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A NEW SUBFAMILY OF BEETLES PARASITIC ON MAMMALS

Staphylinidae, Amblyopininae

BY

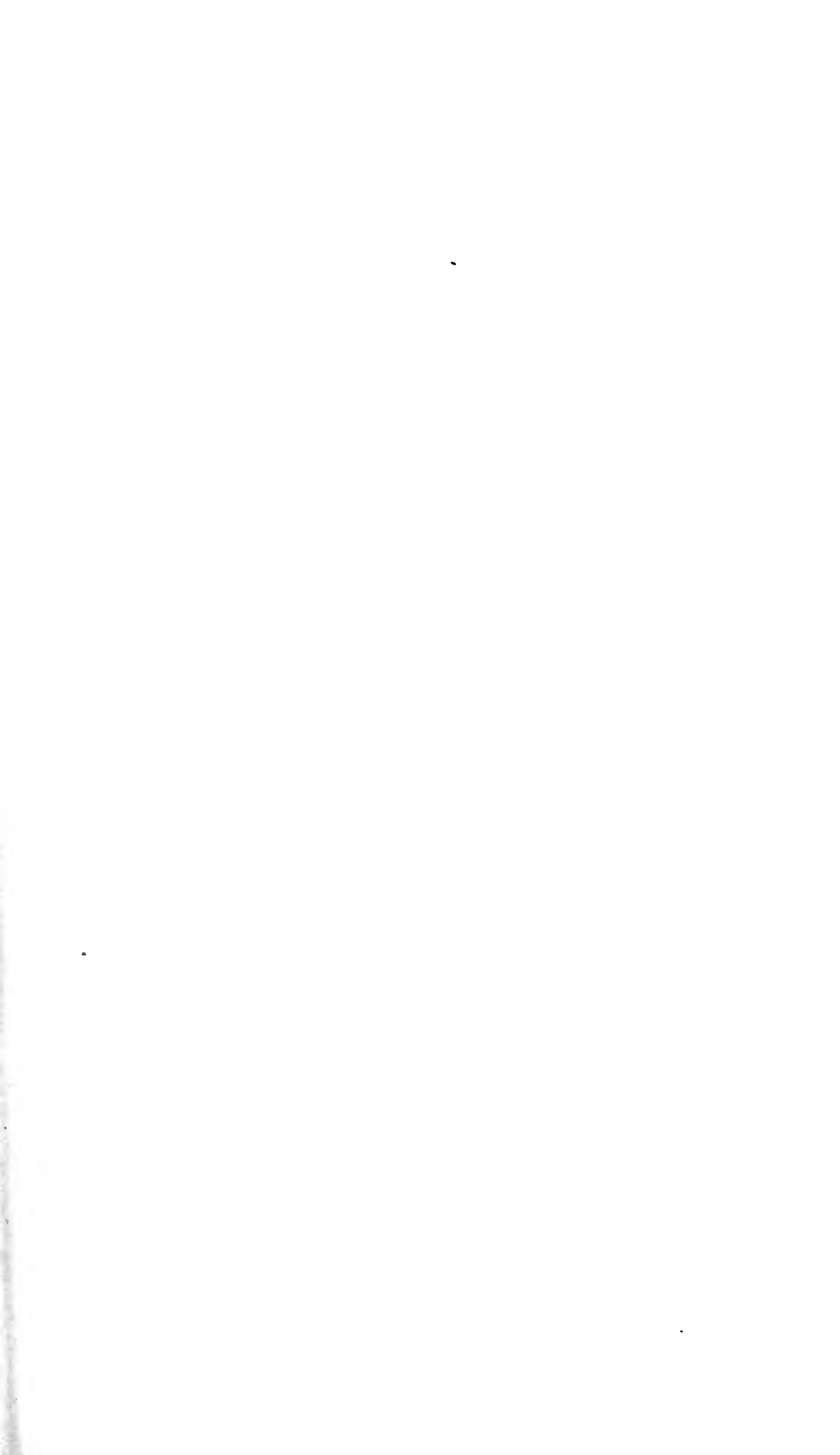
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AMERICAN ENTOMOLOGICAL SOCIETY

A NEW SUBFAMILY OF BEETLES PARASITIC ON MAMMALS

BY CHARLES H. SEEVERS

It has been known for more than seventy years that certain South American rodents and marsupials harbor curious, ectoparasitic staphylinid beetles. More than a dozen species of *Amblyopinus* Solsky and *Edrabius* Fauvel have been recorded, yet surprisingly little is known about them, although ectoparasitism is an unusual mode of life among beetles.

The rarity of notes on the biology of these beetles is perhaps due to a misconception entertained by those in a position to make observations—the assumption that they are not truly parasitic. Undoubtedly many collectors have discarded specimens of *Amblyopinus* or have failed to make significant observations because they have had the impression that these staphylinids were merely attracted to trapped mammals.

Jelski, who first discovered *Amblyopinus* in Peru, noted (Solsky, 1875) that the beetles were frequently attached very firmly to the living mice—almost as tenaciously as ticks and lice. He observed that the hair was eroded from the backs of the mice and that the skin was tumefied and exuded a serous secretion. This early observation strongly indicated that *Amblyopinus* was not present on the mammals merely in the role of a scavenger or as a predator on other parasites. More recently, Zikán (1939) corroborated the observation that *Amblyopinus* may be firmly attached to the host, and concludes that these staphylinids are blood-sucking parasites. Although he gives no direct evidence to substantiate this viewpoint, the fact that the beetles imbed their mandibles so deeply within the skin that they are difficult to remove, suggests that they may feed upon body fluids. Zikán contends that the mouth parts are specialized for sucking blood, and maintains that they differ appreciably from those of other Staphylinidae. It is not evident to me in what respects they are distinctive, since many staphylinid beetles, especially of the subfamily Staphylininae, possess mouth parts similar in general structure. It is true that the mandibles are large and admirably suited for piercing (although not more so than those of many other

staphylinids) but the maxillae and labium do not exhibit any obvious specializations. The fact that their mouth parts may not be greatly different from other Staphylinidae does not, however, reflect adversely on the concept of *Amblyopinus* as a true blood-sucking parasite. The nature of the relationship of *Amblyopinus* to the mammals with which they live is a problem worthy of careful consideration.

One of the purposes of the present paper is to suggest a change in the systematic position of *Amblyopinus* and *Edrabius* within the Staphylinidae. Attempts to classify these genera have not been numerous and their history may be briefly outlined. Solsky (1875) assigned *Amblyopinus* to the Tachyporides with some hesitancy. Fauvel (1883) believed that the genus should be allied to *Habrocerus* Erichson, then grouped with the tachyporines. Matthews (1878) placed *Amblyopinus* in the Staphylini Genuini but withdrew this opinion (1884) in favor of the Tachyporine relationship. Fauvel's association of *Amblyopinus* and *Habrocerus* has been generally accepted, and after the subfamily Habrocerinae had been proposed by Ganglbauer (1895), *Amblyopinus* was tacitly included. Eichelbaum's (1909) catalogue of the staphylinid genera and subsequent catalogues have adopted this classification. The only dissenting opinion has been that of Notman (1923), who placed this group in the Trichophyinae.

It is my belief that *Amblyopinus* and *Edrabius* are not properly united with the Habrocerinae; they seem to occupy an isolated position in the Staphylinidae and probably merit subfamily status. The advanced degree to which these species are adapted to parasitism clearly suggests a rather extended period of ecological isolation. This appears to be reflected in morphological changes of subfamily significance.

