DESCRIPTIONS OF NEW AND REMARKABLE NEW ZEALAND DIPTERA

By A. L. Tonnoir, Field Entomologist, Cawthron Institute, Nelson.

Bombyliidae.

The presence in New Zealand of a representative of the family Bombyliidae has been recorded for the first time by Hutton, but one might say that it was a false alarm, because the dipteron he ascribed to that family, with some doubt, it is true, and which he described under the name of *Faudator perspicuus* sp. n. (Tr. N.Z. Inst. XXXIII., p. 23) is in fact a true Empidid, as an examination of Hutton's type has shown.

However, a true representative of the Bombyliidae exists in New Zealand; it is a rather rare and apparently very localised species which has been collected for the first time by Dr. Tillyard near Nelson.

It belongs, apparently, to a new genus of rather difficult location within the family, and for which I propose the name of **Tillyardomyia,** in honour of its discoverer; I think it can be best placed among the Toxophorinae in the vicinity of *Marmasoma* White, a Tasmanian genus.

Tillyardomyia is characterised in the following manner:— Body elongated, rather thin, completely covered with scales and hairs. Abdomen cylindrical, with seven visible segments (besides the genitalia); the abdomen is placed at an angle with the thorax, this gives to the body a somewhat humpy appearance. Antennae as long as the head, first segment elongated, cylindrical. Legs thin, tibiae with rows of bristles. Venation $R_2 + _3$, and R_4 joined by a cross-vein; $R_2 + _3$ bent at right angle near its extremity. M with three branches (three veins issuing from the discoidal cell).

This type of venation (see fig. 1A) is rather similar, if not identical, to that of *Conophorus* Meig (*Ploas* Loew) of the subfamily Bombyliinae, but the elongated cylindrical abdomen of *Tillyardomyia* precludes its being placed in that subfamily. In Bombyliidae the morphological characters given by the body are, to my mind, much more important than those given by the venation of the tip of the wing, which takes sometimes the same course in fairly remote members of different subfamilies. Thus the cross-vein between $R_2 + _3$ and R_4 in *Tillyardomyia* is found again, besides *Conophorus*, in *Eniconeura, Toxophora, Cyllenia, Tomomyza* of the Toxophorinae in *Hyperalomyia* and *Exoprosopa* of the Anthracinae, in *Lardotus, Geminaria, Exepacmus*, etc., of the Bombyliinae.

The upward curving or looping of $R_2 + _3$, and R_4, is also not a character limited to certain subfamilies, contrarily to what is often given in certain subfamilies tables; this condition of these two veins is found just as well in the Lomatiinae as in the Bombyliinae (*Legnotomyia, Lardotus*, etc.).

It seems that the only group where this new genus can fit satisfactorily would be the Toxophorinae (s.l.). As already mentioned the nearest ally to *Tillyardomyia* in the Australian region is *Marmasoma*, the venation of which is given in fig. 1B. The genus *Marmasoma* was erected by White (Proc. Roy. Soc. Tasm., 1916, p. 189), who placed it among the Bombyliinae, in spite of the fact that this author recognised that all its affinities were with genera like *Toxophora*, *Amictus* and *Cyllenia*, which all belong to the Toxophorinae (s.l.), and this because he did not know which limits to ascribe to this last subfamily.

