

Chapter XI

Hemiptera (Homoptera): Psyllidae

By G. HESLOP-HARRISON

Introduction

In perhaps the most comprehensive survey of world Psyllidae ever made, I have established, at least to my own satisfaction, that this Homopterous family of insects is divisible into six distinct subfamilies only. This conclusion has been reached despite the fact that some eight or even nine subfamilies may be recognised by other authors. As a full account of the reasons, the methods of subfamily separation used as well as details of the tribal units into which I have divided each subfamily is being published in another place, it is sufficient to state here that the six subfamilies recognised are the Psyllinae LÖW, the Triozinae LÖW, the Aphalarinae LÖW, the Liviinae LÖW, the Ciriacreminae ENDERLEIN and the Spondyliaspinae HESLOP-HARRISON. All six of these subfamilies occur in Africa, and except for the Liviinae, are known to extend in range as far south as the region covered by the present Swedish South African Expedition of 1950-1951.

Perhaps the most recently evolved subfamilies of the six now recognised within the Psyllidae are the Psyllinae and the Triozinae, but despite this, many of their genera have an almost global distribution. This particularly applies to the genera *Psylla* CURTIS (GEOFFROY) and *Trioza* FÖRSTER, both of which occur in South Africa.

The Aphalarinae also seems to have a world-wide distribution although, as yet, no truly aphalarine genus has been described from Australia. In the latter case, previous confusion of identities amongst Australian genera render the position still quite uncertain. The typical genus *Aphalara* FÖRSTER and its derivatives *Craspedolepta* ENDERLEIN, *Colposcения* ENDERLEIN and *Stigmaphalara* ENDERLEIN, etc. (the latter considered by me to be good, sound genera) are, for the most part, restricted to the North Temperate Region, although *Aphalara* itself penetrates into North India (Dehra Dun) and in certain island groups of the West Indies. All four of these genera, however, are very characteristic of that part of the North African fauna influenced strongly by Mediterranean influx, but the subfamily is distributed throughout Africa, where it is represented by many new genera. Despite contrary reports, however, the old exogenous genus *Rhinocola* FÖRSTER is not present anywhere in Africa and the South African species hitherto known as *Rhinocola crotalariae* PETTEY, whilst being of the Aphalarinae, is only related to *Rhinocola* by virtue of its small size.

The Liviinae as at present known, consists of two genera only, *Livia* LATREILLE and *Diraphia* WAGA. For the most part, species of these genera have a North Temperate distribution, but some do occur in the Indo-Malayan region (Shillong, Assam). As pointed out elsewhere, reports of the Liviinae occurring in Australia are completely erroneous. In North Africa, species of both genera occur in the Atlas Mountains, a mountain range which seems to have restricted their passage further south into other parts of Africa.

The Ciriacreminae, a subfamily about which much confusion exists, was first established in an authentic fashion, and under that name, by ENDERLEIN, on the basis of material collected by an earlier Swedish Expedition to Africa (Kilimanjaro-Meru), and it can, for our purposes, be regarded as typical of the Old World Tropics. It does, however, extend throughout the tropics, but it certainly has its widest degree of expression in the African region; it is present in South Africa.

The last subfamily, the Spondyliaspinae, I have only recently defined (1954) although SCHWARZ suggested that such a subfamily should be created as early as 1898. Just as the Ciriacreminae may be considered as typical of the African Old World Tropical Region, so too, may the Spondyliaspinae be regarded as typical of the Australian region. Although contrary impressions may have been created by other authors, when I defined the subfamily I was very careful to indicate that the Spondyliaspinae did have a wide extra-Australian distribution as well. Some of its genera occur throughout the African region including South Africa.

In the past, knowledge of the African Psyllidae has been of a very limited nature, and in an earlier place I have implied that I considered that the richest psyllid fauna in the world was perhaps that of Australia. Since that was written, vast collections of African Psyllidae from many different parts have become available for my study and I conclude now that if not greater, the Psyllid fauna of Africa, both numerically and in kind, is at least equal to that of Australia.

The forty or so species hitherto described and which at present represent this vast assemblage, can therefore only be considered as a very small fraction of the actual total that will be described in time. Even so, when the few described species are all placed in their correct genera, and the relationships of the latter properly assessed, this small proportion is seen to give an incomplete but nevertheless correct impression of the nature of the African psyllid fauna as a whole, since all the subfamilies have been represented and most of the major critical genera included. The information concerning the described African species is scattered and the publications in which it occurs are frequently obscure, but the published works themselves include many by authors who have made outstanding contributions to our knowledge of the Psyllidae of other regions. Why the African psyllid fauna has been so much neglected in the past is extremely difficult to understand.

For the present purposes it has been necessary to consult the works of such authors as AULMANN, DE BERGVIN, BOSELLI, ENDERLEIN, KIEFFER, LETHIERY, NEWSTEAD, PETTEY, PUTON, RUSSELL, SCOTT, VOSSELER and WALKER, and these date from as early as 1870 to as recent as 1945.

Of the many contributions of outstanding importance, in my opinion, has been the oft-misquoted and certainly misunderstood work of ENDERLEIN, which was published in 1910. It deserves special mention in this place, first because it happens to have been a most important contribution from an earlier Swedish Expedition to Africa, but second, and perhaps of even greater significance, because a detailed examination of its inclusions has revealed that the Carsidarinae, a subfamily of psyllids introduced by CRAWFORD in 1911, is only an invalid version of the earlier (1910) category recognised by ENDERLEIN as the Ciriacreminae, a subfamily of special significance in Africa. This state of affairs has been obscured subsequently by the frequent misquotation of the facts, or a failure to refer to ENDERLEIN's original text after the initial misquotations had been made concerning it. There are, however, other issues involved, and a very difficult situation has arisen.

More important from our immediate point of view with regard to the identification of the psyllids from South Africa, have been the three contributions made by PETTEY from 1921 to 1923. In these he described ten species from South Africa, eight of which were indigenous species, and two, introductions from Australia. None of the species handled by PETTEY, however, seem to have been collected by the present Swedish Expedition to South Africa.

PETTEY's descriptions and illustrations, compared with those of some of his contemporaries in this field, may be considered to have been exceptionally good, but despite this fact there is clear evidence that he was no specialist. He stated that the American, CRAWFORD, had been consulted in placing his species in their respective genera, and it is also known that he spent some time in the British Museum, where it is presumed he was studying types. Even then, four or more wrong genera have been used, a fact indicated by reference to his illustrations, beyond all reasonable doubt.

PETTEY's work is the first and only work in which South African Psyllidae have previously been described, and although only eight indigenous species were considered, the present indications are that South Africa has a very rich and varied psyllid fauna indeed. It is also one, which, strange as it may seem on the surface, appears to have strong Palaearctic-Mediterranean or North Temperate leanings.

Undoubtedly a large autochthonous psyllid fauna is also present but the parts of the latter about which we know, have not as yet, revealed anything very surprising or strange. For the most part, my impressions of the psyllid fauna of Africa, and South Africa in particular, have been gained from several different sources. I am primarily indebted to Mr. CAPENER, of Johannesburg, who, over the past few years, has sent me many consignments of psyllids he has collected, to Dr. HALL, Director of the Commonwealth Institute of Entomology with whom I have a working arrangement, and to the Trustees of the British Museum who have given me full access to the TURNER Collections; the latter include many very interesting psyllids from South Africa, all new, and these I have undertaken to describe as they fit into my current working programme.

The psyllid fauna of South Africa cannot be considered in isolation, that is, if a

proper understanding of the Psyllidae of Africa as a whole is to be gained, and although I am at present treating the Psyllidae of the 1950-1951 Swedish Expedition independently for the purposes of describing the new species, it should be appreciated that the following remarks, even if of a general nature, have been based on studies over a much wider field, and one which has already embraced vast resources of psyllid material from all parts of Africa and the world in general.

Except in one or two instances, as for example in the cases of the two genera of the Liviinae, no sharply drawn line exists between genera ordinarily considered to be of a Palaearctic or North Temperate type and others at present considered to be more typical of Equatorial Africa. Despite the existence of extensive desert regions and high mountain barriers between, the one type simply merges into, and is then gradually replaced by the other. Genera seem to range north or south, as the case may be, without interruption, and replacements appear to be largely at the specific rather than the generic level. Since no host data is available for the species in most cases, and without the special, on-the-spot ecological studies that would be necessary, no conclusive statements are therefore possible. Thus, without being able to be more specific, we have to accept on its face value only, the fact that such accepted Mediterranean genera as *Floria* LÖW, *Diaphorina* LÖW, *Trioza* FÖRSTER, *Psylla* CURTIS, *Euphyllura* FÖRSTER, *Carmarotoscena* HAUPT, and even *Homotoma* GUÉRIN, reach as far south in the African continent as French Equatorial Africa, Southern Sudan and Ethiopia (Erytrea), and, so far as I can ascertain, in their accepted typical forms. That some of them appear to diversify considerably in their most southerly range, is also a fact that we have to accept on its face value at present, but it may be suggested that genera of this type are not, strictly speaking, typically Mediterranean or Palaearctic, although they have all been previously accepted as such.

The equatorial region of Africa itself, however, is populated to a very large extent by a host of additional genera, most of which are new and seemingly specific to that area; within this plexus of tropical autochthonous genera, the genera mentioned above ultimately become absorbed and finally disappear.

There is, unfortunately, a gap in my knowledge of the African Psyllidae, for a region of considerable extent and lying immediately south of the Equatorial Belt, but in that area, which for the present purposes we have termed "South Africa" and which is also inclusive of the area covered by the present South African Swedish Expedition, is not represented. However, we see that many of the genera first appearing in the Equatorial Belt still persist right down to the Cape, and, furthermore, that once again quite a number of the same Mediterranean (?) genera, mentioned above, have reappeared.

