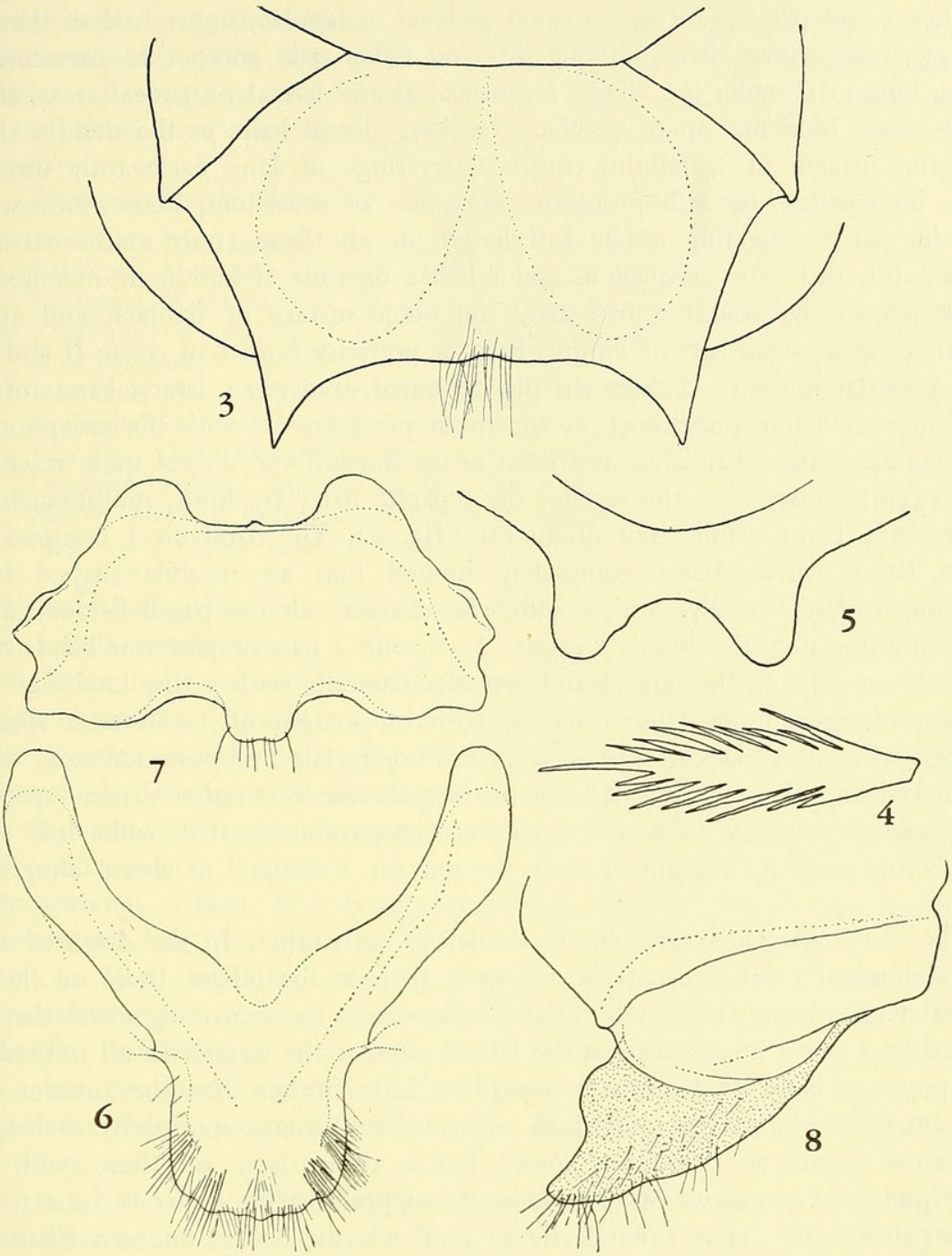
a little less than twice longer than broad and more than 1.5 times the length of succeeding segments; 4—9 subequal in length to one another and from 1.5—1.7 times broader than long, the remaining segments relatively a little longer, though likewise broader than long, except the apical segment which is bluntly rounded and about as long as it is broad; rhinaria very conspicuous, present on 3—13, the one on 3 pit-like, the remainder transverse. Mesoscutum and scutellum densely and rather coarsely punctured, the punctures equal to or somewhat larger than the interspaces. Scutellum and parascutellar lobes shaped as in fig. 3; sulcus between mesoscutum and scutellum well developed; parascutellar lobes acute-angulate posteriorly; dorsal surface of scutellum exhibiting a pair of low convexities on each side of a shallow median sulcus which deepens considerably beyond half-way its length so as to pull down the middle portion of the posterior border; apical lobes flat, triangular, acutely pointed, their margin impunctate and shiny. Mesepisternum coarsely rugoso-punctate, the punctures large, irregular and confluent; anterior (longitudinal) half of mesocoxa smooth and impunctate, its posterior half deeply and densely punctured, as is also the hypoepimeral area; metapleuron and propodeum coarsely punctured; tegula finely and superficially punctured, its outer margin impunctate, dull. Surface of metasternum and coxae III covered with large punctures, remaining coxae as well as the trochanters dull, superficially and finely punctured.

Legs normal, femora rather slender, their inner surface smooth and shiny in distal portion. Tibiae II and III distinctly expanded and somewhat swollen towards apex, surface rugosely punctured but not conspicuously spinulose. Basitarsi II and III shorter than tibia.

Wings subhyaline, apical portion of anterior pair strongly enfumed brown (see pl. 2 fig. 1). First submarginal cell distinctly longer than both the 2nd and 3rd, but shorter than 2 and 3 taken together; *2rm* strongly convex but widely distant costad from 1st abscissa *Rs*, meeting *Rs* slightly in advance of the middle of the marginal cell.

