189ME FASCICULE DIPTERA

GENERA INSECTORUM

DIRIGÉS PAR

P. WYTSMAN

DIPTERA

FAM. TANYDERIDÆ

By CHARLES P. ALEXANDER

WITH 1 PLAIN PLATE

1927

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THE Flies included in the family Tanyderidæ were for many years placed in the older and better-known Ptychopteridæ, a group to which they are now known to be rather distantly related. The first member of the family to be described was the long-lost *Nemopalpus* Macquart (1838) which is now placed in the subfamily Bruchomyiinæ. The second genus to be defined was the fossil *Macrochile* Loew (1851), followed in quick succession by *Protoplasa* Osten-Sacken (1859) and *Tanyderus* Philippi (1865). The first recognition that members of the family should be elevated to a higher rank came in 1880 when Osten-Sacken (Verh. Zool.-bot. Ges. Wien, Vol. 29, p. 517-522 [1879]) proposed the term Tanyderina, using the latest genus to be proposed rather than one of the earlier ones. The group was accorded full family rank by the writer in 1919 (Cornell Univ. Agr. Expt. Sta. Ithaca Mem. Nr. 25, p. 883). Recent studies by Crampton and Edwards have shown that the Tanyderidæ are most closely allied to the Psychodidæ, the Bruchomyiinæ discussed at this time forming a close connection between the two groups. The relationships with the Ptychopteridæ are likewise evident.

The members of the family constitute a small, palæogenic aggregation of species that occur in all the major regions of the World with the exception of the Oriental. Because of the excessive rarity of almost all of the known species, it is impossible to predict where or when new forms will be discovered and it is quite possible that eventually they will be taken in the Oriental Region. Flies of this family have been taken in numbers only in New Zealand (*Tanyderus*) and in Argentina (*Bruchomyia*).

Geological distribution. — As mentioned above, the second genus of the family to be characterized was the remarkable fossil *Macrochile spectrum* Loew, described from Baltic Amber (Oligocene). In 1910, Handlirsch (Contrib. Canad. Palæont. Vol. 2, Pt. 3, p. 122-123, fig. 30) described a new genus and species of Insect under the name *Etoptychoptera tertiaria* from beds that were supposed to be of Oligocene age. The writer cannot believe that this Insect is a true Tanyderid, since it differs notably in the following features: The long fusion of veins R_4 and R_5, this fusion being longer than the free branches beyond the fork; cell *1st* M_2 is very long; two distinct anal veins. Two

species of *Nemopalpus* from Baltic Amber have been described by Meunier (1905) and Edwards (1921). The above are the only fossil records of the family so far made known and it is interesting to note that they all pertain to the Oligocene.

Biology. — The immature stages of members of this family have never been discovered with certainty. The supposed larva of *Protoplasa fitchii* was discussed in detail and figured by the writer (Cornell Univ. Agr. Expt. Sta. Ithaca Mem. Nr. 38, p. 769-772, pl. 13 [1920]) but its identity has never been confirmed by rearing. The larva is very remarkable in its combination of characters; the body is encephalous; integument smooth and shiny white in color. The terminal two segments of the abdomen are produced into a stout, non-retractile breathing-tube that is distinctly five lobed at the tip. At the base of this tube are borne two very large, pinnately branched tracheal gills. The head is provided with numerous, scattered, multisetose punctures (**Plate, Fig. 4**). These very curious larvæ were found in saturated decaying maple logs.

The habits of adult Tanyderidæ are likewise but little known. Bruch (*in litt.*) discusses the habits of *Bruchomyia* as follows :

« The flies always occur in damp places, being found on damp earth and in crevices of rocks. Pieces of wood, roots, moss and other substances in these situations were examined critically but the early stages could not be discovered. No plant-mines were found and the larvæ could not be located in the mud and wet earth along the margins of streams. In a position of rest, the adult flies sit rather high-legged, the wings held obliquely divergent. In copula, the male rests on the female, their bodies not being held in opposition. The flies are rather wary and take flight readily when disturbed. However this flight is of brief duration and one can readily watch such a disturbed fly in flight and see it alight again. »

Thomas R. Harris made the following observations on *Tanyderus forcipatus* Osten-Sacken, near the base of Mount Ruapehu, in the North Island of New Zealand. « I found them hanging on small bushes near the edge of the creek. The weather was rough, there having been heavy rains and the creek was in flood. I got them only on two or three nights but on one night they were fairly numerous. They were sluggish and easily caught while hanging by a leg or two to the bushes, mostly low down. »

The only specimens of the family ever seen alive by the writer were a few individuals of *Protoplasa fitchii* swept from rank vegetation along the Sacandaga River, New York, in 1909.

Characters of the Adult Flies. — The family Tanyderidæ is the most generalized of the recent families of Tipuloidean flies. They are readily told from the other families of crane-flies by the possession of five radial veins, the four branches of the sector forking dichotomously. The two subfamilies considered by the writer as belonging here differ very considerably from one another in their general appearance. The Bruchomyiinæ are small, very hairy flies that bear a considerable resemblance to Tipulid flies of the genus *Molophilus* or to the typical members of the family Psychodidæ. The Bruchomyiinæ have the eyes prominent, naked and markedly approximated on the vertex. The antennæ are elongate, setaceous, composed of either 16 or 30 segments. Maxillary palpi with the terminal segment elongate and more slender than the preceding segments. Pronotum small and inconspicuous, collar-like. Laterocervical plate small. Mesonotal præscutum gibbous, projecting slightly over the head. Metanotum much better developed than in other Diptera. Tibiæ without spurs, though often with large powerful setæ that simulate spurs. Wings with the anal angle lacking, the veins in this region being greatly reduced. Male hypopygium with the tergite twisted through 180 degrees so it lies on a plane with the remaining abdominal sternites. Ovipositor with small fleshy valves that are retracted within the preceding segment.