The existence of the latter in South Africa we can undoubtedly trace to the Pleistocene (or earlier) effects of the Great African Rift Valley System, to which has also been accredited the presence of parallelling elements in other faunistic and floristic groups in the same region.

As a whole, the South African psyllid fauna seems to be a composite group involving several different types, and these we may assess and recognise as follows.

First we note the presence of a very ancient psyllid fauna, and one whose genera approximate or are identical with some that characterise the ancient faunas of New Zealand, Australia, Indo-Malaya and India to the east and south-east, and Central and Southern America to the west. The WEGENER hypothesis of Continental Land-drift or the existence of a long-sunken Antarctic land-bridge or archipelago can explain the connection here, for the time factor affords no difficulties in the case of the Psyllidae. As a family of Homoptera, the latter has been recognised by its fossils to have had existence as early as the Permian Period in geological time, and, perhaps not in identical form, was in existence long before direct or indirect land connections were believed to have spanned the present land masses of the Southern Hemisphere.

Genera which I associate with this very ancient group are *Gyropsylla* BRETHES (Aphalarinae) with close genera in Africa, New Zealand, and South and Central America, *Mesohomotoma* KUWAYAMA (Ciriacreminae), having species in Africa, India and the Indo-Malayan Archipelago, Australia and the Pacific, *Carsidara* WALKER (Ciriacreminae) with species or species of related genera occurring throughout the area in question, *Homotoma* GUÉRIN (Ciriacreminae), mentioned in another connection above, but which, whilst in typical form, has always previously been considered to be of a Mediterranean type, has numerous typical species in Africa, but additionally many genera closely related occurring throughout the Pacific, Indo-Malayan and Australian regions, and finally, *Ctenarytaina* FERRIS & KLYVER (Spondyliaspinae) with a similar range and numerous species.

For the most part, the species of such genera are never really very abundant; they are very uniform and appear to have reached a point of stasis in their evolution. In other words, they are relict in that they clearly represent a type, or types, seemingly very much more abundant and prolific in the earlier history of the modern Psyllidae.

Together with these may be considered those forms having a common African, Indo-Malayan and Pacific distribution only. This group is inclusive of such genera as *Tenaphalara* KUWAYAMA (Ciriacreminae), *Pauropsylla* RÜBSAMEN (Ciriacreminae), *Macrohomotoma* KUWAYAMA (Ciriacreminae), *Paurocephala* CRAWFORD (Aphalarinae), etc. They are not quite so primitive as the former group.

A third group of indeterminate age, is comprised of autochthonous genera, that, for the present, seem to be restricted to the African region entirely. I refer to such genera as *Phytolyma* SCOTT (Aphalarinae), *Kleiniella* AULMANN (Ciriacreminae), *Ciriacremum* ENDERLEIN (Ciriacreminae) and the species hitherto known as *Rhinopsylla lamborni* NEWSTEAD, a species having nothing whatever to do with the genus *Rhinopsylla* RILEY of North America other than that it is also to be referred to the Ciriacreminae; it is quite unique.

I have other genera to add to this list as I describe them.

Finally, overlying these "exotic" elements, there is the strong, and to our eyes, "more ordinary", North Temperate-Palaeartic element already mentioned. Undoubtedly the latter is inclusive of many forms of more recent origin, and is seen to be comprised of genera of the Psyllinae, Triozinae and Aphalarinae such as

Floria, *Diaphorina* and *Psylla* (Psyllinae), *Trioza* (Trioziinae) and *Carmarotoscena* (Aphalarinae).

Members of this last group, in their long journey south, via the "rift-route" to South Africa, may still remain typical of the individual genera concerned as they appear in their more northerly ranges. Alternatively, they may lose some of the minor characters still possessed by their Palaearctic counterparts, or apparently retain similar characters which the latter have lost in the interim. The results are interesting, to say the least, and similar differences are to be observed in parallel cases in other insect groups also. In the Psyllidae, these differences do not warrant more than subgeneric recognition, and are never sufficient to obscure the common origin of the forms concerned.

The picture I have now presented of the nature and possible multiple origins of the South African Psyllid fauna perhaps lacks the conclusiveness that greater specificity of detail may have afforded to it, but it should be borne in mind that this is my first contribution towards a better understanding of the Psyllidae of Africa and I am still in the process of identifying, arranging and relating a vast number of new genera and species from all parts of Africa. Until this has been completed it should be evident that a more detailed and specific account would not merely be premature but possibly lead to a misunderstanding of the whole situation; it would certainly not be expedient at this stage. I have therefore had to omit reference to many new, interesting and critical genera some of which involve two or more distinct species. The additional knowledge invested in them is considerable, and whilst it has not been used here, the existence of the forms themselves, in no way invalidates the remarks already made.

I am very grateful to Dr. PER BRINCK for having given me the opportunity to study the Psyllidae collected by the Swedish South African Expedition of 1950-1951. Numerically the collection may be small, but, as will be seen, the contents are all very interesting; some are of extreme importance and all are new.

Classification, description and relationships of the genera and species of Psyllidae collected by the 1950-1951 Swedish expedition to South Africa

The eleven species represented in the present collection fall into two of the six subfamilies of the Psyllidae that I now recognise; they are to be referred to the Psyllinae and the Trioziinae. All the species are new, some belong to new genera and others to new subgenera recognised here for the first time.

The single trioziine species belongs to the typical genus *Trioza* FÖRST. and no difficulties of definition are involved in placing it. On the other hand, a not wholly unexpected situation has arisen in dealing with some of the new psylline genera. At

least one new tribe is involved and this has all the appearances of being transitional between the Psyllinae and the Spondyliaspinae. The genus concerned is a new one, and it, together with another new genus at present to be referred to the Arytainini, reveals sufficient spondyliaspine affinities to have given clear indication as to the possible derivation of the Psyllinae from the much older and more primitive Spondyliaspinae. This is a very important discovery in that it has, for the first time, revealed in a positive fashion that such relationships exist; hitherto the origin of the Psyllinae has been open to speculation, with little supporting evidence for any of the views expressed.

The new genus, however, carries a very unique spondyliaspine feature in the presence of definitive ante-occipital lobes, and although with a general overall spondyliaspine facies, other characters support its inclusion in the Psyllinae, and this is a circumstance which now necessitates a redefinition of the Psyllinae to include it.

1. PSYLLINAE

This, the typical subfamily of the Psyllidae, may be characterised as follows:

Genae normally developed into conical swellings of variable development, only occasionally flat or rounded. When developed into cones, the latter do not obscure the antennal bases, but frequently cover or suppress the frons. Venation psylline, i.e. with the radial petiole arising from the common basal petiole independently of the joint medio-cubital petiole. The latter is rarely as long as the former and usually much shorter. The male proctiger is never bipartite, is comprised of an entire segment ten, and is usually tubular or, more rarely, with short, rounded, lateral wings. The antennae are filiform, medium to quite long, and only occasionally short and stout; in the former case, from one and one-half times to two or more times as long as the width of the head. In all known species, ten-segmented. Paired metatarsal spines are present in all genera except some of the Arytainini, when they may be reduced to one or none. The pronotum is never constricted laterally as in the Triozinae. The propleurites are of variable development, and except that the dividing pleural suture is either vertical or diagonal, they are never quadrate and divided horizontally as in the Liviinae. Ante-occipital tubercles only rarely present.

The typical genus *Psylla* CURTIS (GEOFFROY) is represented in South Africa by numerous species, but does not appear in the present collection.

Acizzia HESLOP-HARRISON

Neopsylla HESLOP-HARRISON, 1946. *nomen praeoccupatum*, WAGNER, 1903.

Acizzia HESLOP-HARRISON, 1949, *nomen nudum*.

Acizzia TUTHILL, 1952, sub-genus of *Psylla*.

Psylla TUTHILL & TAYLOR, 1955, *partim*.

A great deal of new information is to be published in other places concerning this genus. In view of certain recently expressed and apparently confused ideas as to its true nature, which have appeared (L. D. TUTTILL, Pacific Science, April, 1952, pp. 86-87), it has been subject to special study by me. It is sufficient to state here, that, as it is a member of the tribe Arytainini, to have given it subgeneric status within the genus *Psylla* has simply made nonsense of the current systems of classification which give recognition to the tribes Arytainini and Psyllini as distinctive parts of the Psyllinae. Perhaps it is the transitional genus I believe it to be, but in possessing at least one fundamental arytainine character no true psylline form may possess, it lies outside of the scope of the Psyllini and is then certainly not immediately related to *Psylla*, the typical genus of the tribe Psyllini, despite the fact of the earlier confusion of some of its species with those of *Psylla* by such authors as MASKELL, FROGGATT and FERRIS and KLYVER.

Acizzia is a prolific genus with a wide African, Indian, Indo-Malayan, Australian and New Zealand distribution.

Head: Slightly broader than the width of the thorax, generally not deflexed. Vertex extended forward into two rounded lobes. Genae only occasionally produced into conical swellings, but generally slightly swollen into widely spaced hummocks; not contiguous, and separated by a small but distinct quadrate frons. Anterior and lateral ocelli visible in the same plane. Antennae slender and in length rarely more than one and one-half times as long as the width of the head.

Thorax: Somewhat flattened as in *Arytaina*, never strongly arched. Pronotum parallel-sided, curved forward, broad and ribbon-like. Propleurites subequal, more or less quadrate in many species, and divided by an almost vertical suture, depending on the degree of inclination of the head.