Gastral tergites evenly and finely, but not very densely punctured, the posterior margins of tergites 1—6 impunctate, shiny and hairless; 7th gastral tergite densely punctured, deeply excised, the apical tubercles prominent (fig. 5). Basal portions of sternal plates densely punctured, the punctures becoming larger and more widely spaced posteriorly, a low triangular zone along posterior margin of 1—5 remaining smooth and shiny; 6th sternite densely punctured, slightly tuberculate posteriorly on either side of the middle. Sternal plates 7 and 8 shaped as in figs. 6—7; terminal lobe of 7th sternite provided with a lateral group of numerous irregular-placed marginal bristles, the median ones fringing the apical margin much shorter and thinner; 8th plate trilobate, with apodemes prominent and rounded, the median terminal lobe carrying 6—8 bristle-like setae. Genitalia with the apical portion of the parameres (gonostyli) of simple structure and small size, curved, broad at base, gradually tapered, its outer border sparsely clothed with short setae (fig. 8).

Pubescence of body black and pure white. Black hairs on labrum, vertex and almost all ventral parts of head and thorax, including most of the coxae and femora, short, sub-erect and scanty, on middle portion of mesoscutum and scutellum rather longer. Short appressed black pubescence on abdominal tergites dense,



Figs. 3—8. *Thyreus scutellaris* (F.), ♂ plesiotype from W. Siberia. 3, dorsal view of scutellum, long fringe of white feathery hairs projecting from underneath apical border omitted; median tuft shown consists of white hairs; 4, white hair-scale from spot on 2nd gastral tergite; 5, apex of 7th gastral tergite, ventral view, hair omitted; 6, seventh, and 7, eighth gastral sternites, ventral view; 8, apex of right paramere, lateral view

but not entirely concealing the surface. Inner sides of basitarsi II and III densely clothed with brush-like black hairs most conspicuous and longest on basal one-third of basitarsus III. The following parts are clothed with pure white pubescence, without admixture of black: long, dense and decumbent hairs on anterior surface of head, progressively longer and more erect upwards posterior to level of antennae; a partial thin and decumbent coating of antennal scape; long

erect hairs on posterior portion of vertex, occipital crest, upper part of temples, prothorax, anterior $^2/_5$ of mesoscutum to level of tegulae, upper half of thoracic pleurae, conspicuous dense oblique tufts on either side anterior to parascutellar lobes, long tufts under the wings, on metanotal and lateral propodeal areas, small patch along hind margin of tegulae, few long dorsal hairs in the middle along posterior margin of scutellum; conspicuous fringe of long backwardly directed hairs immediately beneath posterior excavation of scutellum; dense snow-white exterior patch extending nearly full length of all tibiae (only apices narrowly black), this pad very conspicuous and felt-like on tibia II but finely indented by black posteriorly; scattered hair-streak on outer surface of basitarsi and apical tarsal segment; small tuft of longish hairs at posterior border of coxae II and III. The gastral tergites 1—5 carry sharply delimited, transverse, lateral bands of appressed snow-white pubescence as shown in pl. 2 fig. 1; with the exception of the one on 2, these bands are restricted to the dorsum and do not quite reach the latero-ventral margin of the tergite; the separate hairs are thick, multibranchiate, their shape being reminiscent of an ear (fig. 4). The band on 1 occupies the entire lateral surface but is completely divided into an irregular-shaped basal portion, widest laterally, and a somewhat longer, almost parallel-sided, distal portion along posterior border; tergites 2—5 with a pair of posterior bands only, the one on 2 being the largest and provided laterally with a tiny knob-like forward prolongation not quite reaching posterior margin of 1. Sternites sparsely clothed with short blackish hairs, except the impunctate mid-posterior areas which are naked and also on the sides, where the pubescence is rather dense, especially on 5 and 6; sternites 2—4 with a pair of conspicuous squarish white hair spots just before posterior margin of each, the one on 4 vestigial or absent altogether.

The above specimens are closely similar to each other. In the dissected male the abdominal bands are a trifle narrower than in the others, those on the 1st gastral tergite being completely isolated, whereas in the remaining males they are united by a linear anastomosis at the lateral edge of the tergite. In all individuals the posterior band of 1 projects inwards a little further than the anterior one.

I am satisfied that the individuals of *scutellaris*, enumerated above, belong to the same species as FABRICIUS' insect, but a comparison of these with the description of *crassicornis* Mor. leads me to suppose that the latter is distinct. The discrepancies are: "erste Cubitalzelle so groß wie die beiden anderen zusammen genommen" (*scut.*: distinctly shorter); "Bauch schwarz behaart, die fünfte Platte mitten am Endrande mit einer dreieckigen glatten und glänzenden Fläche, welche von kurzen schwarzen Haaren eingefaßt wird, versehen" (*scut.*: gastral sternites 2—4 with white pubescent spots, texture of the 5th normal, not as described).

LEPELETIER's description of the female of *scutellaris*, as far as it goes, applies fairly closely to our insect, but I have not seen the author's specimen. The *scutellaris* of RADOSZKOWSKY 1893, has correctly been referred to *T. orbatus* (Lep.) by DE BEAUMONT (1939).

In a previous paper (loc. cit., 1958), I have already called attention to the fact that FABRICIUS' specimen figuring under the name *Nomada scutellaris* in the BANKS collection (British Museum, Nat. Hist.), is an Australian species with blue pubescent body markings. I have recently examined this individual which

proved to be a female of *Thyreus caeruleopunctatus* (Blanchard 1840), a fairly common insect in north and east Australia and conspecific with *Crocisa australensis* Radoszkowsky 1893. This is also identical with the species generally known as *Crocisa lamprosoma* (nec Boisduval 1835). The synonymy of these species will be further dealt with in the forthcoming parts of my revision.

Nomada histrio Fabricius 1775 (pl. 2, fig. 2 and figs. 9—14)

1775. FABRICIUS, Syst. Ent., p. 388—389. — Sex not stated; Ind. or.
1781. FABRICIUS, Spec. Ins. 1, p. 487 (First two captions quoted).
1787. FABRICIUS, Mant. Ins. 1, p. 306 (First sentence quoted, *variis* replaced by *variegatis*).
1793. FABRICIUS, Ent. Syst. 2, p. 345—346 (Original description repeated; indication "In nova Hollandia" omitted).
1804. FABRICIUS, Syst. Piez., p. 385—386 (First two captions quoted; indication "In nova Hollandia" omitted; description of head structures) (*Melecta*).
1897. BINGHAM, Fauna Brit. India, Hym. 1, p. 517 (key), 518—519 (partim ?). — ♀ ♂ "Kumaon; Bombay; Madras; Ceylon; Burma" (*Crocisa ramosa* Lep.).
1921. MEYER, Archiv f. Naturgesch. 87A, p. 139 (key ♀), 142 (key ♂), 146—147 (with fig.). — ♀ Ceylon (*Crocisa rectangula* sp. n.).