The Tanyderinæ, on the other hand, are almost invariably large, subglabrous flies. The eyes are densely short-hairy. The mouthparts are generally short but in some cases greatly produced. Antennæ with a variable number of segments, ranging from 15 to at least 25 in the known species. Pronotum more massive. Laterocervical plate large to very large. Metanotum reduced. Tibiæ spurred. Wings with a more or less conspicuous anal angle; *m* present, closing the long cell *1st* M_2; a single well developed anal vein. Supernumerary crossveins occur in various cells of the wings in many species. Male hypopygium not twisted, of primitive structure, there being a single dististyle. Ædeagus dividing into two or three elongate, slender prongs, each of which is penetrated by an opening, the entire structure suggesting the condition found in the Tipulid subfamily Cylindrotominæ. Ovipositor with fleshy valves.

Phylogeny. — The Tanyderid flies are presumably the most generalized of the living Diptera. It appears probable that both the Psychodidæ and Tanyderidæ may have been derived from an ancestor that was not greatly different from certain of the Bruchomyiine forms, as *Bruchomyia* or *Nemopalpus*. Since no members of the family are known from geological formations that antedate the Oligocene, we have no hint as to their ancestry from this source. It is interesting to note that the oldest fossil Tanyderids known are very close to existing genera.

TABLE OF SUBFAMILIES

Small flies with the body and wings densely hairy; eyes naked; pronotum collar-like, inconspicuous; laterocervical plate small; metanotum large; tibiæ without spurs; anal angle of wings lacking, the anal and cubital veins correspondingly crowded and reduced; *m* lacking, cell *1st* M_2 being open (**Plate, Fig. 1, 2**). . . . . 1. Subfam. BRUCHOMYIINÆ.

Larger flies with body and wings subglabrous or sparsely hairy; eyes hairy; pronotum more massive; laterocervical plate moderately elongate (*Macrochile*, *Protoplasa*) to very elongate (*Tanyderus*); metanotum reduced; tibiæ spurred; wings with a conspicuous anal angle; *m* present, closing cell *1st* M_2 (**Plate, Fig. 6-13, 15**) . . . . . 2. Subfam. TANYDERINÆ.

1. Subfam. BRUCHOMYIINÆ

Bruchomyiinæ Alexander, Ann. Amer. Ent. Soc. Vol. 13, p. 403 (1920).
Nemopalpinæ Edwards, Ann. Mag. Nat. Hist. (9), Vol. 7, p. 439 (1921).
Phlebotominæ Tonnoir, Ann. Soc. Ent. Belg. Vol. 62, p. 127 (1922).
Bruchomyiinæ Crampton, Ent. News, Vol. 37, p. 33-39, 65-70 (1926).

Remarks. — The subfamily Bruchomyiinæ was erected in 1920 to receive the new genus and species, *Bruchomyia argentina*. The following year, Edwards noted the relationship of the genus to the long-lost and misunderstood *Nemopalpus* Macquart and called attention to the fossil genus *Palæosycorax* Meunier which is now known to be a synonym of *Nemopalpus*. For this group, Edwards proposed the term Nemopalpinæ, basing it on the earliest described genus. In 1922, Tonnoir placed the two genera above discussed, together with *Phlebotomus* Rondani, in the family Psychodidæ under the subfamily Phlebotominæ. In 1926, Crampton recognized the subfamily Bruchomyiinæ, placing it in the family Psychodidæ, which assignment now seems to be more nearly correct. Because of its many

annectant characters, however, its seems desirable to discuss the group in the present connection. The venation of the wings is very similar to the condition found in the Tanyderinæ, the only peculiarities being such as are produced by the loss of the anal angle and the consequent reduction and atrophy of the anal and cubital veins. The distribution and arrangement of the veins in the medial and radial fields is quite the same in the two groups.

Characters. — Small flies (**Plate, Fig. 3**) having the general appearance of a *Molophilus* (Tipulidæ) or a typical member of the Psychodidæ; body and wings covered with long, dense hairs. Eyes naked. Antennæ setaceous, with 16 (*Nemopalpus*) or 30 (*Bruchomyia*) segments, the terminal segment very small. Pronotum small and inconspicuous. Mesonotum gibbous. Metanotum large. Legs with the coxæ elongate; tibiæ without spurs; tarsal claws small. Wings with Sc_1 present or atrophied; *R* and *M* forking far back near the wing-base, the forks of all the veins thus being very deep; crossvein *m* lacking; anal vein short or subatrophied; anal angle of the wings lacking, this region fringed with unusually long setæ. Male hypopygium twisted to 180 degrees so the tergite lies on a level with the sternites of the remainder of the abdomen; dististyles small and partly concealed (*Bruchomyia*) or larger and exposed (*Nemopalpus*).

TABLE OF GENERA

1. *Antennæ with 30 segments. Distal section of vein* Cu *elongate, nearly as long as the basal section* (**Plate, Fig. 1**) . . . . . 1. Genus Bruchomyia Alexander.
Antennæ with 16 segments. Distal section of vein Cu *short, recurved to the margin* (**Plate, Fig. 2**) . . . . . 2. Genus Nemopalpus Macquart.

1. Genus BRUCHOMYIA Alexander

Bruchomyia Alexander, Ann. Ent. Soc. Amer. Vol. 13, p. 403 (1920).

Characters. — Body (**Plate, Fig. 3**) very hairy, the head, thorax and abdomen provided with long, dense, erect hairs. Rostrum but slightly produced; palpi very large and conspicuous, very hairy, apparently four-segmented. Antennæ 30-segmented; flagellar segments 28 in number, the last segment minute; scapal segments subequal in size, small, subglobular, the second with a circlet of short, verticillate hairs; flagellum setaceous, the first segment about as long as the following two taken together; flagellar segments 2 to 20 subequal, elongate cylindrical; remaining segments gradually reduced in length, the last very small, button-like, the penultimate and antepenultimate oval. Eyes large, naked; ommatidia moderately large; eyes approximated, separated on the vertex only by a narrow strip that is from one-fourth to one-half the diameter of the basal segment of the scape. Legs comparatively stout; coxæ long and slender; femora shorter than tibiæ; tarsal segments gradually shortened, from the first to the fifth; tibiæ provided with long, conspicuous setæ, the sclerite terminating in one or two that are more slender and simulate tibial spurs; claws small, subappressed to the end of the tarsus, the edges roughened, the rather long apex smooth. Wings with no anal angle; veins and margins with abundant long setæ that are especially elongate and conspicuous in the region of the anal angle; at the union of *r-m* with R_5 is a triangular chitinized area that is provided with conspicuous black hairs. Venation: Sc_1 lacking, Sc_2 ending in *R* before the fork of R_{2+3}; *Rs* originating close to wing-base, slightly proximad of the fork of *M*; *Rs* with four branches; *M* forking far back near wing-base, each fork with two branches; *m* lacking; *Cu* simple, the distal section elongate; *m-cu* conspicuous, without macrotrichiæ; a single, semi-atrophied anal vein. Male hypopygium small, inconspicuous, densely protected by setæ; basistyles

stout, each with a dense brush of stout black setæ on mesal face near apex; the single dististyle is small, bifid. Ninth tergite (the apparent sternite) produced into a flattened lobe, the apex bifid.