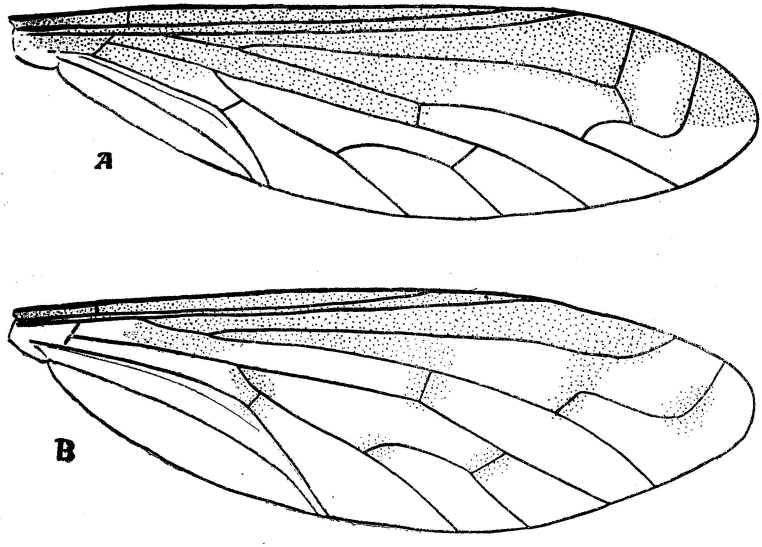

Fig. 1—A, wing of *Tillyardomyia gracilis* sp. n.
B, wing of *Marmasoma sumptuosa* White.

In his revision of the Australian Bombyliidae (Proc. Roy, Soc. Tasm., 1921, p. 41-83), Hardy placed *Marmasoma* among the Systropinae in company with *Eclimus*. It is true that the position of this last genus is doubtful; Loew, who erected it, placed it in the vicinity of *Systropus*, but nearly all subsequent authors include it among the Toxophorinae. There also should be placed *Marmasoma*, which, with its arched body bristly on the thorax, the general vestiture of body, and that of the legs stands in close relationship with *Toxophora*.

Tillyardomyia differs from *Marmasoma* by the longer palpi, the thorax much less humpy, devoid of strong bristles, except on the sides in front of the suture, and by the venation in which $R_2 +_3$ is

bent at right angle near its tip, and united by a cross-vein to R_4. By its venation it comes near *Cyllenia*, another genus of the Toxophorinae among which the cross-vein *r* is often present.

The genotype of *Tillyardomyia* is the following species :—

T. gracilis sp. n.

MALE.—The whole body, the head and its appendages, as well as the legs completely black, with a covering of yellowish or whitish hairs or scales at certain definite spots.

Head with long black hairs on upper part of occiput, yellowish-white on the sides ; those of the lower part are white and fine. Eyes touching on a long distance from the top of vertex to the base of antennae ; small frons silvery-white. Antennae as long as the head, with the first segment cylindrical, about two and a-half times as long as broad, densely covered with sub-erect black hairs, longer below ; second segment shorter than broad ; third elongate triangular, flattened with only a few short setae ; arista composed of two segments, a very short basal one, and the second one ending in a spine. Palpi thin, about two-thirds as long as the proboscis, and with scanty pubescence, basal segment about four times as long as the second.

Thorax little arched, mesonotum and scutellum velvety black, with fine black erect hairs, three more or less distinct rows of yellow pile on the anterior half of the disc ; shoulders and lateral margins with a line of yellowish, long, more or less adpressed hairs in which a few small white tufts are mixed.

Pleurae completely covered with a grey pruinosity, and with some patches of yellow hairs ; hypotergites and metanotum with white tufts of longer hairs ; scutellum bordered with a line of yellow adpressed hairs.

Legs completely covered with black scales ; the femora with yellow scales mainly on the internal side at the base ; tibiae with rows of short bristles, a few bristles present also on the external apical part of the femora ; coxae with white hairs.

Halteres dark brown.

Abdomen thin, cylindrical, twice as long as the thorax ; dorsum covered with black scales, sides with yellowish scales ; the patches of pale scales extending more dorsally in a triangle on segments 3 and 5 ; venter completely covered with yellowish scales.

Wings with a broad anterior dark band widening up to the level of *r-m*, then narrowing in an upward curve, and extending to the tip of the wing, but presenting a clear space in the cell between tip of R_{2+3} and R_4.

Size : Body 10 mm (incl. antennae), wing $7\frac{1}{2}$ mm.