Original description. — "N. thorace, abdomine pedibusque albo nigroque variis, scutello emarginato.

Habitat in India orientali. *Koenig.* In nova Hollandia. *Mus. Bankianum.*

Statura sequentis [*Epeolus variegatus* (L.)], at paulo major. Antennae nigrae. Caput nigrum, fronte villosa, alba. Thorax gibbus, ater, dorso punctis undecim albis et duobus utrinque sub alis. Scutellum magnum, apice emarginatum, puncto albo. Abdomen atrum, singulo segmento utrinque puncto magno albo. Pedes atri, maculis albis."

The material at Kiel, as it is arranged today, consists of the following seven specimens standing over the name *Crocisa histrio* F.:

(1) ♀. Head including antennae partly eaten away by pests and terminal abdominal segments missing, otherwise in good condition. Label: *histrio*, in FABRICIUS' handwriting. Lectotype by present selection;

(2) ♀. In good condition. Label: *punctata*, in FABRICIUS' handwriting. Possibly the *Centris punctata* F. 1804 (Syst. Piez., p. 360) ? This is *Thyreus orbatus* (Lep.);

(3) Sex ? Headless and lacking its legs and most of the gaster. No label. This also is *Thyreus orbatus* (Lep.);

(4—7) Four specimens belonging to four different species, one ♂, two ♀ and one badly damaged, all unidentifiable. No labels.

Of these seven individuals, only the first agrees with the original diagnosis, this example moreover bearing a pin-label with the correct name in the author's own handwriting; hence there can be no doubt that this is the specimen FABRICIUS had before him in 1775. The shape of the patch of white tomentum on the intermediate tibia proves it to be a female; it agrees in every detail with the other individuals of that sex, enumerated above.

Thyreus histrio (F.) is evidently the same species as the one treated by BINGHAM as *ramosa* Lep.; but it is obvious also that BINGHAM had more than one species before him when dealing with the latter.

In his 1921 paper, MEYER also lumped together a number of white-spotted

species, uniting them indiscriminately under *histrio*; but, more important than that, he interchanged two different species, as is evident from the characters and measurements he gave for *histrio* in the keys, which clearly refer to the larger *surniculus*. The confusion resulted in the genuine *histrio* being considered a new species, which he called *rectangula* — an appropriate though quite superfluous name. MEYER's type is a female from Ceylon, still in the Berlin Museum.

A possible near ally of *histrio* is the imperfectly described and figured *massuri* Radoszkowsky 1893 (type from Massuri, Himalayas, probably lost). This is stated to have an "Abdomen à reflet violacé très prononcé", and may or may not be a distinct species. Finally, our species is clearly not the *histrio* Radoszkowsky (also from Massuri); judging from the poor figures, it differs in the shape of the scutellum, the genital organs of the two being also dissimilar.

The relatively large size of *histrio*, the perfectly rectangular L-spot at the side of the 1st gastral tergite, and the palest bluish-white tint of the pubescent pattern of the abdomen (fading to pure white in old individuals), are the most characteristic features of this very distinct species.

Further material. — India: 1 ♀, N. India, Bengalia, Mus. DREWSEN (MC); 1 ♂, 1 ♀, Deesa, X.1898 and XII.1899, coll. C. G. NURSE (BM); 1 ♂, U.P., Kumaon, VIII.1889, Miss A. BROOK, coll. C. T. BINGHAM (BM); 1 ♂, 1 ♀, U.P., Dehra Dun, XI.1907, Col. F. W. THOMSON (BM); 2 ♀, over silver-grey drawer label "Ind.or./*Crocisa nitidula* Latr.", M. SPINOLA coll. (MT); 1 ♀, S. India, Coimbatore, 12.X.1933, P. S. NATHAN (BM); 1 ♂, 2 ♀, S. India, Malabar, D. CHAMPS, 1891, coll. P. MAGRETTI (MCG). Ceylon: 4 ♀, Ceylon, C.P., Kandy and Peradeniya, *C. histrio* F., det. C. DOVER 1924 (NMW & ML); small series ♂ ♀, Ceylon, C.P., environs of Kandy, near Deiyannewela, Roseneath, Haragama, Tambuttegama and Balakuduwa, 12.VII.1953—18.I.1954, F. KEISER (NMB & ML). Andaman Is.: 2 ♀, Andaman Is., Post II, 1878, leg. PLASON (NMW & ML). Plesiallotype: ♂, Ceylon, C. P., Kandy, Roseneath, 12.VII. 1953, F. KEISER (ML).

Measurements: length of anterior wing 8.7 mm (lectotype ♀); length of body (approx.) 13.0, anterior wing 10.0 mm (plesiallotype ♂, Ceylon); ♂ and ♀, length of body 11.0—13.0, anterior wing 8.5—10.0 mm (remaining specimens). One ♀ from the Andaman Is. is exceptionally small: body 9.8 mm, anterior wing 7.8 mm.