The present paper also includes descriptions of new species of *Amblyopinus*, redescriptions of some of the less well-known species, a revised key, and new host records. The most recent review of *Amblyopinus* and *Edrabius* is that of Costa Lima (1936). It is concerned chiefly with the status of the species previously described and clears up several puzzling problems. Costa Lima gives a key to the species, full synonymy, and a complete list of references. His review of the species was necessarily incomplete, however, because several of the Andean species were not available. The species of *Amblyopinus* which are separated in his key on the basis of "having the front of the head emarginate" were not satisfactorily keyed out,

and the validity of several was questioned. The present studies are concerned chiefly with that group of species, and the revision of the key is restricted to the section dealing with them (from couplet 7 to the end of the key).

As a point of departure, it is considered advisable to redescribe *A. jelskii* Solsky, the genotype, since many important characteristics have been omitted from previous accounts. The validity of *fuegensis* Arrow, questioned by Costa Lima, is now believed established. The confusion revolving around *waterhousei* Fauvel, *henseli* Kolbe, and *bequaerti* Notman is partially eliminated; the latter two species are not synonymous with *waterhousei*, and probably are distinct from one another.

The discovery of *Amblyopinus schmidti* sp. nov. in Guatemala appreciably extends the range of the genus, since no Central American records were heretofore known. The host range is also extended somewhat by new records. Marsupials and rodents are undoubtedly the principal hosts of the subfamily Amblyopininae, but we now have an instance of an individual of *A. sanborni* sp. nov. occurring on a bat (*Carollia perspicillata* L.). One cannot conclude from this isolated case that the bat is the usual host of this species, but the record is nonetheless interesting. The four closest allies of *sanborni* are parasitic on marsupials.

I am indebted to Mr. William J. Gerhard and Mr. Rupert L. Wenzel, of Field Museum, and Dr. J. C. Bequaert, of the Museum of Comparative Zoology, Cambridge, Massachusetts, for the opportunity of studying specimens in the collections of these institutions. All of the notes pertaining to the mammalian hosts were furnished by Mr. Karl P. Schmidt, of Field Museum; these are greatly appreciated. I am grateful to Dr. R. E. Blackwelder for identification of specimens of *Habrocerus* and for arranging a loan of examples of *Trichophya* from the United States National Museum.

Amblyopininae, subfam. nov.

Antenna inserted behind the mandibular condyle and under the side margin of the vertex; antennal fossa visible only from the side (pl. 10, figs. 3, 5, 6). Anterior tentorial pits (pl. 10, fig. 2) immediately in front of the antennal fossae. Clypeus large. Frontal suture absent. Clypeus strongly deflexed in some species (pl. 10, fig. 7), in which case the labrum is invisible from above. Clypeus not deflexed in other species; in these instances the apex is emarginate and the labrum visible.

Eyes far back on the sides of the head in *Amblyopinus* (pl. 10, figs. 3, 5, 6); closer to the antennal fossae in *Edrabiis*. Eyes variable; multifaceted in some species (with as many as twenty facets in *schmidti*), and without indication of facets in others (*henseli*, *bequaerti*, *gahani*).

Head constricted caudally to form a neck, the latter roughly delimited by the occipital suture, which extends across the dorsum and far down on the sides. Vertex subject to considerable variation at base; in some species (*waterhousei*, pl. 10, figs. 4, 5) it is elevated and caudally produced on each side of the neck so that the posterior face of the head is deeply concave.

Labrum (pl. 11, fig. 11) broadly emarginate. Antennae as illustrated by pl. 11, fig. 13. Mandibles (pl. 11, figs. 8, 9) large, tridentate. Maxilla (pl. 11, fig. 12) with a large, densely pilose galea and a short, hairy lacinia. Maxillary palpi four-segmented. Ventral aspect of the head rather generalized; the gula and submentum form a moderately broad, hourglass-shaped sclerite. Mentum (pl. 11, fig. 10) trapezoidal; glossae emarginate apically; paraglossal lobes moderately large. Labial palpi three-segmented.

Pronotum large, trapezoidal, all borders narrowly margined. Pronotal hypomera (pl. 12, fig. 15) moderately large, closely appressed to pronotum, postcoxal lobe absent. Elytra (pl. 12, figs. 16, 17) very short, scarcely deflexed laterally; epipleurae obsolescent. Apical margin of the combined elytra broadly and deeply emarginate, exposing the tergite of the second abdominal segment. Scutellum (pl. 12, fig. 16) large, overlapping and concealing a considerable area of the elytra. Apterous; no vestige of the wings present. Metanotal elements greatly reduced. Structures beneath the elytra illustrated in pl. 12, fig. 16; the largest element is apparently the tergite of the first abdominal segment (as the spiracle attests), while the metanotum seems to be represented by several indefinite structures between this and the scutellum.

Prosternum (pl. 12, fig. 15) short, fused laterally with the hypomera (sterno-notal suture absent). Anterior coxae very large, somewhat fusiform, moderately compressed dorso-ventrally. Mesosternum (pl. 12, fig. 18) short, scarcely extending between the coxae. Middle coxae very large, contiguous. Metasternum extremely short behind the middle coxae; produced medially over the inner part of the posterior coxae (these are not separated although fig. 18 may give that impression). Posterior coxae distinctive (pl. 12, figs. 18, 19); ventral surface broadly expanded to form a large lamella

which covers much of the femur and trochanter in repose; dorsal lamella of coxa absent.

Tarsi five-segmented. Prothoracic tarsi with four tarsomeres expanded and densely pilose beneath. Mesothoracic tarsi interspecifically variable and sexually dimorphic; in some species they resemble the anterior tarsi, and in others the pilosity of the slender tarsomeres is very sparse or absent. The slender metathoracic tarsi are not pilose beneath.

Abdomen generalized in its structure; segments 3-7 comprised of a tergite, two paratergites and a sternite. Eighth tergite of both sexes large, its apex strongly arcuate. Eighth sternite similar to the tergite in the female, deeply, arcuately emarginate in the male.

Female genitalia (pl. 12, fig. 22) comprised of lateral paraprocts, dorsal valvifers bearing coxites at their apices (styli absent), and a single ventral proctiger.

Ninth segment of male (concealed within eighth) comprised of a triangular-shaped tergite (its lateral margins strongly inflexed), two stout lateral plates which closely resemble the female paraprocts, and a narrow sternite with an emarginate apex. The lateral plates (which protrude from the abdominal apex) are not bridged dorsally or ventrally. Aedeagus (pl. 12, fig. 23) consists of a median lobe, the proximal part of which is bulbous, and two lateral lobes, which unite and articulate with the median lobe ventrally. The lateral lobes are separate for the most part and extend beyond the tip of the median lobe.

Remarks.—The beetles of the Amblyopininae are readily distinguished from all subfamilies of Staphylinidae save the Habrocerinae by the structure of the metathoracic coxae. A completely satisfactory comparison with the Habrocerinae is not possible at present because the characteristics of that group are not sufficiently known.

Pending a thorough investigation of the Habrocerinae, the present comparison amounts to contrasting *Amblyopinus* and *Habrocerus*. The latter genus, as based on the European genotype, *H. capillaricornis* Gravenhorst, and the closely allied North American species, *H. schwarzi* Horn, is clearly quite different from *Amblyopinus*.

The eighth and ninth abdominal segments of the male are generalized in *Amblyopinus* and profoundly modified in *Habrocerus* (for discussion and illustration of the male abdomen of *Habrocerus*, see Muir, 1920, and Blackwelder, 1936). In *Amblyopinus*, the frontal

suture is absent, and the elytral epipleurae are obsolescent; the species are completely apterous, and have the metanotum reduced to a few very indefinite elements. The head capsule and associated parts in these two genera exhibit numerous differences which in summary contradict the view of close relationship. A detailed comparison of the heads is not advisable, and it is hoped that the illustrations will serve to emphasize the morphological features of the Amblyopinine head; these as a whole are distinctive and unparalleled in the Staphylinidae. Superficially, the heads of some species of *Amblyopinus* bear a striking resemblance to those of *Leptinillus*, an ectoparasitic genus of Leptinidae found on North American mammals. This is apparently due to convergence and has no phylogenetic significance.