FEMALE.—Head. Eyes well distant, width of frons 2½ times smaller than the width of eye seen from above; a conspicuous white tuft of hairs just above the antennae. First antennal segment relatively longer than in male. Pale tufts of hairs on the sides of the thorax mostly whitish. Only the front femora with yellowish scales on the internal side, the other completely covered with black scales. Abdomen somewhat flattened, and wider than in the male.

Type: Dun Mt., 2,000 feet, 14th Feb., 1925 (E. S. Gourlay), in Cawthron Institute collection.

Allotype: Same locality, 20th Dec., 1925 (E. S. Gourlay).

Paratopotypes: Four males.

Paratypes: Dun Mt., 13th Jan., 21st and 3rd Feb., 21 (A. Philpott); Maitai Valley, 10th Feb., 1924 (A. Philpott); Ohakune (T. Harris).

A female from this last locality differs from the others by the pale tufts on the side of the thorax, and even the pale hairs bordering the scutellum, are all white.

All the scales on the under side of the abdomen are also white, and the dorsal white triangles of segment five are nearly meeting on the median line.

LEPTIDAE.

Up till now no species of this family had been recorded from New Zealand, and, after several years of collecting through the country, I had come to the conclusion that none existed here. When going through a collection of Dolichopodidae, kindly submitted to me by Mr. D. Miller, I was most surprised to find among the lot a small form belonging to the Leptidae. The specimen had been collected on the west coast of the South Island by J. W. Campbell in 1918, and the species has apparently never been met since.

This species belongs evidently to the genus *Chrysopilus* of world-wide distribution, although it is deprived of the golden or silvery pile, which is characteristic of nearly all the known species.

The specimen I have before me is a female, and the peculiar conformation of its head is typical of that of *Chrysopilus*; the eyes are widely separated; the ocellar tubercule is rather prominent; the vertex is separated from the occiput by the typical, rather shallow furrow; the vertex ((frons of the dipterists) is slightly puffed up, and provided with the shallow transverse depression just above the antennae; the epicranial suture is present on the lower part of the vertex, and its arms run in deep furrows, which separate the very convex fronto-clypeus from the parafacials. All the appen-

dages are typical of the genus only the legs are a little shorter than usual ; the number of tibial spurs agree, and the venation differs only by unimportant details.

The species can be described as follows :—

Chrysopilus nitidiventris sp. n.

FEMALE.—Head greyish brown, darker on the frons, paler on the face and occiput ; all the hairs of the upper part of the head black, those of the under side yellowish ; palpi, proboscis and antennae blackish brown ; arista a little over twice the length of the antennae.

Thorax dull greyish, paler on the pleurae ; mesonotum with two median, rather narrow brown lines, and a wider lateral stripe on each side divided into two by the suture. All the hairs of the thorax black, with exception of a small yellow tuft on the edge of the mesonotum just in front of the suture, and those of the pleurotergites, which are yellowish.

Legs : Coxae dull grey with yellowish hairs, femora shining black, their tip tawny ventrally, their vestiture black. Tibiae tawny orange, with black apex ; their apical spurs pale ; metatarsi tawny, rest of tarsi blackish. The legs are comparatively short, especially the front and middle pairs. The front tibiae are equal to their femora, but the middle ones are only by one-sixth longer than their femora, and the hind ones by two-sevenths. The tibial bristles are very diminutive, and difficult to detect ; on the fore and mid tibiae they are present on the under side only ; on the hind tibiae the dorsal bristle form a rather closely set row, but in the ventral row the small bristles are wider apart and less conspicuous. The tarsi are also relatively shorter than usual in the genus ; the front ones are very little longer than their tibiae, but the mid and hind ones are distinctly shorter; the metatarsi of all the legs are about as long as the four other segments.

Wing with a rather uniform brownish suffusion, the stigma pale brown, the membrane seems somewhat tougher as is usually the case in the genus. Sc long, ending at the level of *r-m* ; R_{2+3} not conspicuously curved upward at the tip, and ending in costa at a distance from R_1, equal to the distance between the tip of Sc and that of R_1. Cross-vein *r-m* placed on the middle of the discal cell ; *im* placed at the fork of M_1 M_2 ; fork R_5 R_4 a little past that of M_3 M_4, its branches somewhat convergent at the tip. Squamae brown, fringed with yellow hairs. Halteres orange.