♂ ♀. — Integument black, dark reddish to purplish black in immature specimens; abdomen without metallic lustre. Labrum subquadrate but widest basally, strongly arched, lateral and distal margins gently rounded, its surface uneven, convex, shallowly longitudinally sulcate, rather densely and deeply punctured, except low baso-lateral tubercles and weakly pronounced ridges on either side of the median impression, where the punctures are few in number. Mandibles finely longitudinally striate in basal half, smooth and shiny distad. Anterior and dorsal surface of head densely finely punctured, the entire surface of clypeus most closely so, free margin of the latter very narrowly impunctate. Supraclypeal keel with keeled frontal line strongly pronounced but low and only slightly convex in profile view, extending upwards towards median ocellus about half-way the distance. Antennae normal, segments not keeled; scape distinctly curved; segm. 3 about 1.5 times longer than broad and 1.2—1.4 times the length

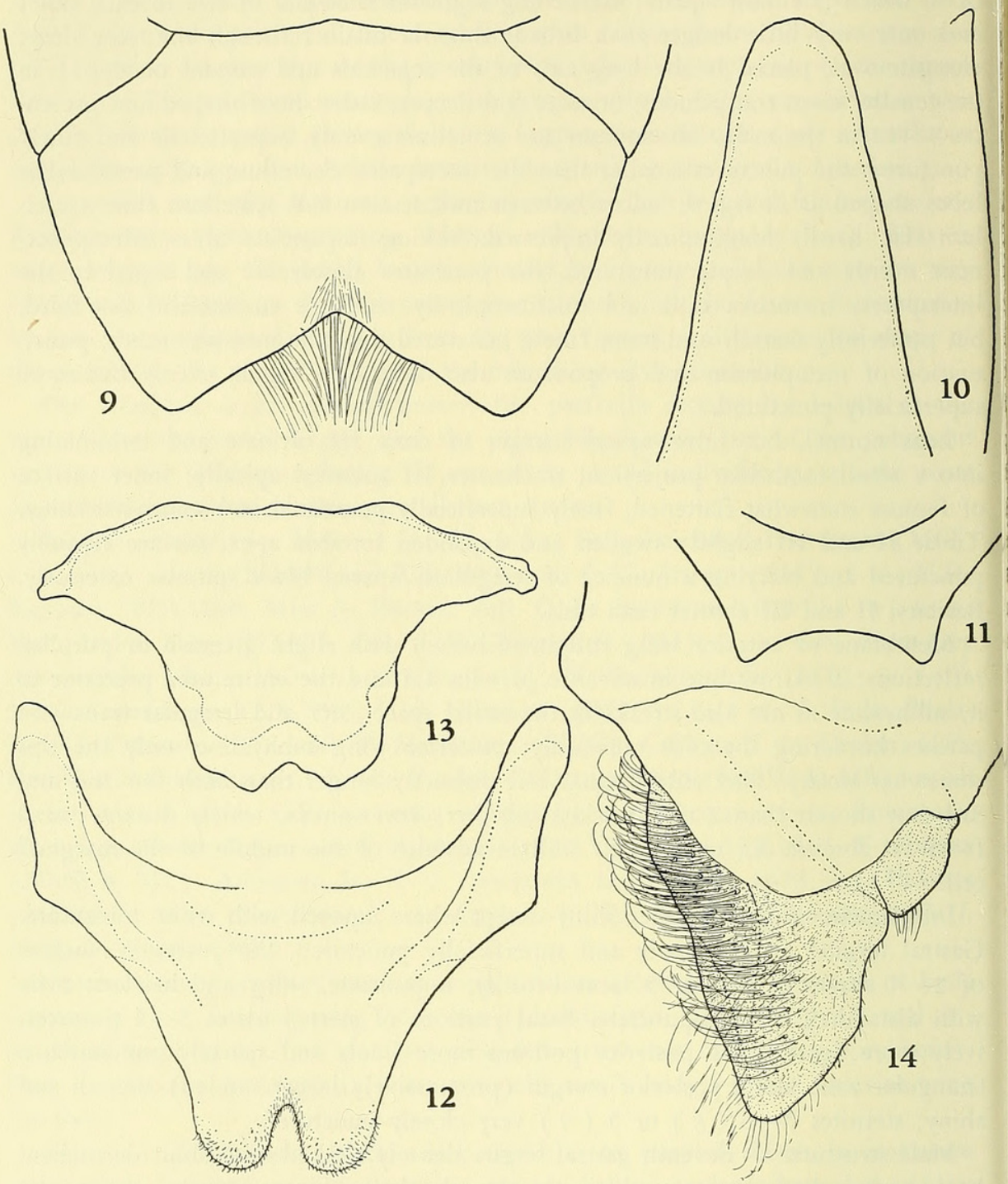
of 4, which is almost square; succeeding segments subequal in size to each other and only very little longer than broad; rhinaria distinct though not very deep, elongate-oval, placed in the long axis of the segments and present on 4—11 in the female, more conspicuous, broader and deeper, rather hoof-shaped and present on 3—12 in the male. Mesonotum and scutellum evenly, superficially and finely punctured, the punctures smaller than the interspaces. Scutellum and parascutellar lobes shaped as in fig. 9; sulcus between mesoscutum and scutellum fine; scutellum flat, hardly longitudinally impressed, lacking impunctate areas. Mesepisternum evenly and deeply punctured, the punctures closely set and equal to the interspaces; mesocoxa dull and microscopically tessellate in anterior one-third, but posteriorly densely and more finely punctured than the mesepisternum; puncturation of metapleuron and propodeum also dense, the tegula evenly but more superficially punctured.

Legs normal, but intero-apical margin of coxa III carinate and terminating into a small tooth-like projection; trochanter III rounded apically; inner surface of femora somewhat flattened, finely superficially punctured and somewhat shiny. Tibiae II and III slightly swollen and expanded towards apex, surface rugosely punctured and carrying a number of irregularly spaced black spinules exteriorly. Basitarsi II and III shorter than tibia.

Membrane of anterior wing fuliginous-brown with slight greenish or purplish reflections; a narrow line in advance of vein *1A* and the entire area posterior to it, subhyaline as are also streaks in the radial space, *3R1* and irregular transverse patches bordering the cells outwardly; posterior wing subhyaline, only the tips somewhat smoky. First submarginal cell distinctly longer than both the 2nd and 3rd, but shorter than 2 and 3 taken together; *2rm* convex, widely distant costad from 1st abscissa *Rs*, meeting *Rs* well in advance of the middle of the marginal cell.

Integument of gaster rather shiny except where covered with white tomentum. Gastral tergites evenly finely and superficially punctured, the posterior margins of 1—4 narrowly, that of 5 more broadly, impunctate, shiny and hairless; male with distal half of 6 impunctate. Basal portions of sternal plates 1—4 progressively more densely, the posterior portions more finely and sparsely punctured, a triangular zone along posterior margin (progressively larger caudad) smooth and shiny; sternites 5—6 (♂) or 5 (♀) very closely punctured.