Wings: Membranous, venation typically psylline. Pterostigma closed and usually opaquely white. Costal nodal break distinct. Membranes in most species, carrying a distinctly crenulated pigmental pattern, and involving distinct radular areas. R/MCu petiole ratio approximately $\frac{1}{2}$.

Legs: Normally developed. Hind tibiae with either one or two basal metatibial spines. Meracanthi developed as in *Psylla*.

Male genitalia: Proctiger expanded into two, prominent, lateral wing-like lobes which may possess additional finger-like marginal processes of greater or lesser development. Parameres not developed in any special way, but ordinarily with strongly developed, inner, basal, retrorse spines, not found in *Psylla*.

Female genitalia: Somewhat angulate in lateral view, normally deflexed ventrally and frequently with gaping-open valves.

Type of the genus: *Psylla acaciae* MASKELL, 1894.

Acizzia immaculata, new species

(Fig. 1)

The present species is one of those aberrant forms of the genus whose existence has caused previous confusion between *Psylla* and *Acizzia*. The general psylline appear-

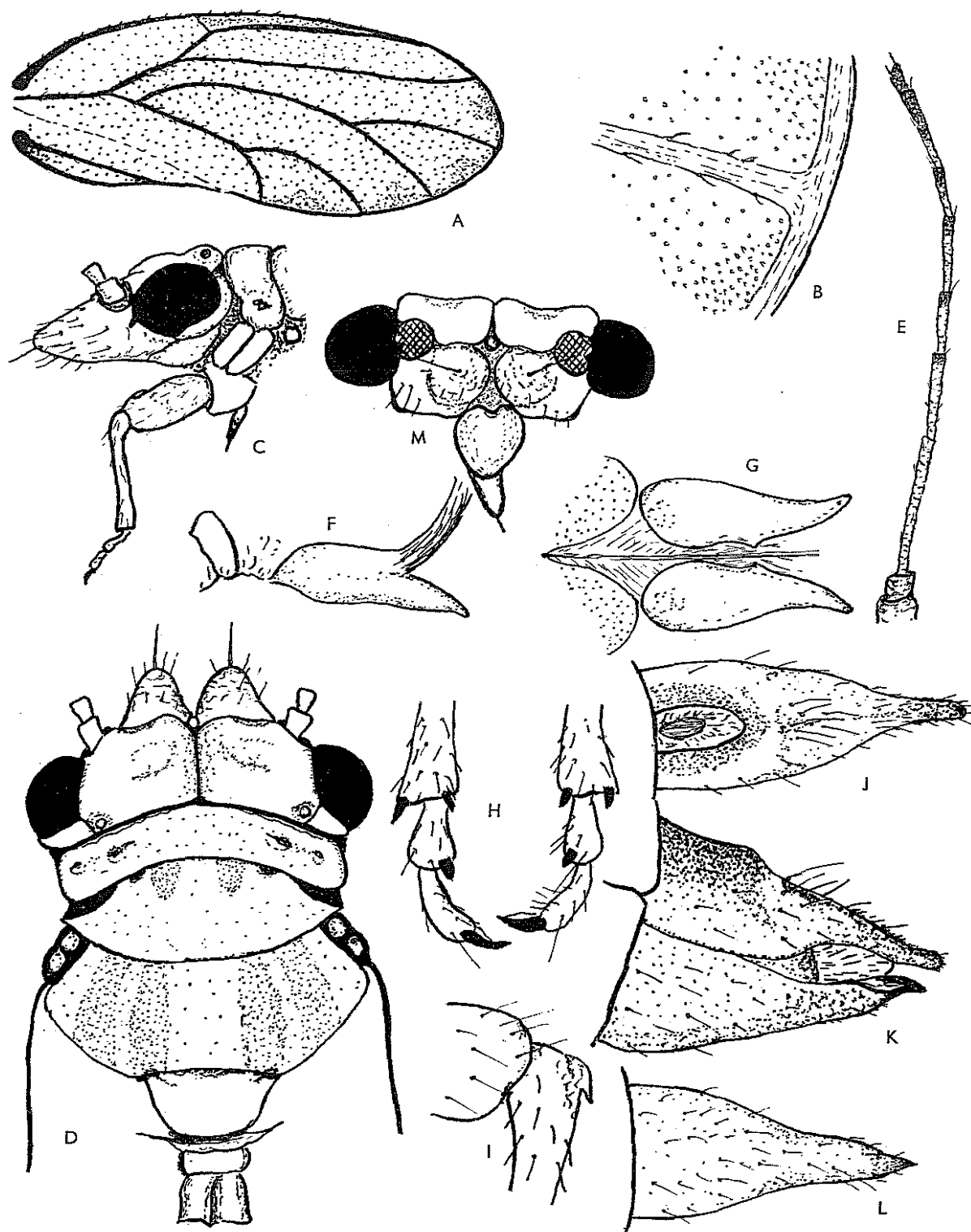


Fig. 1. Details of *Acizzia immaculata* n. sp. and *Lindbergiella* (*Palaeolindbergiella*) *primitiva* n. sp. — *Acizzia immaculata*. A. forewing. — B. Vein M_{1+2} and radular areas. — C. Lateral view of head and prothorax. — D. Dorsal view of head and thorax. — E. Antenna. — F and G. Lateral and ventral views of meracanthi. — H. Metatibial spines and basal metatarsal spines. — I, K and L. Details of female genitalia. — *Lindbergiella* (*Palaeolindbergiella*) *primitiva*. M. Frontal view of head showing exposed frons.

ance of such species as this tends to obscure the distinct arytainine characters which are also possessed.

Although the forewings bear distinct radular areas in cells M, MCu and Cu, they are devoid of pigmental patterns, and only slightly fuscous in the apical third; only close examination revealed that this species is not a member of the genus *Psylla*, for the head carries distinct genal cones very similar to those borne by true species of *Psylla*.

Colour

Head, thorax, abdomen and legs: Except for darker pigment in the vicinity of the sutures, pigmental patterns on the dorsal surfaces at least, are not very strongly developed, and whilst the three insects on which this description is based are obviously not teneral, they are perhaps not fully mature. The broad and characteristic bands of pigment usually present on the thorax can, however, all be distinguished, and in particular, the pigmental pattern on the metapostnotum is very strongly developed and throws that structure into strong relief against the lighter background. Spines and claws black; apical tarsal segments brown. Disc of the dorsal valve of the female genitalia with a prominent dark, chocolate-brown pigment patch, whilst two similar patches are borne one at either side of the anal opening. Male genitalia, unknown. Antennae: basal two segments concolorous with the rest of the head, segments three to eight with increasing apical bands of darker pigment, segments nine and ten wholly pigmented, with chocolate brown pigment. Ocelli orange. Compound eyes dark. Apex of rostrum black.

Wings: Membranes clear, only slightly fuscous towards the apical third. Veins yellowish-straw coloured. Pterostigma opaquely white. Radular areas showing up darkly in cells M, MCu and Cu, but not very prominent.

Structure

General body-surfaces smooth and not very hirsute. Prominent single hairs of sensory nature are borne at the apex of the genae in the fashion characteristic of members of this genus. A few longish hairs are also borne midway along the dorsal valve of the female genitalia, and these are also characteristic of other members of the genus.

Head: Slightly deflexed, but in dorsal aspect very strongly suggestive of species of *Arytaina*; slightly broader than the width of the thorax. Compound eyes prominent, by virtue of their darker centres, but somewhat compressed dorso-ventrally. Occipital sclerites large and in dorsal view, seemingly quadrate. Vertex divided medially by a distinct dark-pigmented suture, each half roughly rectangular. Apical margins developed into lobes forming part of the antennal shelf, and over-lying the genal bases. Disc of the sides of the vertex with small foveae. Lateral ocelli orange, not very prominently displayed on small raised tubercles, one at each corner between the compound eyes, the occipital sclerites and the anterior margins. Genae in dorsal view conforming in general pattern to other species of *Acizzia*, and very similar in

appearance to many species of *Arytaina*. In lateral aspect seen to be conical and much more like species of *Psylla*, but unlike the latter, not contiguous at their bases. Apices bearing quite prominent single, sensory hairs. Frons not concealed between the bases of the genae, but not easily visible; small. Antennae: basal two segments small, segment three twice as long as segment four; four, five, six, seven and eight subequal; nine and ten together approximately the same length as segment eight.

Thorax: Not strongly arched, but somewhat humped in the middle, the mesonotal region sloping downward and forward in the same plane as the vertex and the metanotal region towards the depressed base of the abdomen. Pronotum broad and ribbon-like, parallel-sided, arching forward in the middle to fit into the posterior margin of the vertex. Lateral extremities with small foveae, faintly orange in colour. Propleurites angled forward, suture straight; subequal. Not concealed by the lateral extremities of the head and compound eyes. Prescutum narrower than the pronotum, small, elliptical and with sharp-pointed lateral extremities. Scutum nearly as broad as the pronotum, more quadrate in outline than the prescutum. Scutellum small, almost square, and depressed posteriorly towards the metanotal region. Metapostnotum square and strongly outlined in darker pigment. Tegulae small, hemispherical; not very prominent.

Abdomen: Offering no special diagnostic features.