Abdomen conical, but not much elongated, the first four segments strongly shining black, the first one with long yellow hairs, the others with black hairs ; no golden or silvery pile present ; the last segment forming the ovipositor, dull grey.

First segment of palpi twice as long as wide, second large, incrassate distally ; third one half as long, fourth a little longer than the second, but thinner.

Thorax ochreous, scutellum and disc of postnotum brownish ; pleurae and mesonotum mostly dark, rather shining and bare, except the pteropleurae and hypotergites ; mesonotum with rather long erect pubescence.

Legs ochreous, thickly covered with long and short golden hairs

Abdomen ochreous, the tergites darker laterally ; pubescence rather long, golden, more scanty than on the thorax.

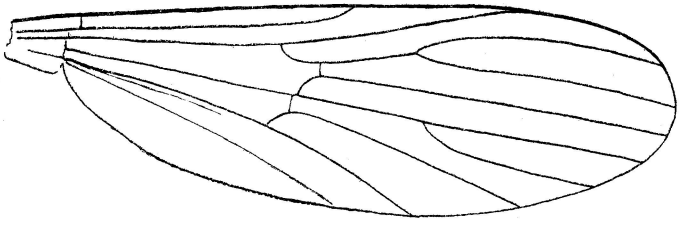

Fig. 2—Wing of *Corethrella novae-zealandiae.*

Wings slightly yellowish, and slightly infuscated on the cross-veins and at the forks ; veins covered with a dense row of devaricated adpressed golden hairs ; posterior fringe formed of elongate silvery golden scales ; venation as in fig. 2. Halteres yellow.

Length of body, 2mm. ; wings, 2½mm.

Type : Otira, 7th Feb., 1922 (Tonn.) in Cawthron Inst. Coll.

Paratypes : Lake Brunner, 2nd Feb., 1922 (Tonn.).

THAUMALEIDAE (ORPHNEPHILIDAE).

In his beautiful study of this family (Taumaleidi Italiani, Portici, 1913), Professor Mario Bezzi, when speaking of the geographic distribution of the species mentions that sooner or later they would be found also in other zoological regions than the three in which they were known to occur then (Palearctic, Nearctic and Neotropical). As regards Australasia I have been able to fill the gap by a methodical search for Thaumaleidae in the mountainous districts of N.S.W., Victoria, Tasmania and New Zealand.

In this paper I intend to deal only with the two species I discovered in the latter country. I found them first on the Mount

Arthur plateau, then on the West Coast of the South Island, and in the vicinity of Nelson ; so far they have not been recorded from the North Island.

Although not rare, Thaumaleidae are likely to be easily overlooked on account of their small size, and their dull colouring ; however, when once in the net they attract immediately one's attention by their peculiar habitus, and the way they have to hold the wings folded, drooping on the sides of the body. These flies are usually found on the foliage of plants in the vicinity of small waterfalls, or near small springs trickling down a rocky bank.

The two species here studied, and the eight from Australia and Tasmania, which will be dealt with in another paper, form a compact group, which, although not differing widely from Thaumalea, presents, however, some peculiar characters justifying the formation of a new genus, so as to oppose it to the group of species of the Northern Hemisphere.

I propose the name **Austrothaumalea** for this new genus.

The genus *Thaumalea* Ruthe is characterised in the following manner :—Head roundish, with holoptic eyes in both sexes ; antennae placed near the oral margin, composed of twelve segments, the 4-5 basal ones much swollen comparatively to the distal ones which are elongate, scarcely distinct from each other, and forming consequently a sort of arista. Palpi 4 segmented distinctly (sometimes conspicuously) larger than the antennae. Thorax much arched, almost bare. Abdomen more or less cylindrical ; legs simple, bare without tibial spurs ; wings rather elongate (Fig. 3A) ; Sc rather short, and ending in costa ; stem of Rs short ; a cross-vein between R_1, and the anterior branch of the sector which may be R_2 ; it is placed very near the base of R_1 ; branches of Rs more or less convergent ; M with two branches ; Cu simple and An absent.