Male structure. — Seventh gastral tergite densely clothed with short decumbent hair, apex naked, truncate, distinctly though shallowly emarginate, the angles moderately prominent and bluntly rounded (fig. 11). Sternal plates 7 and 8 shaped as in figs. 12—13; 7th sternite distinctly bilobate and most deeply pigmented on the main body on either side of the median line before and on the central part of the apical lobes and at extreme base of apodemes, the end lobes themselves very thin and transparent at the periphery, covered with numerous very short microscopical setae all along margin (fig. 12); 8th plate with its apodemal portions wing-like, main body subrectangular, somewhat pinched medially, irregularly excised, its free margin smooth, deeply pigmented and usually hairless. Genitalia with the apical portion of the parameres (gonostyli) not definitely set off from the main body, widest basally, densely clothed interiorly with long curved setae arising from both outer and inner surface (fig. 14).



Figs. 9—10. *Thyreus histrio* (F.), ♀ lectotype "Ind. or." 9, dorsal view of scutellum, showing white hairs and 10, outline of pygidial plate, dorsal view and right side. Figs. 11—14. *T. histrio* (F.), ♂ plesiallotype from Ceylon. 11, apex of 7th gastral tergite, ventral view, hair omitted; 12, ventral view of seventh and 13, eighth gastral sternites; 14, apex of right paramere, lateral view

Female structure. — Fifth gastral sternite tapered and slightly pinched at the apex which is obtuse-angulate and provided with a short, not very sharp, median longitudinal keel. Pygidial plate flat, its side-margins slightly upturned, surface microscopically reticulate, basal half with few scattered punctures, distal portion carrying a low blunt median ridge (fig. 10).

Pubescence of body black and palest bluish white ("rein weiss, mit einem Schein von blau", MEYER, *loc.cit.*), sometimes definitely light blue; the light colour marks consist of short, sharply delimited, dense appressed tomentum, the pattern being exactly similar in the two sexes. Black hairs on disk of labrum, antennae, vertex and almost all ventral parts of the body short, sub-erect, but rather longer and concealing most of the surface on mesoscutum, parascutellar lobes and upper portion of thoracic pleurae; hairs covering scutellum and abdomen short and scanty, except on terminal abdominal segments. The following parts are clothed with white, or blue-white pubescence without admixture of black: short dense and decumbent on clypeus, progressively longer and more erect upwards, especially behind antennal bases and on occipital crest; long and decumbent on temples; eleven spots on pro- and mesonotum, including small spot filling out posterior angle of tegula and large, transverse, coalescent twin-spot on pronotum and antero-lateral part of mesoscutum; small transverse tuft beneath tegula and anterior wing, narrowly separated from, or almost confluent with, a similar (though much larger) subrectangular patch covering upper half of mesepisternum; irregular streak along latero-ventral border of mesepisternum, and small tufts in front of coxae; conspicuous long tufts on either side on metanotal and propodeal areas; small medial triangular patch immediately above emargination at apex of scutellum; conspicuous medial fringe of long backwardly directed hairs immediately beneath posterior excavation of scutellum (this row continued laterally and replaced by black hairs gradually decreasing in length, the latter not shown in fig. 9); fringe of loose hairs posteriorly near apex of femora II and/or III, and dense patch of decumbent tomentum extending posteriorly along full length of tibia I. The shape and extent of the bluish white patches of decumbent tomentum covering the outer face of the posterior two pairs of tibiae, are dissimilar in the two sexes; on tibia II this spot in the male is deeply indented by brownish black apically (pl. 2 fig. 2), whereas in the female the spot is not indented and longer, extending from ¾ to almost the full length of tibia; on tibia III the spot in the female is squarely cut off just before or at the middle of its length, whereas in the male it extends further out, terminating abruptly under an oblique angle (pl. 2 fig. 2). Both sexes have the outer faces of all basitarsi also light-haired. Colour-pattern of abdomen sharply defined, the lateral marks on 1st gastral tergite perfectly rectangulate, L-shaped, the limbs subequal in length but the transverse branch usually slightly thicker than the longitudinal one. Both sexes, moreover, with lateral transverse bands along posterior margin of 2—5; the band on 2 largest, somewhat hollowed out anteriorly, provided laterally with a short, gradually tapered forward prolongation not reaching posterior border of 1, but, like the mark on 1, extending to lateral margin of tergite; bands on 3—5 smaller, subrectangular, abbreviated laterally and restricted to the dorsum so as to remain well distant from the lateral margins; succeeding segments unmarked. Both sexes, in addition, with a pair of bluish white lateral spots placed near posterior margin of gastral sternites 2—4, the spot on 2 being the largest.

Thyreus surniculus spec. nov. (pl. 2, fig. 3 and figs. 15—20)

1897. BINGHAM, Fauna Brit. India, Hym. 1, p. 517 (key), 518 (composite description), fig. 174 (♀ insect). — ♀ ♂ "N.W. Provinces; Bengal; Southern India." (*Crocisa histrio* F.).

1921. MEYER, Archiv f. Naturgesch. 87A, p. 139 (key ♀), 142 (key ♂), 143—145 (excl. syn., Ceylon only). — "Java, Ceylon, Celebes, China". (*Crocisa histrio* F.).

Material. — 1 ♂, no pin-label, with drawer-label "*N. Histrio* Fabr. Sp. Ins. no. 1", in BANKS' coll. (BM). S.E. Peninsular India: 1 ♂, Madras Pres., Tranquebar, DOHRN (ML); 1 ♀, id., Pondichéry, MONCHICOURT (ML); 4 ♂, 2 ♀, Tranquebaria, Mus. DREWSEN, 2 ♂ with recent label "*scutella* Fabr." (MC); 2 ♂, "Bengal, May 1810, Mus. Westerm.", and "Java, Aug. 1814", sub *M. histrio* Fab. (MC); 2 ♂, 2 ♀, India ? labelled "Fichtl", *Crocisa histrio* F., det. C. DOVER (NMW). Ceylon : 1 ♂, 1 ♀, Ceylon, N.P., Mannar, 31.I.1954, and Kuchchaveli, 1.VII.1953; 1 ♀, C.P., Tambuttegama, 6.XII.1953; 1 ♀, Uva P., Inginiyagala, 1.IX.1953; 1 ♀, S.P., Tissamaharama, 20.X.1953, all F. KEISER (NMB & ML); 1 ♀, Ceylon, Uva P., Passara, 1200 m, 19.IX.1938, M. A. LIEFTINCK (ML). Further specimens of both sexes which I have examined in the general collection of the British Museum (Nat. Hist.), are from the following localities: Bangalore, N. Bengal, Bengal, S. India, Coimbatore, and Ceylon. Holotype ♂, S.E. India, Madras pres., Tranquebar, DOHRN; allotype ♀, id., Pondichéry, MONCHICOURT (both ML).