Wings: Approximately three times as long as broad; anterior and posterior margins subparallel, apex broadly rounded. Costal marginal vein strong, but not excessively well developed. Costal nodal break distinct. Pterostigma long and narrow, about half the length of the wing, acutely wedge-shaped, semi-opaque and finely microsculptured. R/MCu basal petiole ratio $2\frac{1}{2}/1$. Rs long, and only slightly sinuate, terminating subapically. Radio-medial cell narrow at the base and broadening to twice the width at the apex. Medial petiole and M_{3+4} forming a uniform arc from the point of separation from the basal petiole to the termination of the latter at the wing margin. M_{1+2} almost horizontally placed, not strongly arching. Medial cell broadly wedge-shaped, length exceeding the greatest width (i.e. at the apical margin) as $1\frac{1}{2}/1$. Cubital petiole straight, diagonally placed. Medio-cubital cell quite regular, only slightly broader at the base than at the apex. Cu_{1a} curved upwards and paralleling M_{3+4} . Cu_{1b} , only half as long as Cu_{1a} . Cubital cell, twice as long as broad. All membranes heavily covered with fine micro-trichia on both surfaces. Radular areas broad, but quite distinct in cells M, MCu and Cu_1 . Wing veins are well-developed and all adorned with a double row of very fine marginal trichia.

Legs: Normally developed. Meracanthi normally developed. Metatibiae slightly shorter than the metafemorae, slightly curving inward, and bearing carinae at their bases, but with no true spurs. Apical spines three in number, two together and one isolated. Basal metatarsal spines two in number.

Genitalia (female): Dorsal valve (segment ten) acutely pointed; in lateral view, seen to be broad at the base, flattened dorsally in the region of the anus, then becoming depressed downward and somewhat sinuate towards the apex. A few prominent hairs are borne subapically. Ventral valve (sternite of segment nine) in

lateral view apparently one and one-half times as broad basally as segment ten; ventral contour sinuate, curving up apically, terminating subapically, but through the palps forming a uniform ventral contour for the whole genitalia and with the apex of the dorsal valve.

Although more tapering, the general shape of the female genitalia conforms with other species placed in this genus, and the subapical tuft of hair on the dorsal valve is a quite characteristic feature of all of them.

Genitalia (male): Unknown.

Cape Prov.: Cape Peninsula, Table Mnt., Blinkwater stream, 3 ♀♀.

Floria Löw, 1878

When Löw first described this genus in 1878, the account presented was quite comprehensive when compared with the similar descriptions submitted by his contemporaries. However, details of certain characters, some now considered critical, were, unfortunately, omitted by this author, so that as now presented, with these added details, this is still *Floria* Löw and it can include the new subgenus I now erect. No character he used has been omitted.

Head: Equal in width or slightly broader than the thorax. Genae well developed into conical protrusions, parallel to the plane of the vertex, but not strongly depressed below the latter. They are divergent or contiguous, extremely prominent in most species, and of a length frequently exceeding the vertex, and terminating in conical or bluntly rounded apices. Frons obscured between the genal bases with the anterior ocellus visible dorsally and thrust up between. Antennae long and slender in all known species and frequently reaching beyond the claval suture when the wings are held at rest.

Thorax: Broad and robust, flattened dorsally. Pronotum broad and ribbon-like. Propleurites subequal, almost quadrate. Pleural suture nearly vertical.

Wings: Membrane not thickened, but with some maculation in most species. Veins of moderate thickness, with their paths frequently adorned with a double row of parallelling small setae. Venation psylline. Costal nodal break distinct. Pterostigma present. Radular areas variably developed. R/MCu petiole ratio approximately $\frac{1}{2}$.

Legs: Long and slender. Hind tibiae with or without basal spurs. Meracanthi well developed. Basal metatarsal spines reduced to one (outer) or none. In the latter cases species are to be referred to the new subgenus *Brinckitia*.

Male genitalia: Proctiger tubular and simple. Parameres long and slender in most species; simple.

Female genitalia: Affording no special generic characters.

Type of the genus: *Floria spectabilis* (FLOR), 1861.

Brinckitia new subgenus.

In all discernible characters except one, species to be referred to this subgenus conform in detail with the type species of the genus *Floria* Löw.

Floria in typical form is one of the European genera referred to the psylline tribe Arytainini, and as such, conforms with the rest of the members of that tribe in Europe in that all previously known species possess only one basal metatarsal spine on the hind limbs. *Brinckitia* has been erected as a subgenus of *Floria* to include those species which have lost both basal metatarsal spines.

Now whilst such a loss may not seem to be either very big or important, in assessing the value to be placed upon this difference, several facts have been taken into consideration. Firstly, the presence, number when present, or absence of basal metatarsal spines has been considered by all American systematists since CRAWFORD's time as a subfamily character. For the most part, however, it may not be used in such a capacity unless supported in other ways, and there is certainly a lack of uniformity within the subfamilies as they are now known in this respect. The whole position is therefore under review.

Secondly, but with special reference to the importance one may attach to partial or total loss of basal metatarsal spines in some of the groups of otherwise congeneric species such as the present, it is already known that *Acizzia* HESLOP-HARRISON and *Homotoma* GUÉRIN (*nec* CRAWFORD) are genera which can be split by such differences. This is therefore not a unique instance.

Thirdly, and certainly not of least significance, is the fact that so far as is now known in the present genus, all of those species which are otherwise typical of *Floria* but which have lost the remaining basal metatarsal spine, occur in South Africa, appear to be closely syngenetic, and clearly have a more recent origin than wholly typical forms.

I have, therefore, had no hesitation in erecting a subgenus of *Floria* to contain these seemingly aberrant South African forms, and in so doing, it has given me very great pleasure in naming it *Brinckitia* in honour of Dr. PER BRINCK.

***Floria (Brinckitia) annosa*, new species**

Figs. 2, 10)

The present new species is one of a group of several Mediterranean and North and South African species in which the forewings are more or less covered by numerous small, round, irregular or confluent dark pigment spots. Of these, only *Floria pyrenaea* MINK and *Floria spartiisuga* PUTON have been described previously. All of them possess the characteristic arytainine facies, long slender antennae, elongated narrow wings and a general nondescript body colour.

Some of these species appear to be covered, when alive, with a thick dusting of white pulverulent wax; the present species seems to have been similarly covered.

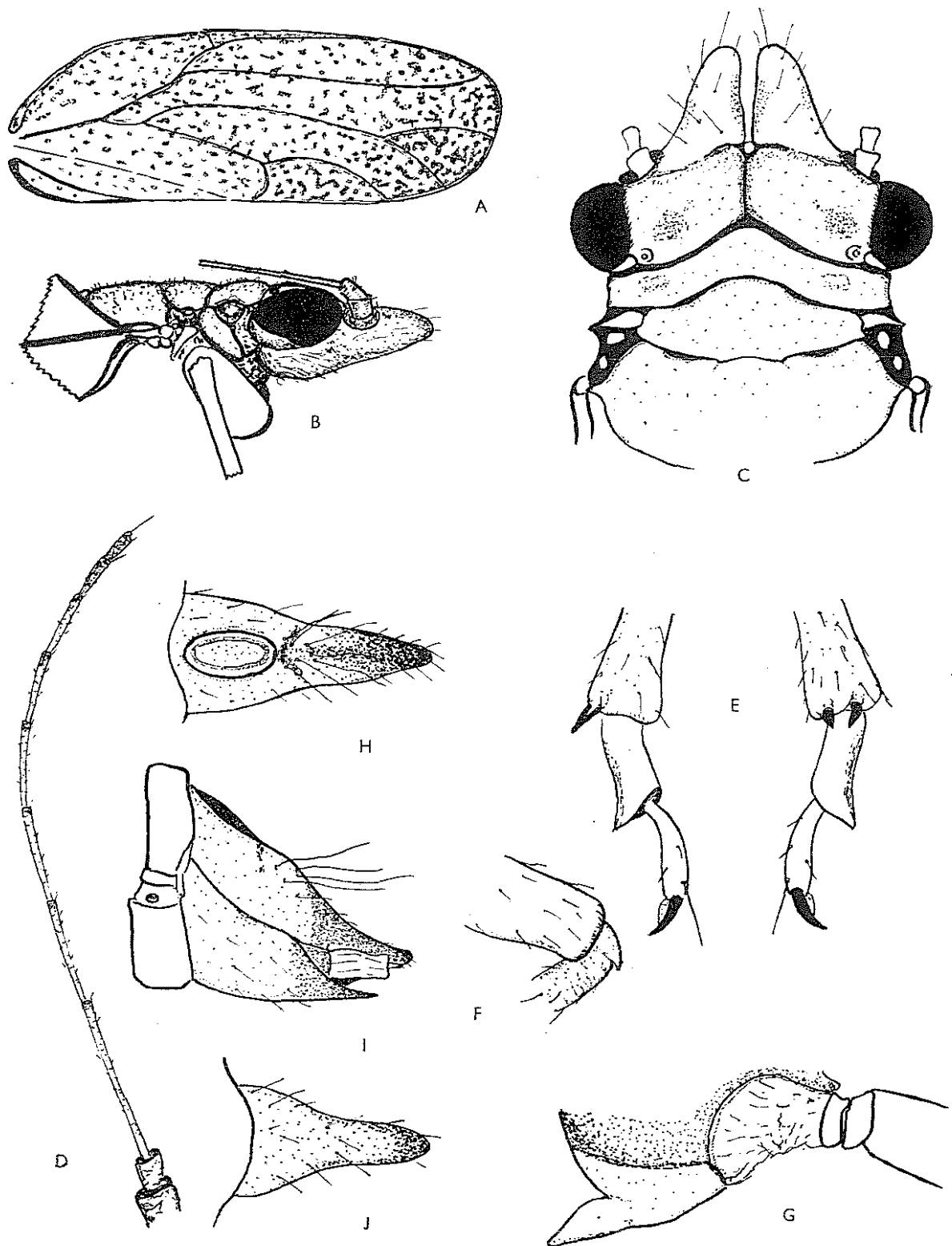


Fig. 2. Details of *Floria (Brinckitia) annosa* n. sp. — A. Forewing. — B. Lateral view of head and thorax. — C. Dorsal view of head and thorax. — D. Antenna. — E. Apical metatibial spines. — F. Basal metatibial spur. — G. Lateral view of meracanthal spur. — H, I and J. Details of female genitalia.