The above comparison is complicated somewhat by a Canadian species described by Le Conte as *Habrocerus magnus*. Dr. R. E. Blackwelder informs me that this species is probably not congeneric with the species of *Habrocerus*, and after comparison of *magnus* and *schwarzi* I agree fully with this view. For one thing, it appears (without dissection) as though the male of *magnus* does not have the specialized genital apparatus of *Habrocerus*. If this is true, and *magnus* is included in the Habrocerinae, the interpretation of the subfamily must be broadened considerably. As a whole, *magnus* shows greater structural similarity to *Amblyopinus* than do the species of *Habrocerus*. Even so, this does not alter my opinion that the Amblyopininae should be separated. Expanding the interpretation of the Habrocerinae to include *Amblyopinus* does not seem justified, since it is by no means evident that the Amblyopinine and Habrocerine stocks were derived from the same ancestral forms. A single criterion like the similarity in coxal structure is not sufficient to demonstrate relationship, since it may be a convergent development. In conclusion, the obligatory nature of their parasitism is strong evidence to support the view that the Amblyopininae have long been isolated.

The view that *Amblyopinus* is related to the Trichophyinae is untenable; the distinctions are so numerous that detailed treatment need not be given.

KEY TO THE SPECIES OF AMBLYOPINUS

1. Larger species; 15 mm. or more in length..... 2
 Smaller species; less than 10 mm. in length..... 3
2. Pronotum strongly depressed laterally; elytra also depressed (Peru).
 Pronotum without lateral depressions; elytra convex (Peru)... *mniszewski* Solsky
 germaini Fauvel

3. Clypeus strongly deflexed, labrum invisible from above (pl. 10, fig. 7); anterior "margin" of the head arcuate 4
 Clypeus not deflexed, its apical border emarginate; labrum visible; head not arcuate (pl. 10, figs. 2, 4) 7
4. Head and pronotum opaque; basal margin of pronotum distinctly sinuate (British Guiana) *angustus* Arrow
 Head and pronotum shining; basal margin of pronotum straight 5
5. First three abdominal sternites with a row of black, claviform scales along the margin 6
 Abdominal sternites without scales (Brazil) *longus* Franz
6. Length 6.5–10 mm.; antennae and pronotum relatively shorter than those of the following species (Brazil, Argentina) *gahani* Fauvel
 Length 4–6 mm.; antennae and pronotum relatively longer (Brazil).
travassosi Costa Lima
7. Apex of metathoracic tibia with a very stout, dentiform spine (pl. 12, fig. 26; Brazil) *marmosae* sp. nov.
 Metathoracic tibia without such a spine 8
8. Eyes apparently composed of a single facet 9
 Eyes composed of more than one facet 10
9. Fifth tarsomere of mesothoracic and metathoracic legs with a comb of spines on its inner margin; vertex of head with four setae (Brazil).
henseli Kolbe
 Fifth tarsomere without comb of spines; vertex without setae (Brazil).
bequaerti Notman
10. Shape of head as illustrated by pl. 10, figs. 4, 5; its posterior surface deeply concave lateral to the neck; pronotum with basal row of four to six setae on each half 11
 Shape of head as illustrated by pl. 10, figs. 2, 3; its posterior surface not concave or very feebly so; pronotal base with not more than two setae on each half 12
11. Head and pronotum with numerous shallow, crateriform pits; in addition, finely, closely, and reticulately strigulose (Peru) *sanborni* sp. nov.
 Head and pronotum punctate (punctures not at base of pits); also finely, closely, and transversely strigulose (Ecuador, Colombia).
waterhousei Fauvel
12. Pronotal base with two setae on each half; pronotal shape as in pl. 12, fig. 21; scutellum three-fourths as long as broad (Chile) *fuegensis* Arrow
 Pronotal base with one seta near each posterior angle; pronotal shape as in pl. 12, fig. 20; scutellum one-half as long as broad 13
13. Clypeal seta present; subocular bristle close to margin of eye (Peru).
jelskii Solsky
 Clypeal seta absent; subocular bristle some distance behind the eye (Guatemala) *schmidti* sp. nov.

Amblyopinus jelskii Solsky (pl. 10, figs. 2, 3; pl. 12, fig. 20)

Amblyopinus jelskii Solsky, Hor. Soc. Ent. Ross., 11, p. 11, pl. 1, fig. 3, 1875—
 Peru (Chanchamayo, Junfn; near La Merced).

Description.—Color reddish-brown, elytra yellowish-brown, head and pronotum with a slight smoky tinge. Head and pronotum sparsely, irregularly, and moderately coarsely punctate; intervals finely and reticulately strigulose (the meshes of this reticulation are smaller on the pronotum where the connecting lines are more numerous). Scutellum reticulately strigulose; elytral surface not so. Abdominal sclerites densely and transversely strigulose, the fine lines much closer together than on head and thorax and with fewer connections. Elytra, scutellum, and abdomen with a moderately dense vestiture of recumbent, acicular setae; in some instances, especially along the apical margins of the sclerites, these become moderately spinose in character. There is a tendency for these recumbent setae to become sparser in the medial areas of the tergites.

Head with setae arranged as in pl. 10, figs. 2 and 3; one bristle on the lateral clypeal margin, one lateral to it on the ante-clypeus, one supra-antennal bristle, one supraocular bristle, one subocular bristle, one occipital bristle, and a series of finer setae caudal to the eye. Pronotum with one seta along the lateral margin a short distance in front of the middle, and one near each basal angle. Each elytron with one bristle on lateral margin behind the humerus. Tergites with a pair of erect setae on each half of the apical margin a little mesad of the lateral margin, the outermost one feeble. Sternites 3-7 with a single bristle on each half of the apical margin a short distance lateral to the middle (those of the third and fourth sternites very feeble or absent). Eighth sternite of female with three setae in longitudinal sequence on each side of the middle, the most caudal of the three more lateral in position and out of line with the others. Eighth male sternite with two setae on each side of the emargination.

Form of head illustrated by pl. 10, figs. 2 and 3. Clypeal emargination shallow. Side of head rather abruptly deflexed, the lateral margin of the head above the eye rounded so that it virtually conceals the eye from above. Vertex of head unmodified; not sulcate in front of occipital suture. Lateral to the neck, the posterior surface of the head gradually declivous and not concave.

Pronotal form illustrated by pl. 12, fig. 20. Scutellum one-half as long as broad, apex broadly and obtusely rounded.

First tarsomere of the male mesothoracic tarsus bearing a trace of white pile beneath; female tarsus not pilose.

Measurement.—Length 6-8 mm.

Material examined.—Three specimens from Cailloma, Arequipa, Peru: A female, collected from *Chinchillula sahamae* Thomas, August

24, 1939, by C. C. Sanborn; a male, collected from the same host, December 5, 1939, by Oliver Pearson (M.C.Z. coll.); a male, collected from *Akodon pulcherrimus* Thomas, August 25, 1939, by Karl P. Schmidt.

Remarks.—Previous host records of this species have not been satisfactory. The type series was collected by Jelski from several species of rodents inhabiting the mountains of central Peru. He first encountered these beetles on mice ("*Mus insectivora*") kept in a cage at Chanchamayo; they were attached to the skin in the manner of an acarid or a louse, according to him. The skin of the mice in the region of the tail was denuded, swollen, and exuded a serous secretion. Later he encountered the beetles in the puna zone, once in a mouse nest under a stone, and on another occasion on a dead mouse ("*Mus lobiceps*") in a trap. Apparently the names assigned by Jelski are valueless in determining the hosts of the type specimens.