Austrothaumalea differs from the genus *Thaumalea* as above defined as follows :—

Antennae subequal to palpi.

Wings short and rounded, with a distinct kink in the costa at the base.

Sc ending in R_1, and not in costa.

Cross-vein r (R_2 ?) placed rather near the tip of R_1.

Anterior branch of Rs usually strongly undulated.

Cross-vein m-cu, reaching M at the fork of this vein ; in holarctic species this cross-vein is shorter, and reaches the lower branch of M at some distance past the fork.

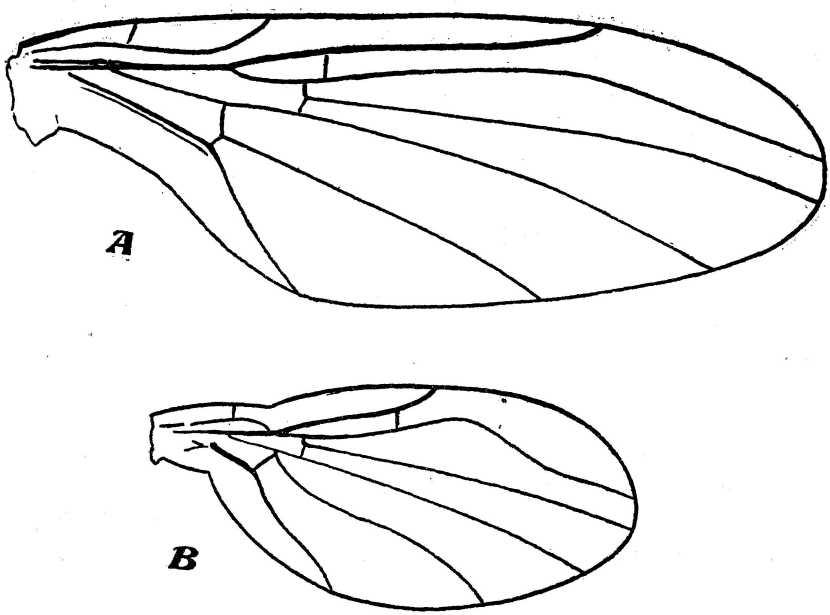

Fig. 3—A, wing of *Thaumalea testacea* Ruthe ;
B, wing of *Thaumalea neozealandica* sp. n. ;
(These two wings drawn at the same scale).

Cu sometimes provided with a basal spur.

Besides these differences in the adult stage, the erection of a new genus is justified by the peculiar conformation of the pupa, which is provided with foliate expansions on the side of the body.

The genotype of *Austrothaumalea* is the following species :—

A. **neozealandica** sp. n.

Size : length of body, 2mm., of wing 2¼mm.

Male.—Head brownish black, as well as its appendages ; antennae nearly as long as the head ; its first segment much reduced, the second large, spherical ; the third smaller, subspherical ; the fourth and fifth sub-equal to each other, and globulous ; the following segments are cylindrical, and gradually thinner towards the extremity of the antennae ; the last one is, however, a little thicker than the preceding ones, and also a little longer. The vestiture of the antennae is formed of a fine microscopical pubescence, and of a few short bristles, especially on the second segment ; segments 3 to 5 bear some sense organs in shape of a thimble.

Palpi four segmented, nearly as long as the antennae ; the first three segments thick, sub-equal to each other, the last one thinner and longer, about four times as long as wide.

Thorax reddish brown, with a very short scattered yellowish-brown pubescence, and a few black bristles as follows :—one humeral, two or three notopleural, one supra-alar, the prescutellars are difficult to homologise ; they may belong either to the acrostical or to the dorsocentral series ; the pair nearest the scutellum is reclining forward ; there are six scutellar bristles.