Type species : *Bruchomyia argentina* Alexander (**Plate, Fig. 1, 3**).

Geographical distribution.

1. *Br. argentina* Alexander, Ann. Ent. Soc. Amer. Vol. 13, p. 405, pl. 32 [1920] (**Plate, Fig. 1, 3**). Argentina.

2. Genus NEMOPALPUS Macquart

Nemopalpus Macquart, Dipt. Exot. Vol. 1, Pt. 1, p. 85 (1838); Becker, Mitt. Zool. Mus. Berlin, Vol. 4, p. 71-72 (1908); Tonnoir, Ann. Soc. Ent. Belg. Vol. 62, p. 125, plate; Key to known species (1922).

Palæosycorax Meunier, Miscell. Ent. Vol. 13, p. 50 (1905).

Characters. — Body densely hairy, the setæ on head and thorax erect, on the abdomen appressed. Head relatively small, mouthparts not prominent; palpi elongate, 4-segmented, the terminal segment much longer and more slender than the preceding segments. Antennæ 16-segmented, approximately as long as the body; basal segment of scape short-cylindrical; second segment cyathiform; flagellar segments elongate, densely provided with conspicuous verticils. Eyes large, naked, strongly approximated on vertex. Thorax gibbous, the præscutum with longitudinal rows of conspicuous erect setæ. Legs of moderate length, hairy; tibial spurs lacking. Wings with the anal angle lacking; Sc_1 generally present, though sometimes atrophied; base of *R* hypertrophied; *Rs* originating near basal quarter of wing; cell R_2 shorter than (*N. pilipes*) to longer than (*N. flavus*, *N. zelandiæ*) its petiole; *r-m* far beyond the fork of M_{1+2} (*N. pilipes*) or lying at or proximad of this fork; *m* lacking; *m-cu* long; distal section of *Cu* much shorter than the basal section and attaining the wing-margin suddenly at about one-fourth the length of the wing; anal vein reduced. Male hypopygium twisted upon itself through 180° so the ninth tergite lies on a plane with the remaining sternites of the abdomen; a single conspicuous dististyle that tends to be bifurcate. Ovipositor with fleshy valves that are retracted in the eighth abdominal segment.

Type species : *N. flavus* Macquart.

Geographical distribution.

1. *N. flavus* Macquart, in Webb & Bertholet, Hist. Nat. Iles Canaries, Ent. Dipt. p. 102, pl. 4, fig. 4 (1838); Dipt. Exot. Vol. 1, Pt. 1, p. 82, pl. 12. fig. 1, 1*a*, 1*b* (1838); Becker, Mit. Zool. Mus. Berlin, Vol. 4, p. 71-72, pl. 2, fig. 28 (1908). Canary Islands.
2. *N. molophilinus* Edwards, Ann. Mag. Nat. Hist. (9), Vol. 7, p. 437, fig. [1921] (*Palæosycorax*). Baltic Amber.
3. *N. pilipes* Tonnoir, Ann. Soc. Ent. Belg. Vol. 62, p. 130, fig. 1-8 (1922). Paraguay.
4. *N. tertiariæ* Meunier, Miscell. Ent. Vol, 13, p. 50 [1905] (*Palæosycorax*). Baltic Amber.
5. *N. zelandiæ* Alexander, Insec. Inscit. Menst. Vol. 9, p. 158 (1921); Tonnoir, Ann. Soc. Ent. Belg., Vol. 62, p. 134, fig. 9-11 [1922] (written *zealandicus*). — **Plate, Fig. 2.** New Zealand.

2. Subfam. TANYDERINÆ

Tanyderina Osten-Sacken, Verh. Zool.-bot. Ges. Wien, Vol. 29, p. 517, fig. 1-2 (1880).

Tanyderinæ Alexander, Ann. Ent. Soc. Amer. Vol. 13, p. 402 (1920).

Tanyderidæ Crampton, Ent. News, Vol. 37, p. 33-39, 65-70 (1926); Bull. Brooklyn Ent. Soc. Vol. 21, p. 1-14 (1926).

Characters. — Size usually large, the smallest species being members of the genus *Protoplasa* (*P. beckeri*, *P. vanduzeei*). Rostrum moderately to excessively produced, the palpi conspicuous. Antennæ with from 15 to 25 segments. Eyes with short, erect setæ between the ommatidia. Pronotum massive. Laterocervical plates elongate (typical *Tanyderus*, *Mischoderus* and *Radinoderus*), shorter and wider (*Protoplasa*), or greatly reduced in size (*Macrochile*, *Péringueyomyina*). Metathoracic spiracle close to base of halter. Mesothoracic meron fused with mesepimeron. Tibial spurs present. Wings usually with a well-developed anal angle; five radial, four medial, one cubital and one developed anal vein present; *m* present, closing the elongate cell 1_{st} M_2; supernumerary crossveins in certain of the radial cells of the wings (*Tanyderus*; subgenera *Tanyderus*, *Mischoderus*, *Nothoderus* and *Neoderus*) or in cell M_3 (*Protoplasa*, s. s.). Male hypopygium with the dististyle simple, cylindrical (*Tanyderus*, *Péringueyomyina*) or more or less bifid (*Macrochile*, *Protoplasa*); ædeagus trifid, in *Macrochile*, more bifid.

TABLE OF RECENT GENERA

1. *Rostrum elongate, exceeding the combined head and thorax, the mouthparts borne at the extreme apex; wings immaculate; dististyle of male hypopygium simple, very elongate* (**Plate, Fig. 15-18**) . . . . . 1. Genus Péringueyomyina Alexander.