The hosts recorded in this paper, *Chinchillula sahamae* Thomas and *Akodon pulcherrimus* Thomas, are characteristic of the puna of southern Peru and northwestern Bolivia, and do not range much below 14,000 feet. The former is a soft-furred rodent nearly the size of a house rat, although short-tailed. It is coffee-colored above and white beneath. *Akodon pulcherrimus*, a rodent of mouse size, is the most brightly colored species of this widespread genus.

Amblyopinus fuegensis Arrow (pl. 12, fig. 21)

Amblyopinus fuegensis Arrow, Ann. Mag. Nat. Hist., (7), 19, p. 126, 1907—
Tierra del Fuego (Useless Bay region).

Description.—Surface of head medial to the eyes feebly convex; the eyes visible from above. Head and pronotum with fine, wavy, parallel strigulae in place of the reticulate strigulation of *jelskii*, and with irregular areas of vertex and pronotal disk smooth. Abdomen more closely and finely strigulose than in *jelskii*. Eyes separated from the posterior margin of the head by a distance equal to about one-half the length of the eye (the eye of *jelskii* is marginal). The supraocular bristle and subocular bristle of *jelskii* are more caudal in position (near margin of head) and are closer together than in *jelskii*. Basal margin of pronotum with two strong setae on each half (pl. 12, fig. 21). Pronotal shape differing from *jelskii* as illustrated by pl. 12, figs. 20, 21. Scutellum longer and narrower (three-fourths as long as broad) than that of *jelskii* (one-half as long as broad); apex approximately right-angled in contrast to the obtusely rounded apex of *jelskii*. First three tarsomeres of the male

mesothoracic tarsi densely pilose beneath. Sixth and seventh sternites of male with four long, black setae on each half of the apical margin and one on the lateral margin near apex. Eighth sternite of male with a group of four or five long bristles lateral to the apical emargination.

Material examined.—One male from Riesco Island, Magallanes, Chile, collected from *Ctenomys magellanicus* subsp., February 3, 1940, by J. M. Schmidt.

Remarks.—Arrow characterized *fuagensis* as differing from *jelskii* in these respects: Larger size; prothorax more circular, sides more curved, posterior angles less apparent; surface more shining, less punctured; elytra and abdomen less distinctly sculptured; scutellum larger, more angulated.

Because this description seemingly offers little of diagnostic value, Costa Lima questioned the validity of *fuagensis* and suspected it of being a synonym of *jelskii*. This does not appear to be true, however, since a specimen from Riesco Island (only a short distance from the type locality on Tierra del Fuego) agrees in all respects with Arrow's description and is certainly distinct from *jelskii*. The *Ctenomys* of Riesco Island is closely allied to the all but extinct *Ctenomys magellanicus* of southern Patagonia. Like all *Ctenomys* (the "tuco-tuco" of the Argentines), it is a burrowing rodent living an almost entirely subterranean life.

Amblyopinus schmidti sp. nov.¹ (pl. 10, fig. 1; pl. 11; pl. 12, figs. 15–19, 22, 23)

Type from Santa Elena, Chimal, Guatemala. In the collection of Field Museum of Natural History. Male. Collected January 23, 1934, by Karl P. Schmidt and F. J. W. Schmidt.

Paratypes.—Six males and seven females from the same locality as the type, collected January 23, 1934, and January 26, 1934, by Karl P. Schmidt and F. J. W. Schmidt. One female from Volcan Tajumulco, Guatemala, collected February 18, 1934, by F. J. W. Schmidt. Seven in the collection of Field Museum of Natural History, one in the collection of the Museum of Comparative Zoology, and six in the collection of Charles H. Seevers.

Host of type specimens.—*Peromyscus guatemalensis* Merriam.

Description.—Coloration and sculpture as in *jelskii*. Upper surface of head medial to the eyes gradually declivous; eyes visible

¹ Named for the late F. J. W. Schmidt, mammalogist of the Mandel Guatemala Expedition of Field Museum, 1933–34.

from above. Clypeal setae absent; subocular bristle near the caudal margin of the head, some distance from the eye. Eyes smaller than those of *jelskii*, comprised of about twenty facets, situated a short distance from the posterior margin of the head. Plantar surface of mesothoracic tarsi of both sexes with a narrow strip of white pile beginning about the middle of the first tarsomere and extending on to the second and third; in *jelskii* only the first tarsomere of the male bears a trace of pilosity.

Sternites of third and fourth abdominal segments with a few very feeble, erect apical hairs; sternites 5-7 with four or five erect setae on each half of the apical margin (most of these feeble, usually only the innermost one moderately stout). Eighth sternite of female with three setae on each half, the two anterior ones in a transverse line and the third one near the apical margin (in *jelskii* the three are in longitudinal sequence, with the third one slightly out of line).

Measurement.—Length 6-7 mm.

Remarks.—*Peromyscus guatemalensis* Merriam is a white-footed mouse of the temperate zone in western Guatemala. Field Museum specimens are from Santa Elena, in the foggy cypress forest, at 9,500 feet altitude, and from Volcan Tajumulco, at 10,400 feet. It is a large species, with rather long dark fur.

Amblyopinus waterhousei Fauvel (pl. 10, figs. 4, 5)

Amblyopinus waterhousei Fauvel, Revue d'Ent., 19, p. 64, 1900—Ecuador (Riobamba and Cuenca).

Description.—Light reddish-brown, head and pronotum highly polished, elytra and abdomen considerably less so. Head, pronotum, and abdomen finely strigulose, the strigulae close together, parallel, predominantly transverse (frequently the entire pattern is undulating), and with connecting lines relatively infrequent. Head and pronotum sparsely punctate, the punctation of the pronotum finer.

Head (pl. 10, figs. 4, 5) differing in numerous respects from *jelskii*. Clypeal margin deeply and arcuately emarginate. Upper surface of head medial to the eye rather strongly declivous for some distance. Vertex notably different from *jelskii*, this region prominently elevated and produced caudally, delimited from the neck by a transverse sulcus immediately in front of the occipital suture. Lateral to the neck, the posterior surface of the head is deeply concave; the concavities receive the apical angles of the pronotum, which may be partially obscured from above by the overhanging

vertex. Eyes oval, smaller than those of *jelskii*, comprised of about ten facets, situated a short distance from the margin.

Clypeal bristle absent. Supraocular and subocular bristles situated near the posterior margin of the head. Pronotum with one long bristle on the lateral margin about one-third of the distance from apex to base, and four to six bristles along each half of the basal margin. In addition to these long bristles, the pronotum has a row (internal to the raised marginal line) of about 13-14 short setae beginning on the anterior border and continuing along the sides. Elytra with one seta near the lateral margin behind the humerus. Tergites with a pair of setae on the apical margin near each side. Sternites 5-7 bearing a single marginal seta on each side.

Greatest elytral length at a point about two-thirds the distance from median line to lateral margin. Punctuation of elytra coarse, sparse, approximately one-half as dense as in *jelskii*. Elytral surface with only the slightest suggestion of sculpturing.

Mesothoracic tarsi with the first four tarsomeres densely pilose beneath in both sexes.

Measurement.—Length 7.5-10 mm.

Material examined.—Four males and one female from El Calvario, Meta, Colombia, collected from *Didelphis paraguayensis meridensis* Oken, November 20, 1939, by Dr. Ernesto Osorno (M.C.Z. coll.).

Remarks.—*Didelphis paraguayensis meridensis* Oken is an opossum, in general appearance much like the common opossum of the southeastern United States, and with very similar but softer and thicker fur. It is largely arboreal in its habits and ranges at higher altitudes than the common species.

Amblyopinus sanborni sp. nov.

Type from Segrario, Puno, Peru. In the collection of Field Museum of Natural History. Female. Collected October 10, 1941, by C. C. Sanborn.

Host of type.—*Carollia perspicillata* Linnaeus.