Very similar in general appearance to *histrio* (F.), but larger in size and slightly more robustly built. Differs chiefly as follows: light-coloured pubescence snow-white, without admixture of blue; scutellum deeply triangularly excised apically, its dorsal surface entirely black-haired; white pubescent mark on either side of 1st gastral tergite placed in the long axis of the body, shaped more or less like an inverted comma.

Measurements: length of body (approx.) 15.8, anterior wing 12.4 mm (holotype ♂); 15.2, 12.0 mm (allotype ♀); ♂ and ♀, length of body 13.0—16.0, anterior wing 10.5—12.5 mm (remaining specimens).

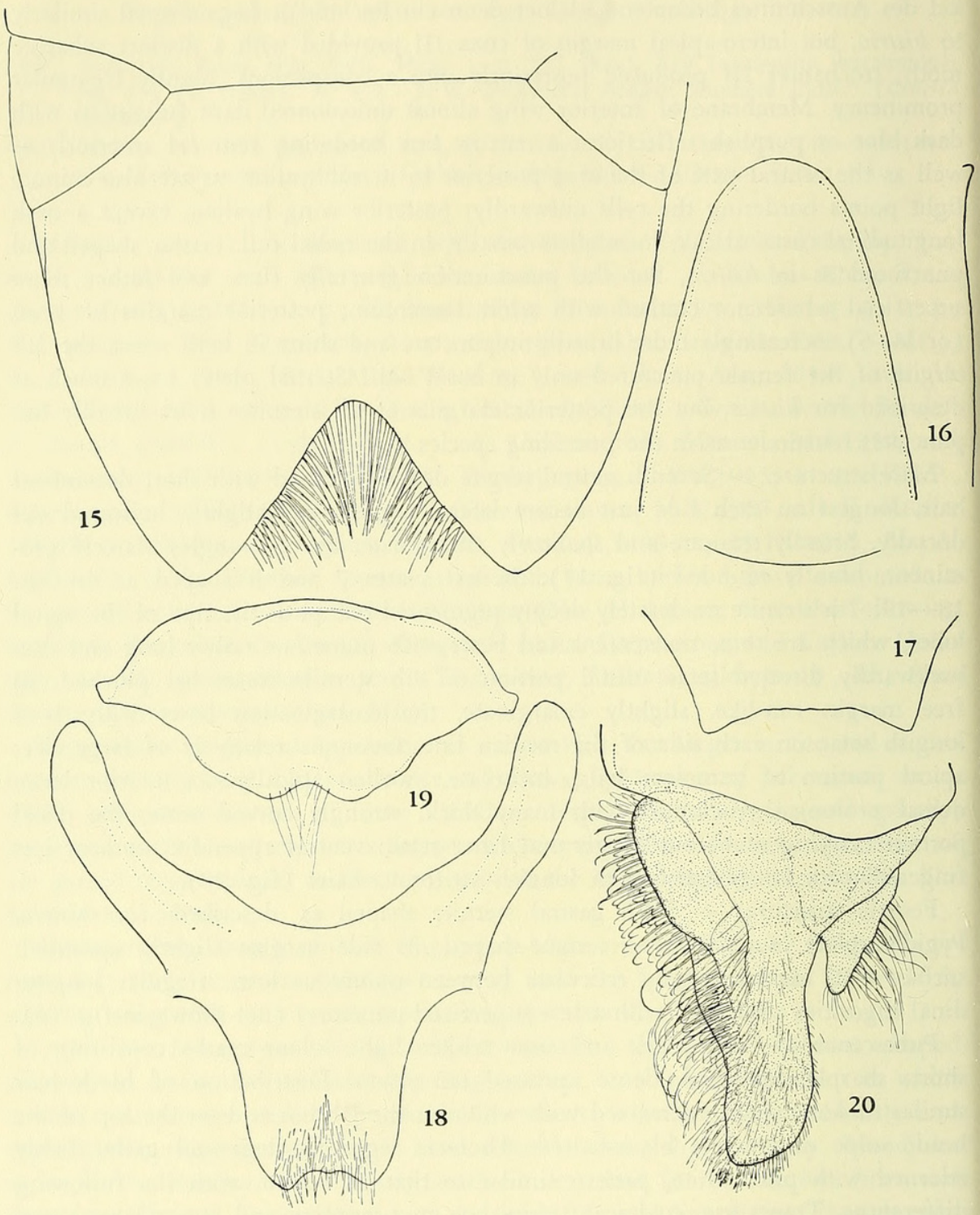
♂ ♀. — Integument black, without metallic reflections. Labrum shaped similarly to *histrio*, but considerably longer, about 1.5 times longer than its width at base; surface indistinctly longitudinally sulcate, microscopically reticulate and superficially, rugosely punctured; basal tubercles low, slightly shiny. Mandibles as in *histrio*. Puncturation of body much as described for *histrio*, but finer and denser on all parts. Supraclypeal keel and keeled frontal line distinct though even blunter and a little shorter than in *histrio*, almost straight in profile view. Antennae normal, segments not keeled, shaped much as in *histrio*; segm. 3 about 1.5 times longer than broad and 1.25—1.35 times the length of 4, 4—12 only a trifle longer than broad, almost diamond-shaped; rhinaria distinct, shaped similarly to *histrio* in both sexes, those of the female still more linear and less deep than in that species. Puncturation of thoracic segments as described for *histrio*, but finer and denser on all parts except on mesepisternum, which is more closely and strongly punctured. Scutellum and parascutellar lobes shaped as in fig 15; scutellum flat, occasionally very faintly longitudinally sulcate towards apex, the emargination acute-angulate (75°—80° approx.; MEYER, loc.cit.: "Win-