Rostrum shorter than the head; wings pictured; dististyle of male hypopygium short . . . . . 2.

2. *Cell* R_2 *relatively short,* R_{2+3} *forking beyond midlength of the distal section of vein* R_1*; pronotum and laterocervical plates relatively short, not forming a conspicuous neck; dististyle of male hypopygium more or less bifid* (**Plate, Fig. 11-14**) . 2. Genus Protoplasa Osten-Sacken.

Cell R_2 *relatively deep,* R_{2+3} *forking just beyond the base of* (*Radinoderus*) *to just before midlength of, the distal section of* R_1*; pronotum and laterocervical plates* (*except in Nothoderus*) *long and conspicuous, forming a conspicuous neck; dististyle of male hypopygium simple, cylindrical* (**Plate, Fig. 5-10, 19**). 3. Genus Tanyderus Philippi.

1. Genus PÉRINGUEYOMYINA Alexander

Péringueyomyina Alexander, Ann. S. Afr. Mus. Vol. 18, p. 232 (1921).

Characters. — Rostrum elongate, exceeding the combined head and thorax (**Plate, Fig. 17**), rather stout, cylindrical, with the base enlarged, the surface with numerous, subappressed setæ, the mouthparts borne at the apex; maxillary palpi slender, 4-segmented, the three basal segments subequal in length, the terminal segment about a third longer than the penultimate; labial lobes fleshy, transverse.

Antennæ apparently with only 16 segments, moderately elongated, setaceous; second scapal segment swollen, subglobular; three basal segments of the flagellum stout, the remaining segments gradually elongated, slender, provided with long verticils that are about equal in length to the segments that bear them; in addition to the verticils, the segments possess a rather abundant, suberect pubescence. Head narrowed behind. Eyes large, broadly contiguous beneath (**Plate, Fig. 16**), narrowly separated above by the vertex; ommatidia small, with short erect setæ between them. Anterior pronotum large and conspicuous, the posterior pronotum very narrow. Laterocervical plates very small. Legs with the margin of the posterior coxæ swollen anteriorly and provided with a row of black setæ; tibiæ with short spurs. Wings broad (**Plate, Fig. 15**), with five radial, four medial and a single anal vein attaining the margin; *m-cu* distinct; anal angle of wing moderately prominent Veins with abundant long delicate macrotrichiæ. Male hypopygium with the basistyles very slender, greatly elongated, gradually narrowed to the tips, each (**Plate, Fig. 18**) bearing a single, very elongate, cylindrical dististyle that is provided with a series of about 30 slender spines and numerous erect setæ along its inner margin, at the apex with two elongate bristles.

Type species : *Péringueyomyina barnardi* Alexander (**Plate, Fig. 15-18**).

Geographical distribution.

1. *P. barnardi* Alexander, Ann. S. Afr. Mus. Vol. 18, p. 233, fig. (1921). South Africa. (**Plate, Fig. 15-18.**)

2. Genus PROTOPLASA Osten-Sacken

Protoplasa Osten-Sacken, Proc. Acad. Nat. Sc. Philad. p. 251 (1859).

Protoplasta Osten-Sacken, Bull. U. S. Geol. Surv. Vol. 3, p. 207 (1877).

Idioplasta Osten-Sacken, Cat. Dipt. N. Amer. (ed. 2), p. 36, 222 (1878).

Members of the genus *Protoplasa* are confined to the Northern Hemisphere, three species being from the Nearctic Region while one is Palæarctic.

Characters. — Rostrum shorter than the head, the palpi long and conspicuous. Antennæ 16-segmented; second scapal segment enlarged, cyathiform; flagellar segments elongate-oval, with verticils that exceed the segments in length. Eyes short-hairy. Pronotum relatively short and stout, shorter than the head excluding the mouthparts. Laterocervical plates relatively short and wide. Mesonotum moderately gibbous. Legs with short, rather sparse setæ; tibial spurs conspicuous. Wings (**Plate, Fig. 11-13**) usually with a prominent anal angle; in *vanduzeei* the wing is long and narrow, showing the first signs of atrophy. Venation as in the subfamily; cell R_2 short, shorter than its petiole, the base of the cell lying beyond midlength of the distal section of vein R_1; cell *1st* M_2 long, gently widened distally, the cells beyond it comparatively short; a supernumerary crossvein in cell M_3 in the typical subgenus, lacking in *Protanyderus*. Male hypopygium with the dististyle deeply bifid in members of the subgenus *Protanyderus* (**Plate, Fig. 14a, 14b**), in *Protoplasa*, s. s., simple but strongly bent near midlength and here provided with a distinct shoulder on outer face (**Plate, Fig. 14c**).

Type species : *Protoplasa fitchii* Osten-Sacken (**Plate, Fig. 11, 14c**).

TABLE OF SUBGENERA

A supernumerary crossvein in cell M_3 *of wing* (**Plate, Fig. 11**). . . Subgen. Protoplasa Osten-Sacken.
No supernumerary crossveins in any cells of wing (**Plate, Fig. 12, 13**). Subgen. Protanyderus Handlirsch.

Geographical distribution.

Subgenus **Protoplasa** Osten-Sacken.

1. *P.* (*P.*) *fitchii* Osten-Sacken, Proc. Acad. Nat. Sc. Philad. p. 252 [1859]. Eastern North America. (**Plate, Fig. 11, 14c.**)

Subgenus **Protanyderus** Handlirsch, Ann. Naturhist. Hofmus, Wien, Vol. 23, p. 267 (1909).

2. *P.* (*P.*) *beckeri* Riedel, Zool. Jahrb. Abt. f. Syst. Vol. 43, p. 365, fig. A-D [1920] (*Tanyderus*). (**Plate, Fig. 14a.**) Turkestan.
3. *P.* (*P.*) *vanduzeei* Alexander, Ent. News Philad. Vol. 29, p. 285 (1918). (**Plate, Fig. 12, 14b.**) Western North America.
4. *P.* (*P.*) *vipio* Osten-Sacken, Bull. U. S. Geol. Surv. Vol. 3, p. 208 [1877] (*Protoplasta*); type of subgenus. (**Plate, Fig. 13.**) Western North America.