Legs reddish yellow, without bristles, but with small spines at the tip of the tibiae and without spurs ; fourth segment of the tarsi bilobed, claws simple ; empodium present in the shape of a thin bristle ; pulvilli not distinct.

Wing membrane tinged with brownish (sometimes a little darker on the anterior border) ; shape and venation as in fig. 3B, and as discussed in generic diagnosis ; the transverse basal fold is marked on the wing only by the weakening of the base of R a little before the origin of Rs.

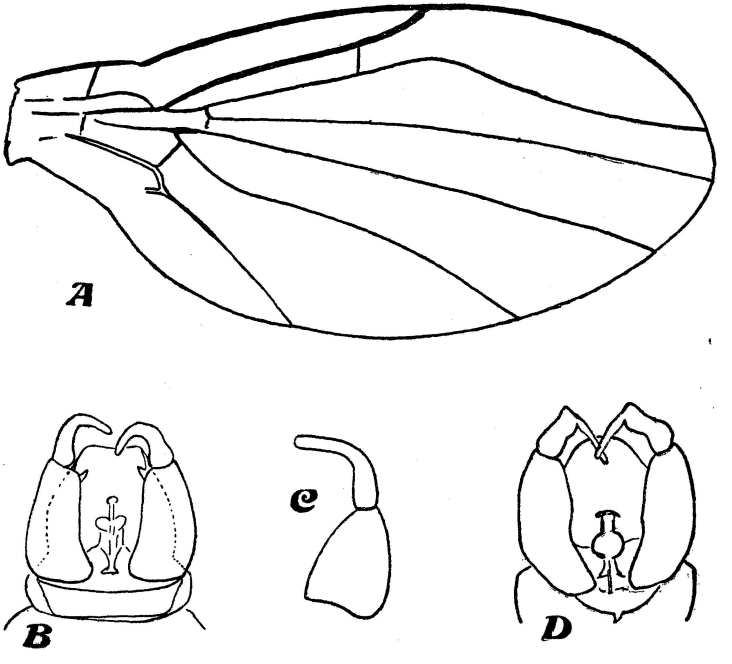

Fig. 4—A, wing of *Thaumalea appendiculata* sp. n. ;
B, hypopygium of *T. neozealandica* seen from below ;
C, sidepiece and branch of forceps of *T. neozealandica* seen from the side ;
D, hypopygium of *T. appendiculata* seen from below.

Abdomen brown, with little distinct pubescence; nine segmented, the first eight each with a pair of spiracles; ninth tergite in shape of an strong arched plate with truncate extremity, and carrying on its internal inferior edge a small tooth on each side; ninth sternite reduced to a very narrow strip; side-pieces swollen, more or less conical, and nearly as long as the tergite; forceps curved upward at the middle, and with rather blunt tips; they are slightly flattened laterally; eadeagus small, but showing distinctly between the side-pieces; tip of the penis with a little terminal knob (fig. 4B, C).

Female similar to the male in every respect; abdomen ending in two little distinct small lamellae; the eighth sternite is emarginated in front of the genital opening.

Type: Waiho, 18th Jan., 1922 (Tonn.), in Cawthron Inst. Coll.

Allotype: same locality and date.

Paratopotype: five males and three females.

T. **appendiculata** sp. n.

Male and female similar to the preceding species from which they differ only by the conformation of the base of Cu, which is rather thick, and is provided, a little distance after m-cu, with a little stump directed backward (fig. 4A).

The male hypopygium differs from that of *neozealandica* by the forceps, which are bent sharply at right angle at the middle, their distal halves being much thinner than the basal ones (fig. 4D).

Type: Otira, 7th Feb., 1922 (Tonn.), in Cawthron Inst. Coll.

Allotype: Waiho, 21st Jan., 1922 (Tonn.).

Paratypes: three males and two females with the type, and from Dun Mountain, 7th Jan., 1922, Mt. Arthur Tableland, 25th Dec., 1921.