Colour

Head, thorax, abdomen and legs: All uniformly yellowish in the dried insect, and presumed to have been greenish-yellow in the fresh adult state. Spines and claws darker, with the apices of the dorsal and ventral valves of the female genitalia black. Male genitalia unknown. Antennae yellow with black bands, black at the tip. Segments one and two, wholly yellow, three to eight narrowly darkened apically, and nine to ten wholly dark or black. Sound producing mechanism of the metathorax dark.

Wings: Membranes semi-opaque, milky-white and covered with small, round to irregular, dark pigment spots, which tend to become confluent in the apical third and in the costal and claval cells. Veins partially spotted with the same pigment spots, ground colour yellow, etched with faint marginal dark lines.

Structure

All visible dorsal surfaces more or less hirsute; the individual fine hairs appear to be wax-secreting. The covering of hair becomes thicker and longer on the sides of the head and genae, and extremely long hairs occur midway along the length of the dorsal valve of the female genitalia, just behind the anal aperture.

Head: Horizontal, large, as broad as the thorax. Compound eyes large and spherical. Occipital sclerites small and receding behind the compound eyes. Vertex broader than long, with small foveae in each half. Lateral ocelli small, visible only with difficulty in the postero-lateral margins of the vertex. All three ocelli are visible together in dorsal view. Posterior margin of the head arching forward strongly towards the centre, but only slightly indented where it is intersected by the median (epicranial) suture. Median suture not very strongly impressed. Genae developed into elongated conical processes held in the same plane as the vertex and almost continuous with the latter. Nearly one and one-third times as long as the vertex, strongly divergent, and somewhat swollen at their bases. Tips bluntly rounded. Frons concealed between the contiguous genal bases. Antennal shelves only imperfectly developed. Antennae long and slender, and as in other species held backwards over the head when at rest and nearly reaching the claval suture.

Thorax: Flat, broad and quite extensive. Pronotum broad and ribbon-like, strongly curved anteriorly to fit into the concavity of the posterior margin of the head, with which it makes a continuous surface. The lateral extremities of the pronotum curve abruptly downward so that the lateral margins present an almost square-cut appearance. Small foveae are impressed laterally in subterminal positions, one on each side. Propleurites small, angled forward so that they are partially concealed under the compound eyes. Prescutum transversely elliptical with pointed lateral extremities. Length down the middle scarcely more than the corresponding part of the pronotum; approximately three times as broad as long. Not strongly arched and with the discal portion more or less quadrate and almost flat. Scutum large and, in area, equal to the pronotum and prescutum together. Length down the

middle, half the greatest width. Remaining dorsal sclerites of the thorax not available for description since the mounting pins penetrate at this point. Tegulae small, spherical and quite hairy, but clearly visible in the angles between the lateral extremities of the scutum and scutellum, where they lie at the bases of the forewings.

Abdomen: Strongly developed, and nearly twice as long as the genital segments in the female, but offering no special diagnostic features.

Wings: Three times as long as broad, slightly broader at the base than at the apex. Bluntly rounded apically, sides subparallel. Costal marginal vein somewhat thickened. Costal nodal break distinct. Pterostigma well-developed, and unlike most species referred to *Floria*, in this case broad at the base and elongated to more than one-third of the length of the wing. R/MCu basal petiole ratio 2/1. Rs long and straight curving only slightly upward where it joins the wing margin subapically. Radial cell long and parallel-sided. M, almost straight, and curving upward only slightly at the point of furcation, but with the secondary M_{1+2} continuing to the apex of the wing so that the cell RM is quite regular. The cubital petiole together with its secondary Cu_{1a} execute a straight path and terminate at the wing margin subapically. Cell CuM is quite regular. The secondary veins of the media, M_{1+2} and M_{3+4} , enclose a wedge-shaped cell, cell M. The latter is quite typical in form. M_{1+2} is about one third as long again as M_{3+4} . The secondaries of the first cubital vein (Cu_1) enclose an elongated cell, the cubital cell, Cu_{1a} , being about three times as long as Cu_{1b} . The cell itself is of slightly greater area than the medial cell. The claval suture (herein recognised as obsolescent Cu_2) is only easily visible because its path lies diagonally across the claval area and interrupts the uniformity of the pigmental pattern. Radular areas are present in the cells RM, M, MCu and Cu, but are quite diffuse.

Legs: Long and slender. Meracanthi normally developed. Metafemorae somewhat thickened and not quite so long as the metatibiae. Metatibiae with carinae at their bases but no true basal spurs; each is armed apically with three inner and two outer black spines. Basal metatarsal spines absent, but the apex of the metatarsal segment is drawn out laterally and in such a fashion as to create the impression that spines are present on casual examination. Terminal claws of all legs only poorly developed.

Genitalia (female): Dorsal valve (segment ten), narrowly acuminate with a blunt, rounded apex; somewhat sinuate in lateral contour. Ventral valve (sternite of segment nine) dilated at the base, dorsal contour sinuate, but rapidly narrowing about two-thirds along its length, after which point the upward arc of its ventral contour is emphasised by the sharp-pointed, upwardly-tilted tip. Ovipositor closely approximating the lower surface of the dorsal valve. Palps quadrate but not gaping, and scarcely reaching the apex of the dorsal valve; a wide gap lies between the dorsal and ventral valves.

Genitalia (male): Unknown.

Type of the subgenus: If it is necessary to designate a type for a subgenus, then in this case the present species *Floria (Brinckitia) annosa* mihi is declared to be such; this will also act as the type species if it is ever necessary to raise *Brinckitia* to the status of a full genus.

The description was made from two females pinned on Polyporus, one of which was very much fragmented. The most perfect of the two has been designated as the type insect, and except for the removal of one wing to facilitate description and photography, it has been left intact. Both specimens bear the same carded data attached to the pins:

Cape Prov.: Langebaan, 31.X.50. Loc. No. 20. Swedish South Africa Expedition, 1950-51. BRINCK-
RUDEBECK.

Retroacizzia, new genus

Head: Very broad, equal to, or slightly less than the width of the thorax. Closely approximating and continuing downward in the same arc as the latter. Genae developed into processes parallel to the plane of the vertex and depressed below the latter. Frons obscured by the genal bases. Compound eyes large and prominently displayed, but forming continuous surfaces with the general contours of the head; flattened and very slightly emarginate where they join onto the vertex. Antennae very long and slender; three or more times as long as the width of the head.

Thorax: Very strongly developed, broad and bulging, strongly arched dorsally. Pronotum ribbon-like, but bulging in the middle dorsally and anteriorly. Propleurites small, subequal; suture diagonal, but developed more as in *Acizzia* than as in *Psylla*.

Wings: Venation psylline. Pterostigma present. Costal nodal break distinct and clearly visible as the result of the considerably thickened composite costo-subcostal marginal vein which terminates abruptly at the costal nodus. R/MCu petiole ratio 1/2.

Legs: Well-developed. Meracanthi present, not very prominent, but somewhat stout. Metatibial spurs absent. Basal metatarsal spines present; two in number.

Type of the genus: *Retroacizzia antennata* sp. nov.

The position of this genus is somewhat obscure, the single specimen available having been confused with some of the extreme forms of *Acizzia* HESLOP-HARR. when the preliminary examination was made. The more detailed examination necessary for descriptive purposes revealed several differences from *Acizzia* as well as obvious relationships for the latter, and strong affinities for the Australian *Brachypsylla* FROGGATT. It is thought now to lie in an intermediate position but at the same time establishing a long-suspected closer relationship between the two.

It differs from *Brachypsylla* in its possession of a broader head, long slender antennae and the presence of a costal nodal break and a very prominent pterostigma and the normal development of the metatibia, but it is related to the latter in the presence of the strongly developed costo-subcostal vein forming the basal anterior marginal vein of the wing, the approximate development of the cubito-medial/radial petiole ratio, and the wing character in general, as well as a peculiar brachypsylline facies which is the result of the special development of the head and thoracic regions in relation to the rest of the body.

The general overall impression is that of one of the extreme acizzian forms, but the antennae are much longer and more slender than in any species of the latter, and

the genae are developed in a more positive fashion into conical protrusions than in the average member of the genus *Acizzia*, whilst the frons is very definitely concealed.

It is possible that certain Indo-Malayan species of the present new genus have been referred by the American, D. L. CRAWFORD, to one of his versions of the genus *Arytaina*.

The latter's reference to the presence of small tubercles lying "at each outer angle" (of the vertex) "behind the antennal bases"—a condition nowhere illustrated—in such species as "*Arytaina*"¹ *flava* (Singapore), "*A.*" *tuberculata* (Philippines), "*A.*" *variabilis* (Philippines), "*A.*" *brevigena* (Singapore) and "*A.*" *meridionalis* (Malay Archipelago), suggests the further development of the emarginate condition of the compound eyes as found in the new species now referred to the genus *Retroacizzia*, into true ante-occipital lobes. If this is so, and since it is evident that the present and CRAWFORD's species are closely related (if not congeneric) then it is clear that the genus or additional genera concerned are transitional genera revealing the point of origin of the Psyllinae within the Spondyliaspinae.