kel des Ausschnittes bedeutend kleiner denn ein Rechter"). Legs shaped similarly to *histrio*, but intero-apical margin of coxa III provided with a distinct subacute tooth; trochanter III produced posteriorly into a conspicuous, bluntly triangular prominency. Membrane of anterior wing almost unicoloured dark fuliginous with dark blue or purplish reflections; a narrow line bordering vein *1A* anteriorly as well as the central part of the area posterior to it, subhyaline, as are also minute light points bordering the cells outwardly; posterior wing hyaline, except a dark longitudinal costal streak, incomplete basally, in the radial cell. Gaster shaped and punctured as in *histrio*, but the puncturation generally finer and rather more superficial where not clothed with white tomentum; posterior margins of 1—5 (or 1—6) increasingly more broadly impunctate and shiny in both sexes, the 5th tergite of the female punctured only in basal half. Sternal plates 1—4 much as described for *histrio*, but the posterior margins of all sternites more broadly impunctate; remainder as in the preceding species.

Male structure. — Seventh gastral tergite densely clothed with short decumbent hair, longest on each side just before lateral angle; apex slightly hollowed out dorsally, broadly truncate and shallowly emarginate, the side-angles scarcely prominent, bluntly rounded (fig. 17). Sternal plates 7 and 8 shaped as in figs. 18—19; 7th sternite moderately deeply pigmented except at the tips of the apical lobes, which are thin, transparent and beset with numerous rather long and thin backwardly directed setae; distal portion of 8th sternite somewhat pinched, its free margin rim-like, slightly emarginate, the emargination beset with 4—5 longish setae on each side of the median line. Genitalia relatively of large size; apical portion of paramere long, incurvate, swollen apically, its interior basodorsal prolongation clothed with many thick, strongly curved setae, the distal portion carrying numerous longer and finer setae; ventral appendix more or less finger-shaped, fringed also with longish setiferous hairs (fig. 20).

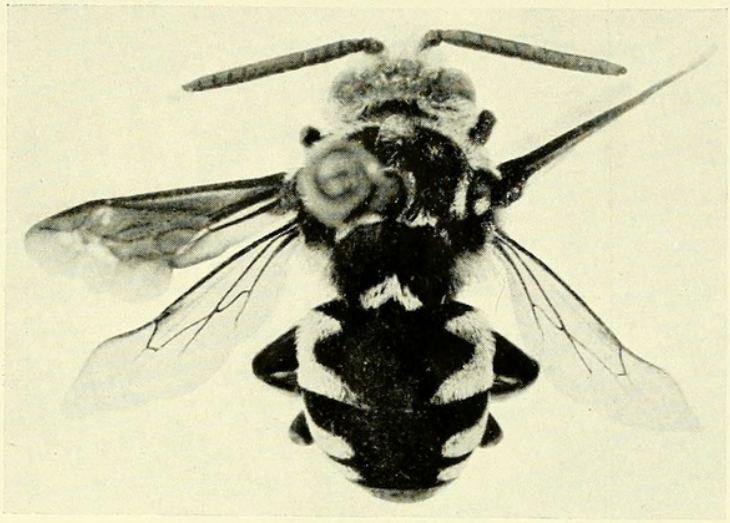
Female structure. — Fifth gastral sternite shaped as described for *histrio*. Pygidial plate much broader, tongue-shaped, its side-margins slightly upturned; surface flat, microscopically reticulate between numerous low, irregular longitudinal rugosities alternated with a few superficial punctures (not shown in fig. 16).

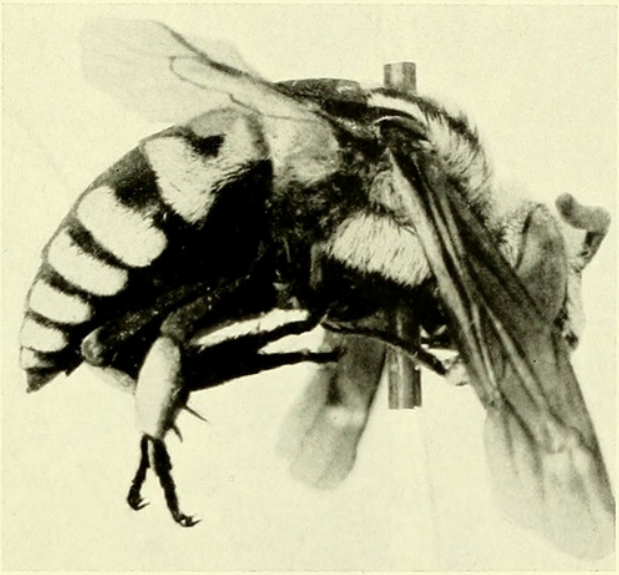
Pubescence of body black and snow-white; light colour marks consisting of short, sharply delimited, dense apressed tomentum. Distribution of black hair similar to *histrio*, but intermixed with white on the labrum and on the top of the head; scape of antenna black-haired. Thoracic segments, legs and gaster richly adorned with pure white, pattern similar to that of *histrio*, with the following differences. Transverse, coalescent twin-spot on pronotum and antero-lateral part of mesoscutum more elongate and a little more oblique; longitudinal anterior streak shorter; four discal spots unequal in size, the anterior pair relatively smaller; streak bordering tegula inwardly longer; spot filling out posterior angle of tegula vestigial; patches on thoracic pleurae and propodeum similar to those of *histrio*; no white hairs above emargination of scutellum; conspicuous medial fringe of long backwardly directed hairs immediately beneath posterior excavation of scutellum thick and ,\-shaped, this row continued laterally and replaced for a short distance by black hair on each side. Dense patch of decumbent tomentum extending posteriorly along full length of tibia I, but occupying basal $^3/_4$ to $^4/_5$ and terminating obliquely on tibia II, basal half or a little less and squarely cut