Description.—Dark reddish-brown. Head and pronotum with numerous small, shallow, irregularly arranged, crateriform impressions, very finely punctured at base. Surface of head and pronotum sculptured with a fine, irregular reticulate (often hexagonal) strigulation. Pronotum with a medial, feebly elevated, incomplete line. Head and pronotum feebly shining. Chaetotaxy of the head and

pronotum as in *waterhousei*; the pronotal base with six setae on each half. Eyes comprised of approximately eight facets; circular in outline.

Structure of the head similar to *waterhousei*, differing only in minor details. Apical margin of the clypeus more feebly emarginate than in *waterhousei*. Lateral margin of the head straight (as seen from above); in *waterhousei* bisinuate. Head smaller in proportion to the body than in *waterhousei*; its greatest width is approximately the same as the length of the pronotum (in *waterhousei* the head is laterally produced at the eye level and its width is one and one-fifth times the pronotal length). Length of head three-fifths the pronotal length (in *waterhousei* four-fifths the pronotal length).

Apical margin of each elytron angulate, the apex of the angle attained (point of maximum elytral length) about four-fifths of the distance from the median line to the side.

Measurement.—Length 7 mm.

Remarks.—*Carollia perspicillata* Linnaeus, from which a single example of this species was collected, is a widespread and common bat in tropical South America, ranging well into the Andean valleys, as at Segrario.

It will be of interest to discover whether this occurrence of *Amblyopinus* on a bat was a fortuitous or normal relationship. If the latter is true, it will be quite noteworthy in view of the fact that the species most closely allied to *sanborni* (*waterhousei*, *henseli*, *bequaerti*, *marmosae*) occur on marsupials.

***Amblyopinus henseli* Kolbe**

Amblyopinus henseli Kolbe, Deut. Ent. Nat. Bibl., 2, p. 117, 1911—Brazil (Rio Grande do Sul, or Rio de Janeiro).

Amblyopinus henseli Franz, Abh. Senckenb. Naturf. Ges., 40, p. 405, 4 figs., 1927.

Amblyopinus henseli Zikán, Rev. Ent., 10, p. 222, 8 figs., 1939.

There has been considerable confusion with regard to the identity and status of *henseli*, *bequaerti*, and *waterhousei*. Costa Lima (1936) states that *bequaerti* is identical with *henseli* and that both are probably synonyms of *waterhousei*.

Kolbe's original description of *henseli* was inadequate, and the additional notes and figures of Franz, who examined the types and a few other specimens, do not contribute much information about this species. The types were collected from a species of *Didelphis*,

but Franz identified specimens taken from *Metachirus opossum* L. as *henseli* also. Franz noted considerable variation in the series before him but was unable to conclude that more than one species was represented. Subsequent writers have also identified beetles from several Brazilian mammals as *henseli*: from *Didelphis aurita* Wied (Costa Lima, 1936; Fonseca, 1939); from *Metachirus opossum* L. (Costa Lima; Zikán, 1939); from a mammal designated as "rato silvestre" (Costa Lima). Zikán redescribed and figured *henseli* in some detail from specimens identified as that species by Costa Lima.

Notman (1923) based *bequaerti* on specimens collected from *Monodelphis* sp. at Itatiaya, Rio de Janeiro, Brazil. Costa Lima concluded that *bequaerti* is synonymous with *henseli* since Notman's description does not present any significant differences from the descriptions of *henseli* by Kolbe and Franz. This is no doubt true and there has been no substantial reason to regard *bequaerti* as valid. But in view of Zikán's description of *henseli*, the validity of *bequaerti* is not nearly so questionable, for it differs in a number of respects from that description. If the specimens examined by Zikán are indeed *henseli*, a point which has by no means been established beyond doubt, then *bequaerti* is apparently a valid species. Since several genera of marsupials (*Didelphis*, *Metachirus*, and *Monodelphis*) are involved as hosts in this situation, it is very probable that more species of *Amblyopinus* are concerned than has been suspected. I am unable to contribute to the solution of the problem except by redescribing a paratype of *bequaerti* and calling attention to the differences between it and Zikán's *henseli*.

There is little doubt that *henseli* and *bequaerti* are quite distinct from *waterhousei*. The last is larger, much darker, and exhibits many differences in chaetotaxy, sculpture, and head structure. The head of *waterhousei* is rather sharply delimited from the neck by a moderately deep sulcus; in the others this is very feebly indicated. The posterior face of the head (lateral to the neck) is much more deeply concave in *waterhousei*. The eyes of *waterhousei* are composed of about ten facets; those of *bequaerti* and *henseli* are very small and not divided into facets. The chaetotaxy and sculpturing of *waterhousei* and *bequaerti* are described elsewhere and need not be compared in detail here.

***Amblyopinus bequaerti* Notman (pl. 10, fig. 6; pl. 12, fig. 24)**

Omaloxenus bequaerti Notman, Amer. Mus. Nat. Hist., Nov., No. 68, p. 1, 1923—Brazil (Itatiaya).

Examination of a paratype of *bequaerti* reveals that it differs from Zikán's description of *henseli* in the following respects: The four setae of the vertex are absent; the two long, curved setae of the cardo are absent; the gula has two very long, black setae near the apical margin and a number of fine pale hairs (none of which are noteworthy), while *henseli* has eight moderately conspicuous setae on the gula; the middle tibia is beset with about fourteen stout spines (exclusive of the apical row) arranged in about five irregular, longitudinal rows, while *henseli* seems to have four spines on its inner margin and one on its outer surface; the fifth tarsomeres of the mesothoracic and metathoracic legs lack the comb of spines on their inner margins. In *henseli* this comb is comprised of about eight spines (Zikán, 1939, fig. 1) and is apparently an adaptation for clinging to fur.

It seems advisable to supplement the above comparison with some descriptive notes:

Coloration rufotestaceous, elytra yellow. Head with moderately dense, coarse punctation; surface obsoletely strigulose, the fine lines appearing faintly on the medial areas and more regularly laterad. Pronotum more finely and sparsely punctured; surface very finely, reticulately strigulose; surface with a moderate number of low, smooth, irregularly longitudinal elevations. Elytral surface with a fine, reticulate strigulation between the coarse, irregular punctures. Pronotum with two long bristles along the basal margin near each posterior angle. Elytra with numerous recumbent, acicular setae interspersed with many definitely spinose setae which tend to become more numerous near the suture. Tergites 3-7 with three long setae (as a rule) on apical margin, the outermost one feeble, the two more medial ones stouter, darker. Apex of tergites with a row of closely set, short, acicular setae interspersed with longer ones at rather regular intervals (pl. 12, fig. 24). Third sternite with one strong apical bristle near lateral margin and several very fine ones more medially. Sternites 4-7 with six or seven apical setae on each half, the outermost ones strong on all of the sternites, but the more medial ones weak on the fourth sternite and stouter on the more caudal sternites. Apex of eighth male sternite deeply emarginate.

Amblyopinus marmosae sp. nov. (pl. 12, figs. 25, 26)

Type from Apiahy, São Paulo, Brazil. In the collection of the Museum of Comparative Zoology. Collected September 4, 1929, by George Allen.

Paratype.—One male, same data as the type, in the collection of Charles H. Seevers.

Host.—*Marmosa incana paulensis* Tate.

Description.—Testaceous. Head and thorax strongly shining. Surface of head and pronotum with numerous shallow, irregularly arranged, crateriform impressions (broad, shallow pits), often more or less confluent. Head and pronotum strigulose, the fine lines forming an extensive, finely meshed reticulation.

Chaetotaxy of the head as follows: A pair of short clypeal setae (one on lateral margin, another a short distance mesad); one long bristle on margin of vertex, caudad of antennal insertion; a short subantennal seta; a very long subocular bristle; a long supraocular bristle; a long bristle on the caudal margin of the dorsum and a short seta medial to it; a pair of very long gular bristles and a few pale setae lateral to them; a single postgenal seta behind the cardo. Pronotum with a long seta on the lateral margin and one near the posterior angle. In addition, the pronotum with a submarginal row (beginning on anterior margin and continuing along lateral and posterior margins) of nineteen or twenty short setae. Elytra with one long seta on lateral margin, sparsely beset with recumbent, acicular setae; distinctly spinose setae infrequent, more or less restricted to apex.