3. Genus TANYDERUS Philippi

Tanyderus Philippi, Verh. Zool -bot. Ges. Wien, Vol. 15, p. 780 (1865).

Remarks. — The genus *Tanyderus* was erected by Philippi in 1865 for the Chilian *T. pictus*. Additions to the genus have been made, more especially in the past decade, so that fifteen species are now referable to it. Handlirsch (1909) was the first to attempt a subdivision of the genus and proposed two new generic terms which are herein considered as being of subgeneric value. Of these subgenera, *Mischoderus* Handlirsch, includes five New Zealand species (*annuliferus*, *forcipatus*, *marginatus*, *neptunus* and *varipes*); *Radinoderus* Handlirsch, includes four species from the Papuan Subregion (*mirabilis*, *oculatus*, *ornatissimus* and *solomonis*); two species (*occidentalis* and *terræ-reginæ*) from Australia; and one (*gloriosus*) from Southern Chile; while *Tanyderus*, s. s., includes only the genotype, *pictus*, of Chile. In order to accommodate the two remaining species, *australiensis* and *patagonicus*, it is necessary to propose two additional subgeneric groups which are termed respectively *Nothoderus* and *Neoderus* (1).

It should be noted that members of the genus are confined to the Southern Hemisphere.

Characters. — Rostrum moderately elongate, about equal in length to the remainder of the head, or, in *Nothoderus*, longer than the head; maxillary palpi apparently 5-segmented, there being a small basal segment; in the subgenera *Neoderus* (**Plate, Fig. 19**) and *Nothoderus* the maxillæ are elongate, stylet-like, and the remaining elements of the mouthparts are likewise well developed. Eyes short-hairy. Antennæ with from 15 to at least 25 segments, the flagellar segments varying from short-cylindrical to elongate-cylindrical in the various species; the number of segments varies greatly in the different subgenera; *Tanyderus* has at least 25 segments; *Radinoderus* has 18 (*gloriosus*), 21 (*mirabilis*) or 22 segments (*oculatus*, *ornatissimus*); *Neoderus* has 17 segments; *Mischoderus* has 16 segments; *Nothoderus* has the minimum known number of 15 segments. Pronotum large. Laterocervical plates usually long and slender, much longer than the head excluding the mouthparts; in *Nothoderus* shorter and stouter. Mesonotum large, moderately hairy. Legs with conspicuous, erect setæ; tibial spurs distinct.

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(1) **Nothoderus,** nov. subgen. Characters as in *Tanyderus* s, s., but Sc_2 fuses with R for a distance and then breaks away, appearing as a distinct oblique vein that is provided with macrotrichiæ. Antennæ with 15 segments.

Type of subgenus. — *Tanyderus australiensis* Alexander (**Plate, Fig. 9**).

Neoderus, nov. subgen. Characters as in *Tanyderus*, s. s., but cells R_3 and R_5 of the wings a supernumerary crossvein. Antennæ with 17 segments.

Type of subgenus. — *Tanyderus patagonicus* Alexander (**Plate, Fig. 8, 19**).

Wings (**Plate, Fig. 6-10**) with the anal angle acute (*pictus*) or more or less developed, the wings always large and broad; Sc_1 usually present, lacking in *Nothoderus*; in this latter subgenus, moreover, the tip of vein Sc_2 is preserved as a conspicuous oblique element provided with macrotrichiæ; cell R_2 is always deep, in the species of *Radinoderus* being unusually so, the base of the cell being only a short distance beyond the end of vein Sc_1; in other groups the fork of R_{2+3} lies before midlength of the distal section of vein R_1; supernumerary crossveins developed in four of the five subgenera, in cell R_4 in *Nothoderus* and *Tanyderus*; in cells R_3 and R_4 in *Mischoderus*; in cells R_3 and R_5 in *Neoderus*; Anal vein well developed. Abdomen moderately elongate. Male hypopygium with a single dististyle, this cylindrical, of moderate length only, and unarmed except for setæ; ædeagus three pronged; gonapophyses lacking. Ovipositor with fleshy valves.

Type species : *Tanyderus pictus* Philippi.

TABLE OF SUBGENERA

1. *No supernumerary crossveins in any cells of wing; R_{2+3} forking shortly beyond vein* Sc_1 (**Plate, Fig. 6**) . . . . . Subgen. RADINODERUS Handlirsch.
   Supernumerary crossveins in radial cells of wing; vein R_{2+3} *longer* . . . . . 2.
2. *A supernumerary cross vein in cell* R_4 *only* . . . . . 3.
   Supernumerary crossveins in two radial cells. . . . . . 4.
3. *Antennæ with 15 segments. Anal angle of wing moderately developed; tip of vein* Sc_2 *preserved* (**Plate, Fig. 9**) . . . . . Subgen. NOTHODERUS, nov. subgen.
   Antennæ with at least 25 segments. Anal angle of wing acute; tip of vein Sc_2 *atrophied* (**Plate, Fig. 7**) . . . . . Subgen. TANYDERUS Philippi.
4. *Supernumerary crossveins in each of cells* R_3 *and* R_4. *Antennæ with 16 segments* (**Plate, Fig. 10**). . . . . Subgen. MISCHODERUS Handlirsch.
   Supernumerary crossveins in each of cells R_3 *and* R_5. *Antennæ with 17 segments* (**Plate, Fig. 8**) . . . . . Subgen. NEODERUS, nov. subgen.

Type species : *Tanyderus pictus* Philippi.

Geographical distribution.

Subgenus **Radinoderus** Handlirsch, Ann. Naturhist. Hofmus. Wien, Vol. 23, p. 264 (1909).