Figs. 15—16. *Thyreus surniculus* sp.n., ♀ parallotype from Pondichéry. 15, dorsal view of scutellum showing white hair-fringe and 16, outline of pygidial plate, dorsal view and right side. — Figs. 17—20. *T. surniculus*, ♂ holotype from Tranquebar. 17, apex of 7th gastral tergite, ventral view, hair omitted; 18, ventral view of seventh and 19, of eighth gastral sternites; 20, apex of right paramere, lateral view

off on tibia III, these markings similar in both sexes. In well-preserved examples of either sex the outer faces of all basitarsi carry a white hair-streak. Colour-pattern of abdomen very characteristic, as shown in pl. 2 fig. 3; lateral marks on 1st gastral tergite reaching latero-ventral border and basal edge of segment;

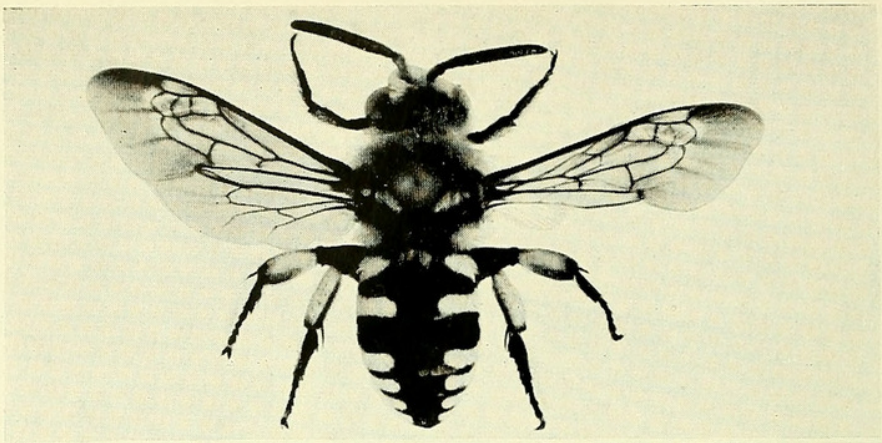




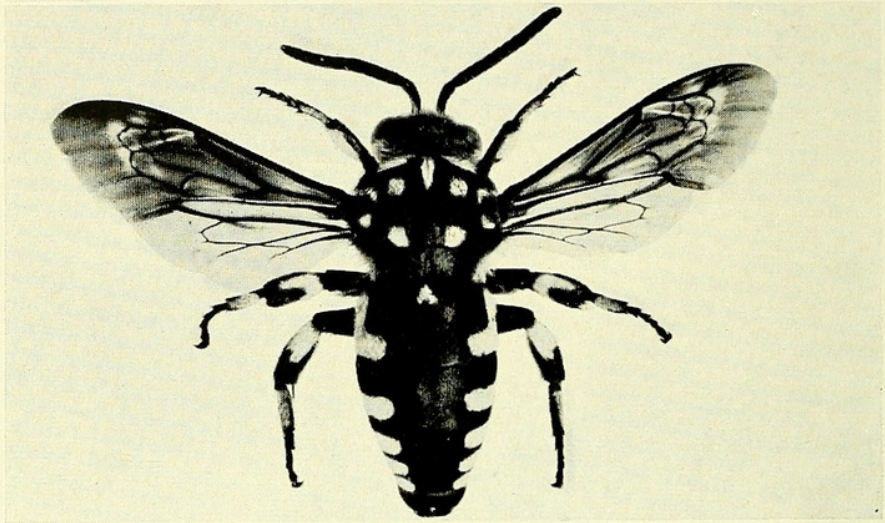
Thyreus albomaculatus (De Geer), ♂ holotype from the Cape (Mus. Stockholm).
Phot. Mus. Leiden

M. A. LIEFTINCK : *Notes on bees of the genus Thyreus*

1



2



3

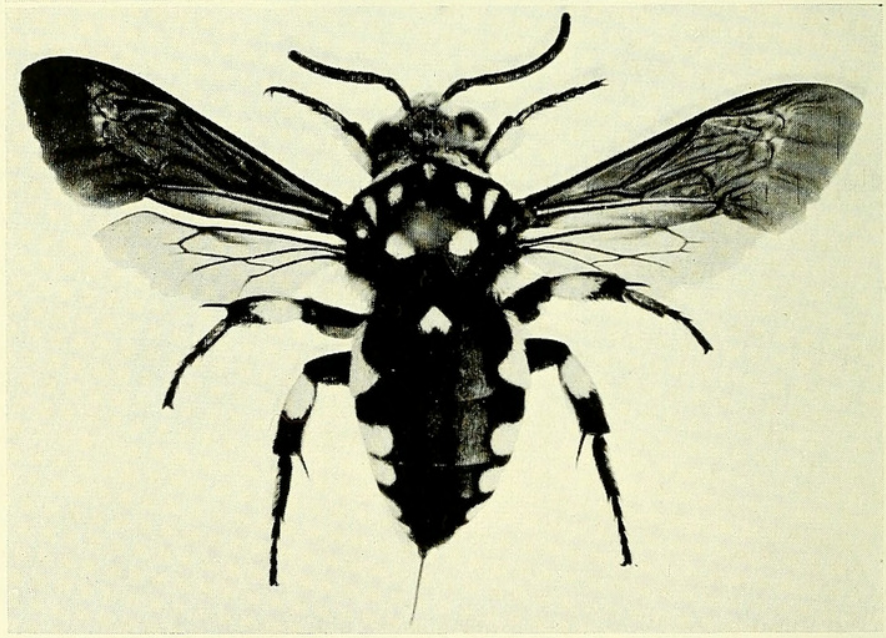


Fig. 1. *Thyreus scutellaris* (F.), ♂ from W. Siberia. — Fig. 2. *T. histrio* (F.), ♂ from Ceylon, Roseneath near Kandy, 12.VII.1953, F. KEISER. — Fig. 3. *T. surniculus* sp.n., ♀ paratype from S. Ceylon, Passara, 1200 m, 20.IX.1938, M. A. LIEFTINCK. Phot. Mus. Leiden, all on the same scale

M. A. LIEFTINCK : *Notes on bees of the genus Thyreus*