Tergites sparsely setose, especially medially. Apex of tergites beset with a row of short, sparsely arranged, acicular setae irregularly placed between longer setae (pl. 12, fig. 25). Tergites 3–7 with two long apical bristles near each side, the outer one very fine, pale, the inner one stouter, darker. Eighth male tergite with four long setae near each lateral margin. Sternites 3–5 with one long, black, erect bristle near each apical angle and several fine, erect bristles along the apical border. Sternites 6–7 with an apical row of six or seven long bristles on each half, the majority of these moderately stout and dark, a few very slender.

Eyes moderately large (nearly four times as large as those of *bequaerti*), very indistinctly faceted; under certain conditions of illumination, division into eight or more areas may be faintly discerned.

Posterior surface of the head, lateral to the neck, scarcely concave.

Anterior tibia unarmed; middle tibia with nine relatively stout spines on the ventral surface and one on the lateral margin; posterior tibia bearing four spines on the ventral surface. Metathoracic tibia

with a very stout, dentiform spine at apex (pl. 12, fig. 26) in addition to the apical row of smaller spines. Fifth tarsomere of the middle and posterior legs with a comb of spines on its inner margin, the mesothoracic tarsal comb of six or seven spines, the metathoracic tarsal comb of about twelve spines arranged in two irregular rows.

Apex of eighth male sternite feebly emarginate.

Measurement.—Length 4.5–5 mm.

Remarks.—*A. marmosae* is most closely allied to *henseli* and *bequaerti*. It is observed to differ from *bequaerti* in numerous respects: smaller size; paler coloration; different sculpture of the head and pronotum; larger eyes, indistinctly faceted; only one long bristle on basal margin of pronotum; the recumbent setae of the elytra approximately one-half as numerous, and spinose setae infrequently present; the short, acicular setae of the apical margins of the tergites much sparser; the tergites with only two long, erect bristles on apical margin; the presence of the stout, dentiform spine at apex of posterior tibia; the presence of the comb of spines on the fifth tarsomere of the middle and posterior legs; the eighth male sternite much more feebly emarginate. There are probably numerous differences between *marmosae* and *henseli*. The presence of the very stout spine at the apex of the posterior tibia should distinguish this species from *henseli*. It is of interest to note that, like *henseli*, it possesses the tarsal comb of spines.

Marmosa incana paulensis Tate, a rather typical mouse-opossum, is found in the Organ Mountains and other nearby ranges in the states of Rio de Janeiro and São Paulo. The forests in this area have a rich undergrowth of bracken and other ferns.

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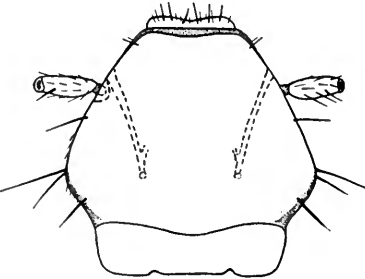
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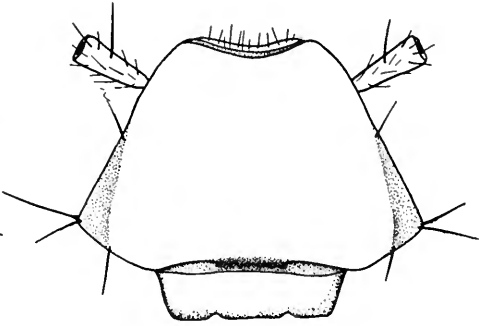
PLATES

PLATE 10

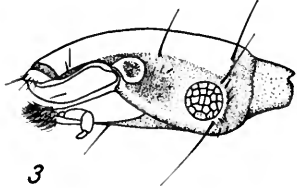
- FIG. 1. *Amblyopinus schmidti* sp. nov.
FIG. 2. *Amblyopinus jelskii* Solsky, dorsal view of head.
FIG. 3. *Amblyopinus jelskii* Solsky, lateral view of head.
FIG. 4. *Amblyopinus waterhousei* Fauvel, dorsal view of head.
FIG. 5. *Amblyopinus waterhousei* Fauvel, lateral view of head.
FIG. 6. *Amblyopinus bequaerti* Notman, lateral view of head.
FIG. 7. *Amblyopinus gahani* Fauvel, dorsal view of head.



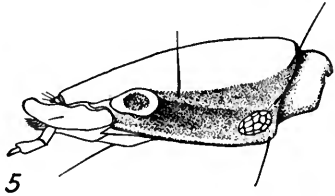
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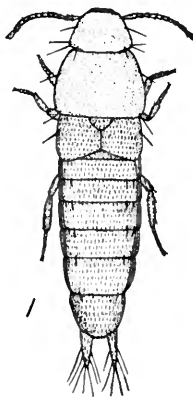
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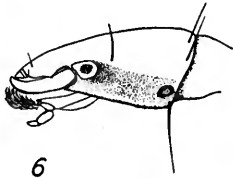
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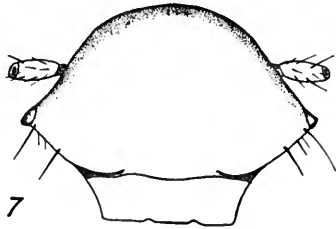
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PLATE 11

Amblyopinus schmidti sp. nov.

- FIG. 8. Dorsal view of mandibles. FIG. 11. Labrum.
FIG. 9. Ventral view of right mandible. FIG. 12. Maxilla.
FIG. 10. Labium. FIG. 13. Antenna.
FIG. 14. Ventral view of head.

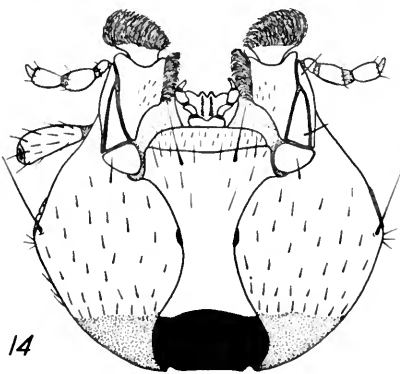
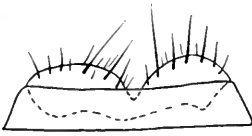
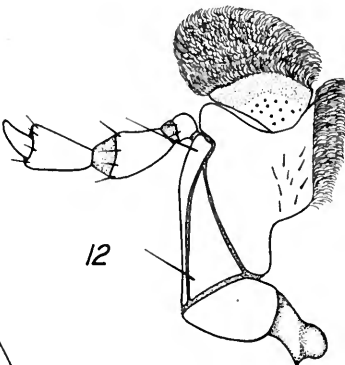
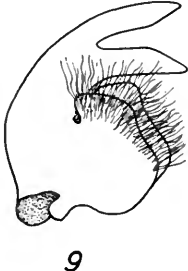
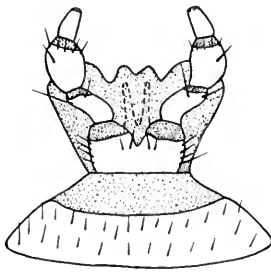
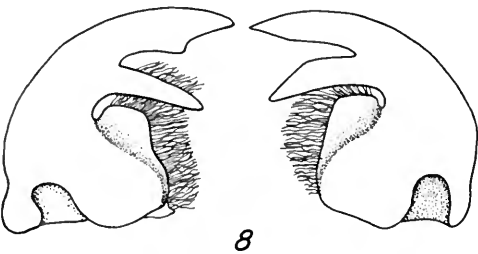


PLATE 12

Amblyopinus schmidti sp. nov.