1. *T.* (*R.*) *gloriosus* Alexander, Arkiv för Zoologi, Vol. 13, p. 5, fig. (1920). (**Plate, Fig 6.**) — Chile.
2. *T.* (*R.*) *mirabilis* de Meijere, Nova Guinea, Vol. 13, p. 51, fig. 1 (1915); Tijdschr. v. Ent. Vol. 58, p. 104, fig. 1 (1915). — New Guinea.
3. *T.* (*R.*) *occidentalis* Alexander, Insec. Inscit. Menst. Vol. 13, p. 32 (1925). — Western Australia.
4. *T.* (*R.*) *oculatus* Riedel, Ann. Mus. Nat. Hungar, Vol. 18, p. 143 (1922). — New Guinea.
5. *T.* (*R.*) *ornatissimus* Doleschall, Natuurk. Tijdschr. Nederl. Indie, Vol. 17, p. 80 [1858] (*Cylindrotoma*); Osten-Sacken, Berl. Ent. Zeitschr. Vol. 31, p. 229 (1887); type of subgenus. — Amboina, Obi.
6. *T.* (*R.*) *solomonis* Alexander, Insec. Inscit. Menst. Vol. 12, p. 143 (1924). — Solomon Islands.
7. *T.* (*R.*) *terræ-reginæ* Alexander, ibidem, Vol. 12, p. 141 (1924). — Queensland.

Subgenus **Nothoderus**, nov. subgen.

8. *T.* (*N.*) *australiensis* Alexander, Rec. S. Austral. Mus. Vol. 2, p. 226 (1922). (**Plate, Fig. 9.**) — Tasmania.

Subgenus **Tanyderus** Philippi.

9. *T.* (*T.*) *pictus* Philippi, Verh. Zool.-bot. Ges. Wien, Vol. 15, p. 781, pl. 29, f. 57 (1865); type of subgenus. (**Plate, Fig. 7.**) — Chile.

Subgenus **Mischoderus** Handlirsch, Ann. Naturhist. Hofmus. Wien, Vol. 23, p. 264 (1909).

10. *T.* (*M.*) *annuliferus* Hutton, Trans. N. Zeal. Inst. Vol. 32, p. 48, pl. 4, fig. 21 *a-e* (1900); Edwards, ibidem, Vol. 54, p. 571, pl. 27, f. 7 (1923). — New Zealand.

11. *T.* (*M.*) *forcipatus* Osten-Sacken, Verh. Zool.-bot. Ges. Wien, Vol. 29, p. 520, f. 1-2 (1880); Edwards, Trans. N. Zeal. Inst. Vol. 54, p. 571, pl. 27, f. 4, 5 (1923); type of subgenus. (**Plate, Fig. 5, 10.**) — New Zealand.

12. *T.* (*M.*) *marginatus* Edwards, Ann. Mag. Nat. Hist. (9), Vol. 11, p. 625 (1923). — New Zealand.

13. *T.* (*M.*) *neptunus* Edwards, Trans. N. Zeal. Inst. Vol. 54, p. 272, pl. 27, f. 6; pl. 32, f. 123 (1923); (doubtfully distinct from *forcipatus*). — New Zealand.

14. *T.* (*M.*) *varipes* Edwards, ibidem, Vol. 54, p. 272, pl. 27, f. 8, 9 (1923). — New Zealand.

Subgenus **Neoderus,** nov. subgen.

15. *T.* (*N.*) *patagonicus* Alexander, Proc. U. S. Nat. Mus. Vol. 44, p. 332, f. 1-3 (1913). (**Plate, Fig. 8, 19.**) — Patagonia.

FOSSIL TANYDERINÆ

1. GENUS MACROCHILE LOEW

Macrochile Loew, Linn. Ent. Stettin, Vol. 5, p. 402 (1851).

Idioplasta Meunier, Mon. Tipulidæ et Dixidæ de l'Ambre Baltique, Ann. Sc. Nat. Zool. Paris (9), Vol. 4. p. 390 (1906).

Macrochile Crampton, Ent. News, Vol. 37, p. 33 (1926); Bull. Brooklyn Ent. Soc. Vol. 21, p. 1 (1926).

Remarks. — This interesting genus was proposed by Loew for the only known species, *M. spectrum*. Osten-Sacken and Meunier believed that the fly was identical with the recent genus *Protoplasa* Osten-Sacken, but this is certainly not the case. Osten-Sacken placed the name in the synonymy of *Protoplasa* under the belief that *Macrochile* was not available because of the earlier use of *Macrochila* Stephens and *Macrochilo* Hübner. A recent study of all the available specimens of this interesting fly has shown that it is curiously annectant between the subfamily Bruchomyiinæ and the typical Tanyderinæ. The detailed papers by Crampton on the affinities and morphology of the genus, cited above, should be consulted.

Characters. — Mouthparts elongated, somewhat shorter in the female than in the male; rostrum about one-half longer than the head, the very long labial palpi nearly twice as long as the rostrum; maxillary palpi long and slender, 5-segmented, the basal segment short, only one-third the length of the second; third segment nearly one-half longer and more slender than the second; fourth segment about one-half the third; fifth segment long and slender, a little longer than the second and about one-half longer than the fourth.

Antennæ 19-segmented, the flagellum long, setaceous, the segments cylindrical, with short, scattered setæ and sparse subbasal verticils that do not exceed the segments in length; flagellar segments decreasing very gradually in length and diameter to the last, which is a trifle longer than the penultimate.

If bent backward, the antenna would extend to about opposite midlength of the third abdominal segment. Head relatively small. Eyes large, rounded, with small ommatidia, between which project short, erect setæ. Anterior vertex reduced, the males being holoptic, the females dichoptic.

Pronotum and laterocervical plates much reduced, inconspicuous. Halteres very short and stout. Legs with the coxæ elongate; trochanters small; femora relatively short and stout, clothed with short, suberect, black setæ; tibiæ slender, the spurs long and conspicuous; tarsi with the segments gradually decreasing in length and very slightly in thickness, each segment on ventral face terminating in a small spine; tarsal claws small, smooth, erect. Wings with *Sc* relatively short, Sc_1 extending to about opposite one-third the length of R_{2+3}, Sc_2 a little longer than Sc_1; *Rs* a little longer than R_{2+3}, gently arcuated at origin; cell R_2 variable in length, in most cases a little more than twice its petiole; a short spur on *r-m* close to its union with R_{4+5}, jutting into cell *R*; *M* in direct alignment with M_{1+2}; cell *1st* M_2 long and narrow, the basal section of M_{1+2} from one-third to one-half R_{2+3}; *m-cu* at the fork of M_{3+4}; Cu_2 well-indicated, extending almost to the wing-margin; a single well-preserved anal vein. Anal angle of wing well-developed but not so squarely so as in *Protoplasa*. Wings without a dark pattern.