This is not an unexpected possibility for in many ways strong evidence has been accumulating which suggests that the early Gondwanan psyllid fauna has been the ultimate source of many of the psylline Psyllidae of other regions; the Spondyliaspinae are essentially of early Gondwanan origin.

The characters of *Acizzia*, as stated already, have recently been studied in great detail over a very wide range of species from all known regions of its distribution. What has been learnt then has suggested that whilst the genus itself is a very ancient one, it is still in a state of flux, and that it is clearly of Gondwanan origin. It, however, seems to possess many characters more primitive than the present new genus *Retroacizzia*, but on the other hand, the latter possesses some primitive characters not shared by the former. The apparent development of the occipital regions into seeming circum-ocular sclerites which I have already named in the Spondyliaspinae as ante-occipital lobes, where they protrude in front of the compound eyes just behind the antennal bases, is quite significant, even in the present reduced form, but for the most part this appears to be a specialised although retrograde form having evolved out of an ancestral acizzian type.

Retroacizzia antennata, new species

(Figs. 3, 7)

A small, thickset species of overall rusty brown and darker brown thoracic markings, with broad, somewhat angular wings bearing apical bands of brown pigment.

¹ Although the 1914 definition of *Arytaina* given by the American CRAWFORD included as one of its species *Arytaina genistae* LATR. which appeared as an introduction in North America, it was actually excluded by the terms of the definition then afforded. At other times other definitions of *Arytaina* appeared at the hands of both this and other American authors, and not one of these definitions appears to have been formed on the basis of any clear understanding of the original European genus. Most of them have since been shown to be composite (at least eleven distinct genera have been involved) and all exclude the designated type species.

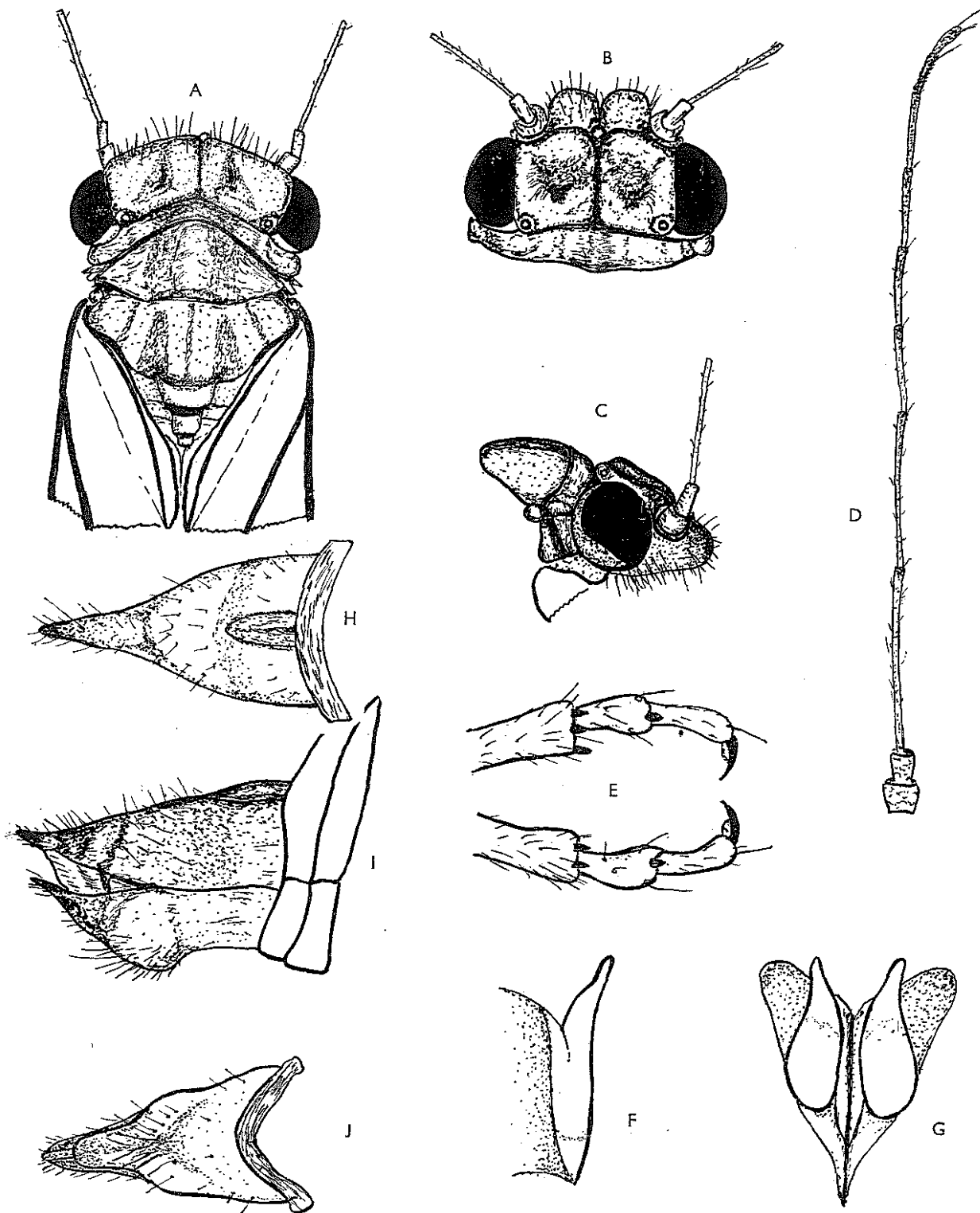


Fig. 3. Details of *Retroacizzia antennata* n. sp. — A. Dorsal view of head and thorax. — B. Frontal view of head. — C. Lateral view of head and prothorax. — D. Antenna. — E. Basal metatibial spines and basal metatarsal spines. — F and G. Lateral and ventral views of meracanthal spurs. — H, I and J. Details of female genitalia.

Extremely long, slender antennae appear exaggerated in length by a seeming brachycephalic character and the broad truncated wings.

Colour

Head: Compound eyes black. Vertex rusty-brown with latero-central depression darkly filled, fading out to irregularly confluent spots of darker pigment, to the lateral and posterior margins where the rusty-brown pigment is more or less solid. Median suture and inverted V-shaped impressions on either side, darker than the rest. Genae of a lighter rusty-brown without other markings, becoming reddish towards the antennal insertions. Anterior ocellus red-brown. Lateral ocelli dark orange. Occipital sclerites yellowish, throwing the darker compound eyes into greater relief by contrast. Antennae: basal two segments pale amber in colour, with the successive segments from two to ten becoming increasingly darker so that segments nine and ten are almost wholly black.

Under surfaces of the head (clypeus and frons, etc.) quite pale.

Thorax: Matching the head in general, overall colour. Pronotum darker rusty colour in the middle portion, paling to the sides; lateral impressions darker. Propleurites pale-yellowish. Prescutum the same colour as the pronotum, lighter in the centre, with two longitudinal darker bands and lighter margins. Mesoepimeron pale, almost yellow. Scutum corresponding in colour to the prescutum, with a narrow longitudinal darker line down the centre, and two broad dark lateral truncated patches on either side, and narrower lateral dark lines outside. Scutellum very darkly recessed into the hind margin of the scutum; disc, paler. Metapostnotum, metascutum and metascutellum each darkly emarginate, with paler lateral processes. Visible lateral regions of the rest of the thorax, pale by contrast. Ventral regions of the thorax also pale; meracanthal spurs shining ivory in colour.

Abdomen: Matching the thorax in reddish-brown or black pigment dorsally, becoming paler in the pleural regions, with creamy or ivory posterior bands on the segments.

Genitalia (female): Matching the colour of the head, thorax, and abdomen. Dorsal valve (segment ten) darker apically, but with the anus broadly ringed with brighter rusty-red pigment. Ventral valve (sternite of segment nine) dirty-white, ventrally with a darker apical band. Lateral palps not distinctively coloured, matching the general overall colour.

Legs: Pale dirty-yellow, with no distinctive bands or bars. Claws not very heavily pigmented, but darker. Spines of the metatibia and basal segment of the metatarsus black.

Wings: Membranes generally only semi-transparent. Veins thrown into relief by darker marginal lines, and brighter, reddish, central lines. Apical facia comprised of confluent, darkish, rust-coloured spots, becoming more opaque towards the vein margins. Radular areas of the cells, clear. The apical facia is continued into the claval region by a solid marginal strip of pigment, broken only by the claval suture itself, and extending along the path of the vein A2. The outer fringes of this basal facia

break down into irregularly confluent spots. The apical facia is a distinctive feature of the forewings and fills cells M and Cu₁ almost completely and continues across the apices of the intermediate cells MCu and MRs, and partially into cell R. Pterostigma opaque, milky. The thickened composite costo-subcostal vein of the wing base is quite darkly pigmented, and thrown into relief by darker margins.

Structure

The general surfaces of the head and thorax are strongly shagreened and covered thickly but variably with light, almost golden hairs of variable length.