FIG. 15. Ventral view of prothorax.

FIG. 16. Dorsal view of mesothorax, metathorax, and first abdominal tergite.

FIG. 17. Under surface of elytron.

FIG. 18. Ventral view of mesothorax and metathorax.

FIG. 19. Right metathoracic coxa.

FIG. 22. Dorsal view of female genitalia.

FIG. 23. Lateral view of male genital tube, with an enlargement of inner surface of apex of lateral lobe.

Amblyopinus jelskii Solsky

FIG. 20. Outline of pronotum.

Amblyopinus fuegensis Arrow

FIG. 21. Outline of pronotum.

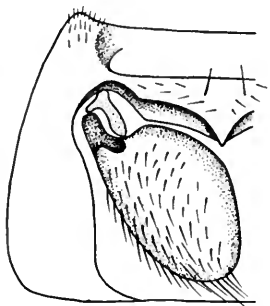
Amblyopinus marmosae sp. nov.

FIG. 25. Apical margin of tergite.

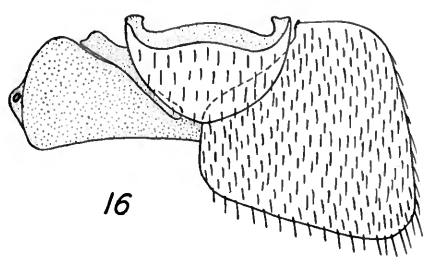
FIG. 26. Apex of metathoracic tibia.

Amblyopinus bequaerti Notman

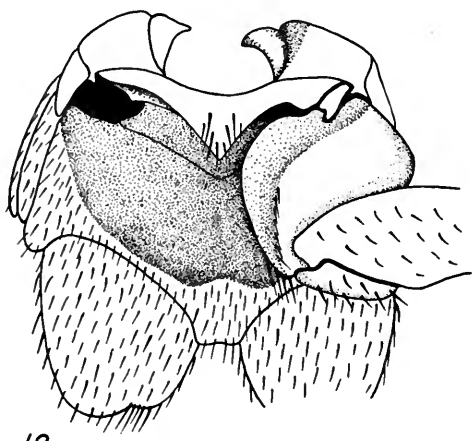
FIG. 24. Apical margin of tergite.



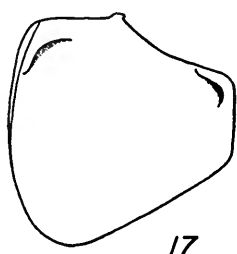
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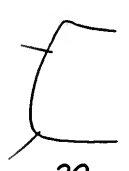
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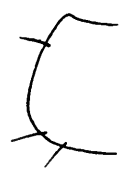
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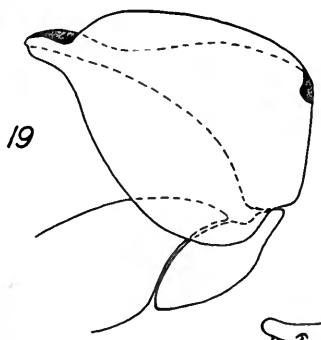
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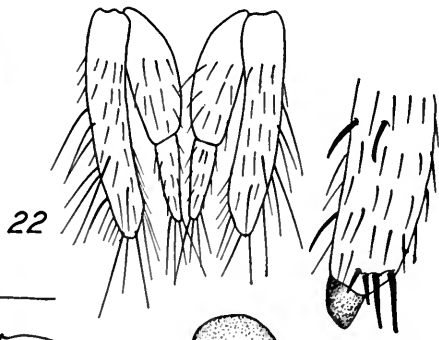
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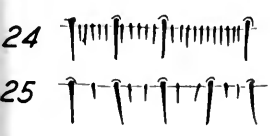
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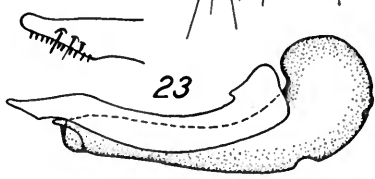


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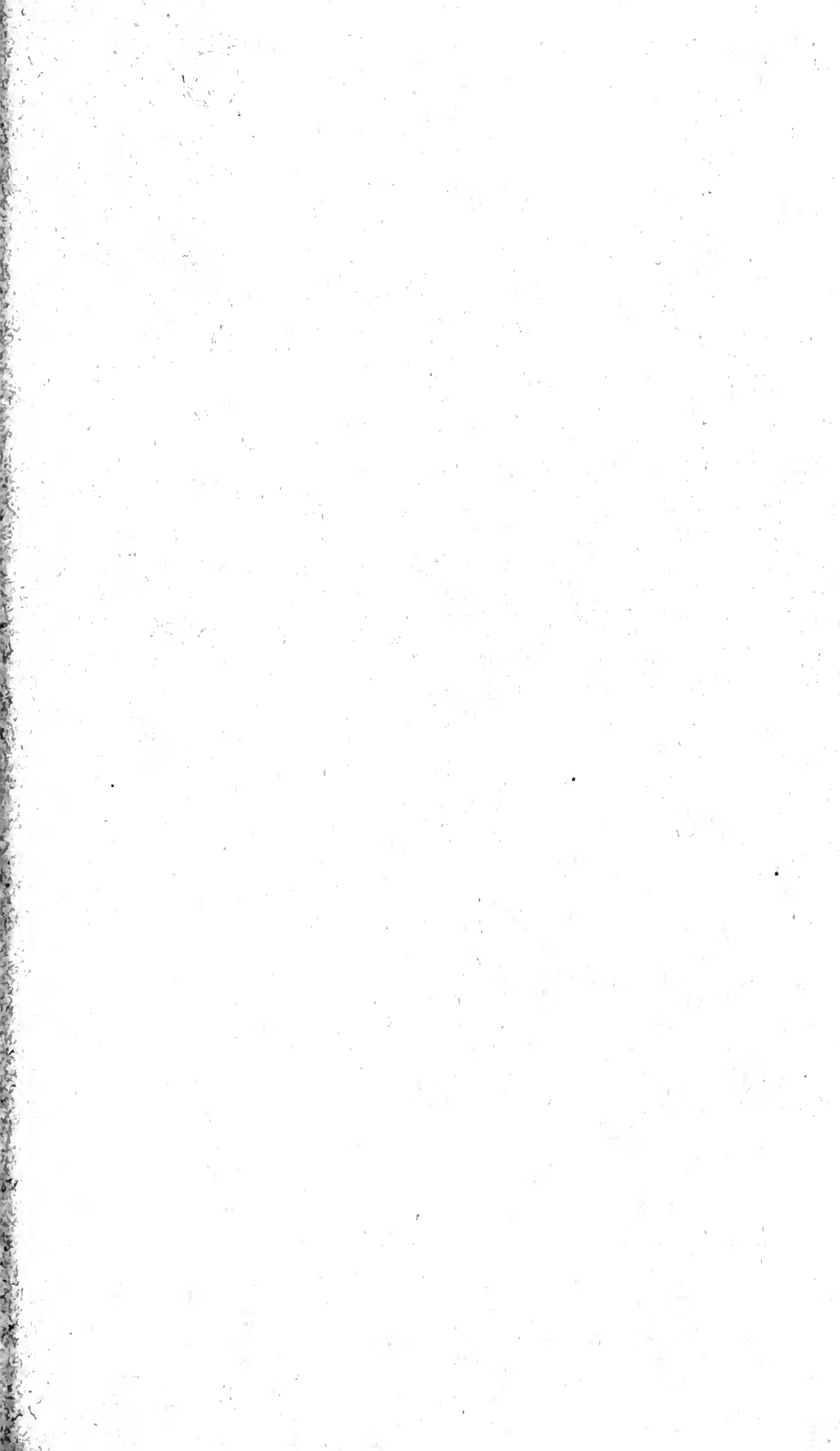