Male hypopygium with a single dististyle, this cylindrical, narrowed to the obtuse apex, on the mesal face at base with a slender curved arm, the apex of which is chitinized and obliquely flattened, directed toward a small rounded knob lying in its axil, the two lobes separated from one another by a small circular notch. Mesal face of dististyle at apex with long erect setæ. Ædeagus apparently bifid. Ovipositor short and blunt, fleshy, consisting of a stouter basicercus and a more slender disticercus, the latter tufted with short setæ.

Type species : *Macrochile spectrum* Loew.

Geological distribution.

1. *M. spectrum* Loew, Linn. Ent. Stettin, Vol. 5, p. 402, pl. 2, f. 24, 25 (1851); Crampton, Bull. Brooklyn Ent. Soc. Vol. 21, p. 1, pl. 1-2 (1926). Baltic Amber.

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EXPLANATION OF PLATE

Fig. 1. Venation of *Bruchomyia argentina* Alexander.

— 2. Venation of *Nemopalpus zelandiæ* Alexander.

— 3. Lateral aspect of adult *Bruchomyia argentina* Alexander.

— 4. Supposed larva of *Protoplasa* (*Protoplasa*) *fitchii* Osten-Sacken.

— 5. Male hypopygium of *Tanyderus* (*Mischoderus*) *forcipatus* Osten-Sacken; slightly flattened on slide.

EXPLANATION OF ABBREVIATIONS. — *a* = ædeagus; *b* = basistyle; *d* = dististyle.

The terminology of the parts of the male hypopygium are interpreted according to Crampton (Trans. Amer. Ent. Soc. Vol. 48, p. 207-225, 1923).

— 6. Venation of *Tanyderus* (*Radinoderus*) *gloriosus* Alexander.

— 7. Venation of *Tanyderus* (*Tanyderus*) *pictus* Philippi (after Philippi).

— 8. Venation of *Tanyderus* (*Neoderus*) *patagonicus* Alexander.

— 9. Venation of *Tanyderus* (*Nothoderus*) *australiensis* Alexander.

— 10. Wing of *Tanyderus* (*Mischoderus*) *forcipatus* Osten-Sacken.

— 11. Venation of *Protoplasa* (*Protoplasa*) *fitchii* Osten-Sacken.

EXPLANATION OF ABBREVIATIONS. — *Sc* = Subcosta; Sc_1 = being the anterior or outer branch; *R* = Radius, R_1, R_2, R_3, R_4 and R_5 being the five branches, the last four being branches of the Radial Sector (*Rs*); M = Media, with its four branches, M_1, M_2, M_3 and M_4; *Cu* = Cubitus; *A* = Anal vein.

The venation is here interpreted according to the Tillyard modification of the Comstock-Needham System.

— 12. Wing of *Protoplasa* (*Protanyderus*) *vanduzeei* Alexander.

— 13. Wing of *Protoplasa* (*Protanyderus*) *vipio* Osten-Sacken.

— 14. Dististyles of male hypopygia of species of *Protoplasa*.

A. *Protoplasa* (*Protanyderus*) *beckeri* Riedel.

B. *Protoplasa* (*Protanyderus*) *vanduzeei* Alexander.

C. *Protoplasa* (*Protoplasa*) *fitchii* Osten-Sacken.

— 15. Wing of *Péringueyomyina barnardi* Alexander.

— 16. Head of *Péringueyomyina barnardi*; ventral aspect.

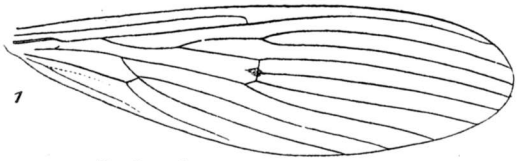
— 17. Head of *Péringueyomyina barnardi*; lateral aspect.

— 18. Male hypopygium of *Péringueyomyina barnardi;* lateral aspect.

— 19. Head of *Tanyderus* (*Neoderus*) *patagonicus* Alexander.

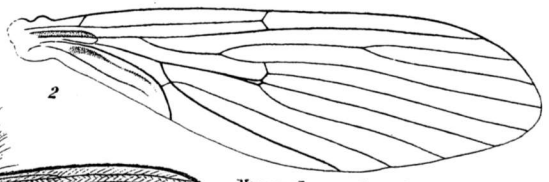
EXPLANATION OF ABBREVIATIONS. — *mxp* = maxillary palpus; *lp* = labial palpus.

Amherst, Mass. U. S. A. June 1, 1926.



1

Bruchomyia argentina Alex., venation



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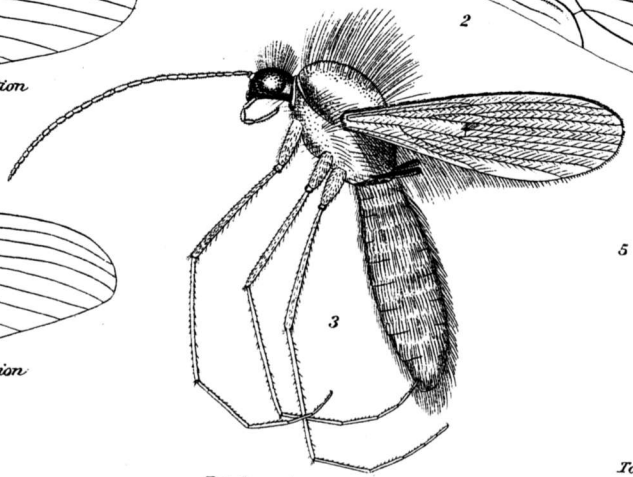
Nemopalpus zelandiæ Alex., venation



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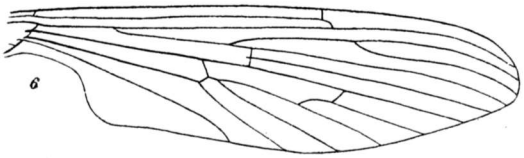
Bruchomyia argentina Alex.,