Head: Continuing the arch of the thorax ventrally, thus exposing only a very small strip of the vertex, the compound eyes and the occipital sclerites to dorsal view. The impression this creates is of a brachycephalic if not decapitated insect, an impression strongly emphasized by the extremely broad thorax. Head as broad or nearly as broad as the thorax. Compound eyes from dorsal view appearing compressed-lenticular, although actually almost spherical. Occipital sclerites prominent and raised above the deeply emarginate posterior borders of the two halves of the vertex. Vertex with the posterior margins curving anteriorly to the median suture. Median suture deeply impressed, dividing the whole into two quadrate halves. The compound eyes provide lateral margins to the head parallel with the median suture. Each half of the vertex is depressed in the centre into shallow foveae with more or less deeply impressed inverted V-shaped markings in the middle. Lateral ocelli appearing as raised pustules on prominent dorso-lateral carinae—more prominent in lateral view than in dorsal. Genae depressed below, but in the same plane as the vertex; flattened, broad and dorsally seen to be quite blunt. Contiguous on the inner margins. Ventrally appearing to taper from the lateral extremities of the compound eyes, where they arise, to their apices. In length less than half as long as the vertex down the middle. Antennal shelves distinct, swelling out in gentle, sinuate curves and continuing to the centre as the lateral arms of the median suture of the vertex. Anterior ocellus large, nearly twice as large as each lateral ocellus, completely occupying the space between the genal bases and the median suture of the vertex and its lateral arms. Frons completely obscured by the large anterior ocellus. Antennae: basal two segments stout; segment three more than two and one-half times as long as the two basal segments together; segment nine and ten, together, not much more than the length of the basal two segments. Whole antenna extremely long and slender, and appearing slightly capitate.

The apices of the genae, disc of the vertex and under surfaces of the head hirsute; hairs of the genae quite prominent, but without the single hairs or groups of longer apical hairs which characterise species of *Acizzia*. Antennae sparsely hirsute; basal segments devoid of hairs.

Thorax: Very strongly arched, dorsally appearing somewhat domed. Pronotum ribbon-like, arched forward in the centre, where it appears to be depressed below the emarginate epicranium. Lateral extremities somewhat expanded at the junction with the propleurites; subterminal foveae present, but shallow. From frontal view

the pronotum is seen to bulge upward into a prominence almost as high as the length of the genae. Propleurites small, almost quadrate, subequal. Pleural suture diagonal, so that the propleurites are almost wholly concealed beneath the margins of the compound eyes. Prescutum with the pronotum occupying about half of the visible dorsal portion of the thorax. Large, elliptical and strongly arched in the middle; two and one-half times as broad as long, with acutely pointed lateral extremities. Scutum extremely large, not quite three times as wide as long. Lateral extremities truncated, latero-posterior margins sinuate in contour, and impressed into foveae into which the claval marginal veins of both the meso- and metathoracic wings fit when at rest. Mid-posterior margin strongly outlined in the usual fashion, where the fusion of the mid-dorsal portion of the scutellum occurs. Scutellum not large or prominent, somewhat crescentic in outline, and about three times as wide as long. Remaining dorsal sclerites of the metathorax progressively smaller and affording no special features of diagnostic significance.

Abdomen: Comparatively short in the dried specimen, and arched strongly above the general level of the thorax; tapering rapidly towards the genitalia.

Wings: Membrane somewhat cloudy and rugose in general, but with strong transverse apical facia of confluent dark, rusty-brown pigment spots, which extend towards the base into the claval area. Veins stout, strongly raised, and pigmented as indicated. Cubital and medial cells subequal in area. Cubital cell quadrate, base almost equal to depth. Medial cell broadly wedge-shaped, base slightly less than the greatest depth. Radular areas distinct in both cells, and also in cell CuM and MRs, since in all cases clear transparent areas exist in the vicinities of the radulae. C + ScA forms a thickened marginal area bounding the anterior of the costal cell; the two veins lie distinct within this marginal area. The continuity of the latter is broken abruptly by a distinct costal nodal break, which occurs just in front of the broad and very distinct pterostigmatic area. R and MCu petioles diverge widely; the radial cell is broad and extends about two thirds of the length of the wing, terminating subapically. Cell CuM is broadly dilated in the disc of the wing, but is considerably narrowed in its apical marginal third. The cubital petiole is straight, but diagonally disposed, and two and one-half times as long as the joint cubito-medial petiole. Claval suture distinct. A 1 distinct. Clavus long and wedge-shaped. The whole wing is broadest near its apex, with subparallel anterior and posterior margins, and possessing a quadrate or truncated general appearance emphasized by the transverse apical facia.

Legs: Only moderately developed. Meracanthi present but short. Metafemorae only slightly dilated at the bases, but articulating apically with small lateral flanges in the fashion of most spondyliaspine forms. Metatibiae devoid of basal spurs, but fringed at the apices with five smaller and two larger apical black spines. Basal metatarsus with two black spines.

Genitalia (female): Dorsal valve (segment ten) acuminate, with a very sharp point. Somewhat dilated at the base and dorsally, where the fairly broad anal orifice is accommodated. Ventral valve (sternite of segment nine): sides parallel at

the base and for about half of its length, but rapidly swelling laterally and dorso-ventrally into a sub-apical bulge, beyond which it tapers in a sinuate manner, to terminate in an acute uptilted point, which nearly extends to the apex of segment ten. The ovipositor is concealed between the so-called dorsal and ventral valves and by small, somewhat obscure lateral palps. The dorsal valve is clothed in hairs, becoming more thickly disposed towards the apex. The bulge of the ventral valve is similarly clothed in hairs, but with some longer hairs directed ventrally.

Genitalia (male): Unknown.

The above description has been based upon a single, pinned female insect, with a slightly damaged thorax.

S.W. Africa: Kaokoveld, Omutati, 70 miles WSW of Ohopoho, 5.VI.51, Loc. No. 329. At light in the evening. Swedish South Africa Expedition 1950-1951. BRINCK-RUDEBECK.

For micro-examination, one wing has been removed and mounted upon a slide. The details of the insect itself have been obtained without removing it from its pin.

Lindbergiella, new genus

Lindbergia HESLOP-HARRISON, 1949, *nomen nudum*, nec *Lindbergia* RIEDEL, 1958.

Species of *Lindbergiella* are intermediate in appearance between *Psylla* and *Arytaina*, but the arytainine character is preserved in all the expected ways in the European and North African members of the genus. The new South African species is more psylline than usual although the generic relationship to *Lindbergiella* is unmistakable.

Head: As broad or slightly broader than the thorax. Vertex in the same plane as the descending pronotum; anterior margins of the two halves square-cut and descending abruptly to the frons; antennal insertions and the genae, each half forming a truncated triangle; excavated in the middle. Genae produced into widely-spaced, small hummocks beneath the head; invisible from above. Apices of the genae with prominent spine-like hairs in all species. Frons flat, pentagonal, and although small, wholly visible in frontal view. Labium of extreme length and very slender, and constituting a very distinctive generic character. Antennae of moderate length; slender and much longer than the width of the head. Compound eyes spherical and quite prominent.

Thorax: Gently arched in most species, broad. Pronotum arched dorsally, anteriorly and laterally, not strip-like as in *Arytaina*, but constricted at each side at points midway behind the compound eyes. Propleurites divided by a median suture into two subequal parts.

Wings: More or less psylline in appearance and venation. Pterostigma moderately well-developed. Costal nodal break distinct. Membranes frequently with indication of pigmental patterns, but never coriaceous or thickened. Alar radulae well-developed and occasionally heavily pigmented.

Legs: Long and slender. Meracanthi present. Metatibiae with small basal spurs and four or five well-developed apical spines, one pair diametrically opposed. Metatarsi with one or two basal spines.

Genitalia (male): Proctiger unipartite, simple and tubular, or with greater or lesser developed basal wings. Parameres in all known species of extreme length; longer than the proctiger and constricted subapically to form a variably dilated and inwardly directed black terminal portion.

Genitalia (female): In most known species nearly as long as the rest of the abdomen in the dried specimens; acuminate, and frequently with wide-open palps.

Type of the genus: Provisionally, an undescribed Canary Island species has been chosen, as numerous perfect examples are available; the present new species is represented by a single imperfect female.

Members of this new genus were first discovered by Dr. HÅKAN LINDBERG of Helsinki, Finland, having appeared in abundance in the extensive psyllid collections he made in Mediterranean and North African countries. I have already indicated the existence of such a genus, and provisionally named it to be *Lindbergia*, but this name has now had to be amended to *Lindbergiella*.

Lindbergiella is regarded as a very important transitional genus of the Arytainini requiring considerable discussion, but such discussion will be reserved for it when Dr. LINDBERG's numerous typical species have been described. I had already concluded that *Lindbergiella* was almost as primitive as the genus *Acizzia*, and I am not at all surprised that it now appears, perhaps in an even more primitive form, in South Africa. The present new species has retained the two basal metatarsal spines, the loss of one of which has hitherto been a major distinguishing character of European Arytainini from Psyllini. It thus reverses the situation presented by the South African *Floria* spp. one of which, *Floria annosa*, I have referred to a new subgenus (*Brinckitia*), because it had lost both basal metatarsal spines. It will be concluded from the above remarks that it is considered that the possession of two basal metatarsal spines is the characteristic and normal condition for the Psyllinae irrespective of how the possession of these spines may be considered in other subfamilies. For similar reasons given in the case of the new South African *Floria* species, it is also necessary to refer the present new species of *Lindbergiella* to a new subgenus.

Palaeolindbergiella, new subgenus

Lindbergiella as previously known to me, constituted a very homogeneous group of species, differing one from another, mainly in the pigmental patterns and micro-sculpturing of the forewings, and the details of the male genitalia. The new South African species does not conform so closely with the general character of the above species but does not differ in any generic fashion.

Wings: Overall character more generally psylline. Pterostigma longer and narrower.

Labium: Much longer than in the average member of the Psyllinae, but not quite so excessively long as in typical forms of *Lindbergiella*.

Legs: Long, developed as in *Lindbergiella*. Metatarsus with two basal spines, instead of the more usual one to be found in the European-North African-Mediterranean section of the genus.