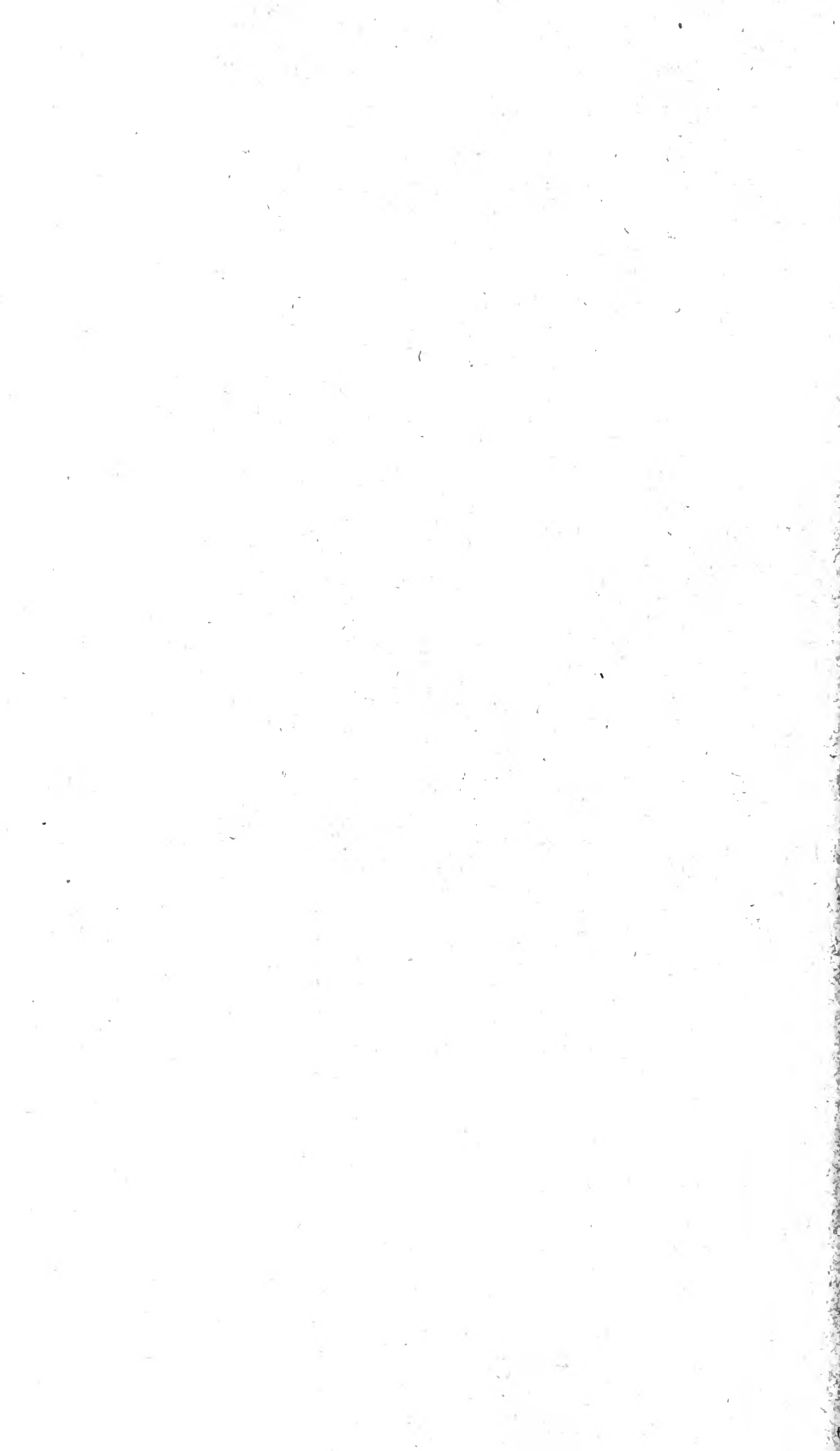
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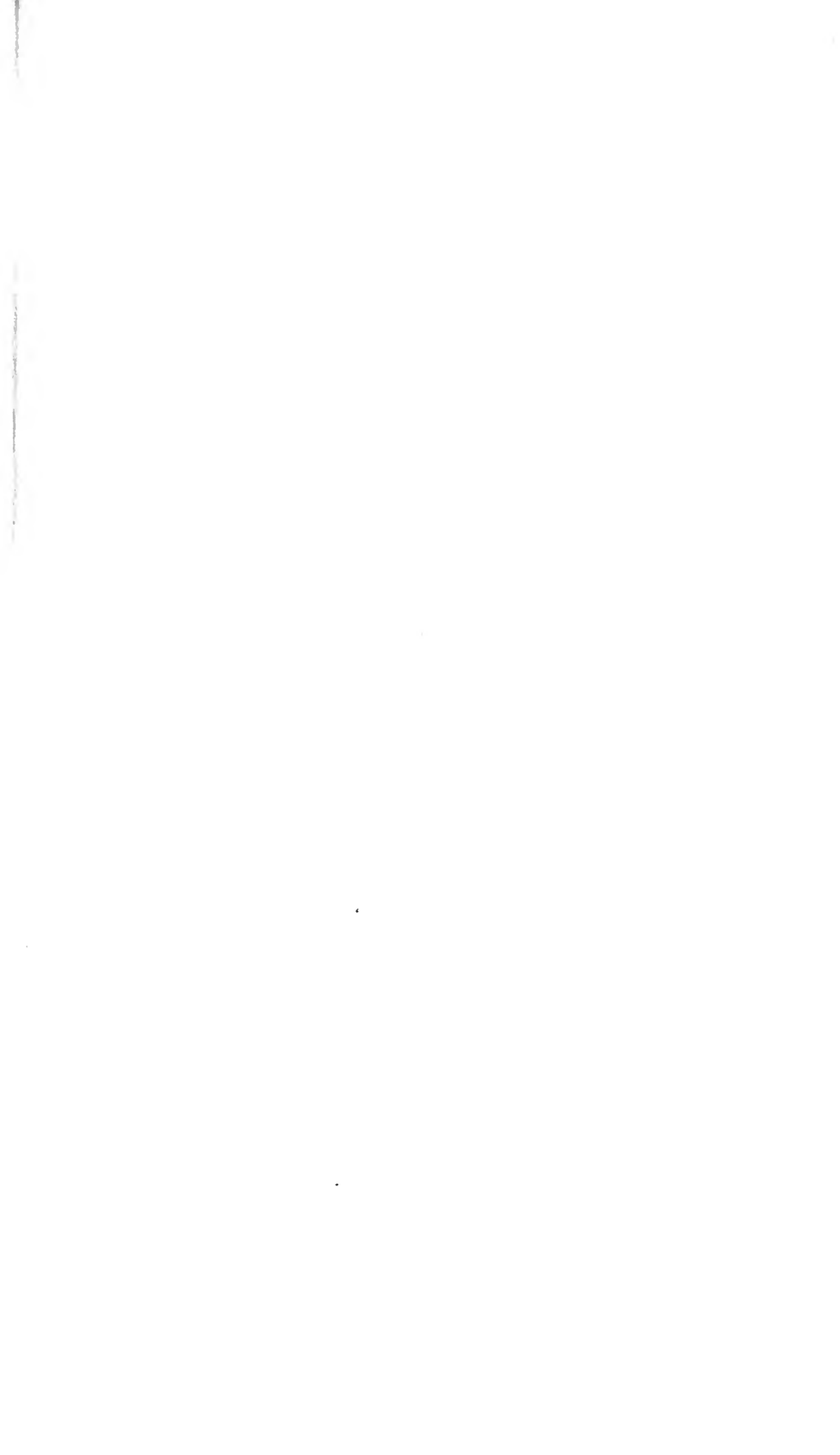


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