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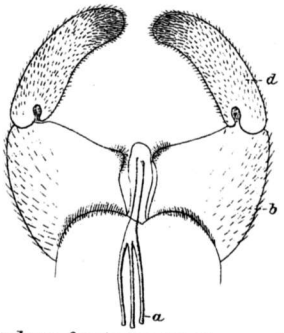
Tanyderus gloriosus Alex., venation



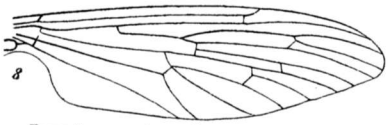
5

d

b

a

Tanyderus forcipatus O.S. ♂ hypopygium



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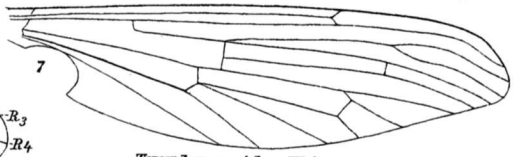
Tanyderus patagonicus Alex., venation



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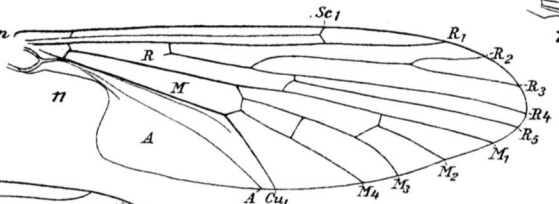
Tanyderus pictus Phil. venation



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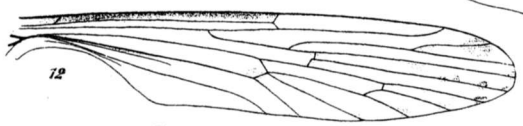
Protoplasa fitchii O.S., venation



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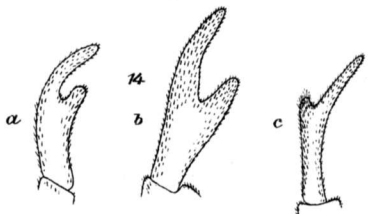
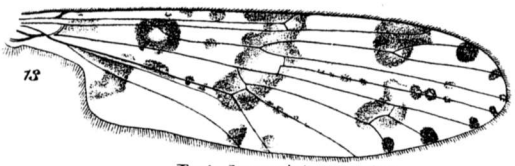
Protoplasa vanduzeei Alex., wing.



Dististyles of hypopygia of Protoplasa



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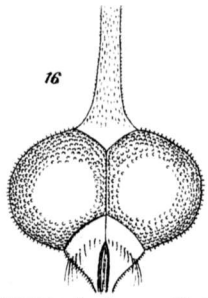
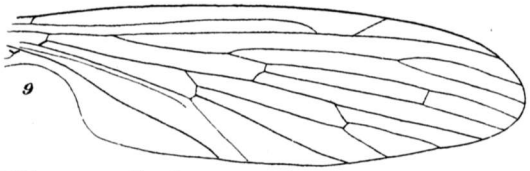
Protoplasa vipio, O.S., wing.



16

Peringueyomyina barnardi Alex., head,.



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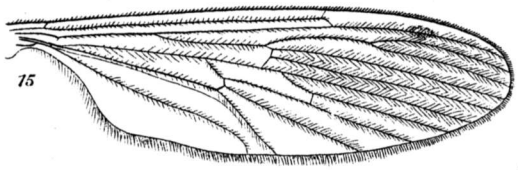
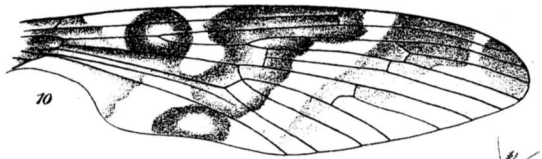
Tanyderus australiensis Alex., venation



15

Peringueyomyina barnardi Alex., wing.



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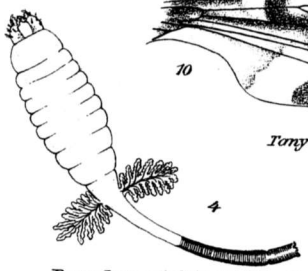
Tanyderus forcipatus O.S., venation



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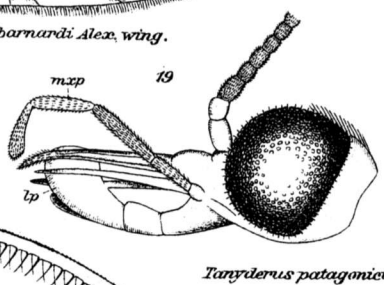
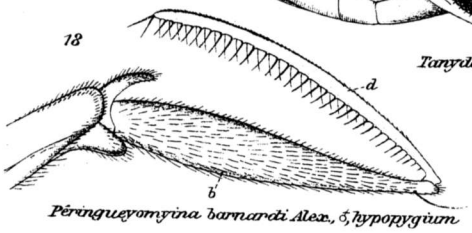
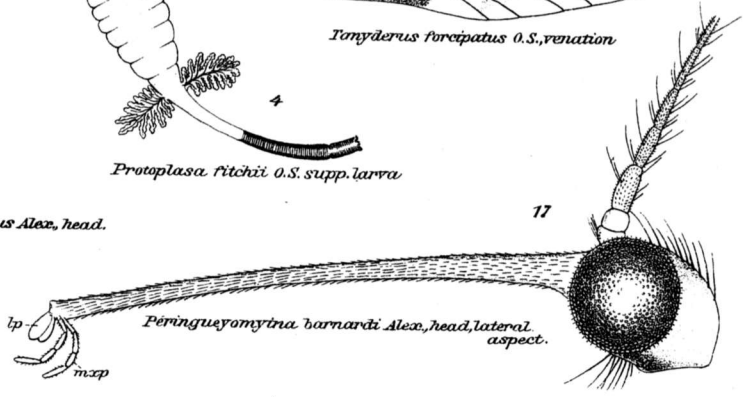
Protoplasa fitchii O.S. supp. larva



Tanyderus patagonicus Alex., head.



Peringueyomyina barnardi Alex., ♂ hypopygium



Peringueyomyina barnardi Alex., head, lateral aspect.

FAM. TANYDERIDÆ