Lindbergiella (*Palaeolindbergiella*) *primitiva*, new species

(figs. 1, 9)

So far, all known species of *Lindbergiella* are associated with host plants taken from the Genistae; the present new species perhaps does not differ in this respect. None of the members of this genus present the so-called arytainine facies very strongly—is one least of all.

Colour

Head, thorax, abdomen and legs: All uniformly yellowish in the spirited specimen; probably greenish-yellow in the fresh adult. Claws horn-coloured; spines black. Antennae missing. Compound eyes prominently dark-centred, almost black. Tip of labium black. Female genitalia conforming in colour with the rest of the body, only the apex of the valves showing any heavier pigment.

Wings: Membranes clear. Pterostigma opaque. Veins yellowish. Radular areas black.

Structure

Head: Although at least as broad as the thorax, the head is shallow and appears tall; it is inclined ventrally, and more or less continuous with somewhat arching pronotum. Compound eyes not large, but small and spherical and quite prominently placed on the extreme sides of the head. Occipital sclerites although not large, seemingly prominent by virtue of the inclination of the head. Vertex differing slightly from the typical form in that the dimensions differ slightly, and the median excavation is not quite so evident. Genae appearing in typical form as wide-spaced hummocks beneath the head, only just contiguous at their inner bases. Frons small and very poorly developed, and almost wholly covered by the anterior ocellus. Anterior ocellus small, and not visible in dorsal view. Lateral ocelli also very small, and scarcely visible in the angles behind the compound eyes next to the occipital sclerites. Labium in length more than half the width of the head, projecting forward strongly, and very sharply pointed. Perhaps not quite so well developed as in more typical species, but nevertheless preserving the original character of the genus. Antennae except for the basal two segments, missing; the latter seem to be typically developed and positioned in the usual fashion.

Thorax: Arched in typical fashion, broad. Pronotum also quite typical in form, with no special distinguishing features. Propleurites vertical, long and well-developed, concealed by the receding compound eyes, and divided equally by a somewhat approximate, but medially placed suture.

Wings: Two and one-third times as long as broad, anterior and posterior margin subparallel for the greater portion of their length, widest point reached approximately two-thirds from the base, and then rounded off apically from this point, in a smooth curve. Pterostigma distinct, long and wedge-shaped. Costal nodal break distinct but not very prominent. Membranes without pigmental patterns, but with fairly heavy micro-sculpturing in the cells, giving way to strong radular areas in cells M, MCu and Cu₁. Veins not strongly developed, clear but bearing marginal fringes of fine, close-set, hook-like setae. R/MCu basal petiole ratio approximately 2/1. Rs of moderate length, slightly sinuate, reaching the wing apex sub-apically. Radial cell slightly more than half the length of the wing, six times as long as broad. M arching upward to Rs. M₃₊₄ continuing in the same arc to terminate at the wing margin almost directly opposite the termination of the pterostigma. M₁₊₂ inclined from the horizontal, terminating close to the wing apex and slightly arched in the middle. Medial cell acutely wedge-shaped, length exceeding the greatest width by more than twice. Cubital petiole short, straight and diagonally placed. Medio-cubital cell curved and somewhat irregular, constricted slightly in the middle. Cu_{1a} executing a sharp bulge upwards towards M at the base, and then becoming quite straight and diagonally inclined for the greater portion of middle length, and with a slight apical ventral curve where it joins the wing margin. Cu_{1b} a little more than half the length of Cu_{1a}, straight and diagonally inclined for two-thirds of its length, and then executing a very strong curve to the base, before it joins the wing margin. Cubital cell about one and one-half times broader than long, irregular in shape.

Legs: Long and slender, and quite typical of the genus. Meracanthi typical. Metatibiae with small but distinct basal spurs. Apical metatibial spines four in number, two diametrically opposed, and two unequal, closely placed medial spines. Metatarsi with two basal spines, of moderate development.

Genitalia (female): Dorsal valve (segment ten) acutely pointed; in lateral view, broad at the base, flattened dorsally to accommodate the anus, and then inclined to the apex; acutely conical. Hairy, hairs becoming thicker and longer before ceasing altogether. Ventral valve (sternite of segment nine) almost as long as the dorsal valve, narrow at the base, and inclined upwards towards the tip of the dorsal valve in a parallelling, very fine, needle-like point. A thick clothing of medium-sized hair is borne subapically, and directed ventrally. The ovipositor structure is closely pressed into the lower surface of the dorsal valve, and without dissection, no details are visible. The lateral palps are not distinct.

Genitalia (male): Unknown.

Cape Prov.: Cape Peninsula, Hout Bay, Skoorsteenkop, 1 ♀ in insect trap, 19-22.XII.50, Loc. No. 95. Swedish South Africa Expedition, 1950-51, BRINCK-RUDEBECK.

Diaphorina Löw, 1879

Diaphora Löw, 1878, *nomen praeoccupatum*.

Diaphorina Löw, 1879.

Euphalarus CRAWFORD 1912, *partim*, nec. *Euphalarus* SCHWARZ, 1904.

Euphalarus PETTEY, 1921.

An aberrant psylline genus whose numerous species present a strong although superficially aphalarine facies greatly enhanced by the characters of the head, thorax and short antennae. Most species are very heavily pigmented. The genus is Asiatic, Southern European, Mediterranean, African and Old World Tropical in general distribution, with no authentic representatives in the New World; apparently not very closely related to any known New World genus.

Head: Equal in width, or slightly tapering from the thorax, horizontal. Genae parallel to the plane of the vertex, depressed slightly below, quadrate, or bluntly conical; short, usually shorter than the length of the vertex, inner margins usually contiguous. Vertex flat, quadrate. Frons obscured by the genal bases; anterior ocellus, visible dorsally, thrust up between the genal bases. Compound eyes lenticular, somewhat flattened and compressed against the side of the head. Antennae quite thick and stout, but very short, and, in all known authentic species, scarcely equalling the width of the head.

Thorax: More or less flattened dorsally. Pronotum broad and ribbon-like, curving forward in the middle. Propleurites small, quadrate.

Wings: Membranes thickened and more or less maculated and microsculptured characteristically in all known species. or, alternatively, completely reticulated. Veins proportionately stout, frequently paralleled by a double row of setae. Venation psylline. Costal nodal break always present, and although R_1 is undivided, a thickened pseudo-pterostigma is formed by R_1 paralleling the costal margin closely for some distance before finally merging with it. Radular areas variable; frequently associated with marginal pale areas in the overall pigmentation. Cubito-medial/radial petiole ratio $\frac{1}{2}$ –3.

Legs: Short and stout. Metatibia without a basal spur. Meracanthi well developed. Metatarsi with two basal spines.

Genitalia (male): Proctiger usually pear-shaped and simple. Parameres simple; spatulate, and very uniform.

Genitalia (female): Of two types. Either of the usual simple conical form, or alternatively, with a distinct, ventrally-directed bulge in the middle of the ventral valve (sternite of segment nine).

Type of the genus: *Diaphora putoni* Löw, 1878.

Although this genus was defined by Löw as early as 1878, the name had to be changed from *Diaphora* to *Diaphorina* in 1879. Until recently I have considered it to belong to the tribe Arytainini of the Psyllinae, but after having examined a large number of new, and some old genera which are clearly related to it, I have concluded that there is a distinct generic aggregate centering round *Diaphorina* warranting recognition as a separate tribe and quite distinct from the Arytainini. Such a tribe will be erected in another place under the name Diaphorinini.

At no time in the history of this genus should there have been any difficulty experienced in recognising it correctly or placing any of the thirteen described species within it, yet considerable confusion has arisen. This seems to have started when CRAWFORD, the American psyllid systematist, failed to recognise it and referred

authentic Indo-Malayan species of *Diaphorina* to the exclusively North American genus *Euphalarus* SCHWARZ. I am fully aware that certain other Old World Tropical species than those that are correctly referable to *Diaphorina*, have also been placed in *Euphalarus*, and will make the necessary distinctions in due course. In the meantime, it should be borne in mind that *Diaphorina* was correctly defined and named first in 1879 and that it would certainly have held priority over *Euphalarus*, defined in 1904, had the two actually been synonymous. No explanation has ever been afforded for the above mentioned misuse of *Diaphorina*, but the error was later perpetuated, at CRAWFORD's instigation, by PETTEY who referred four new species of *Diaphorina* from South Africa to *Euphalarus*. These were *Diaphorina acokantherae*, *D. natalensis*, *D. punctulatus* and *D. carissae*. This further confusion arose despite the fact that PETTEY had access to authentic British Museum material of the type species of *Diaphorina*.

Although only thirteen species of *Diaphorina* have been described previously, this is a very large genus, but the uniformity expressed amongst its species is so great that the recognition of new species, their separation one from another, and the formulation of adequate descriptions sufficiently specific to enable subsequent identification practical, is a tedious and very difficult task; all the distinctive species seem to have been described already.

Five new species of the genus *Diaphorina* are represented in the present collection, and a very careful check has been made to ensure that no one of these is to be identified with species hitherto described from South Africa by PETTEY.

They all belong to the section of the genus to which the type species *Diaphorina putoni* Löw is also to be referred. All of these species are so uniformly similar, that establishing identities for them now seems to be a very formidable task as normal techniques do not seem to help. I have checked and rechecked the forty of these species available to me, and whilst I am fully satisfied that all are specifically distinct, I have decided that the usual descriptive methods would involve much repetition of what, in this case, would be non-specific detail. In the present account, I have therefore chosen to use only two sets of characters which seem to have uniform specific status. I refer to those of the fore-wing, its micro-sculpturing and associated pigmental patterns, and the details of head configuration.

The overall examination of so many species, however, has shown that it is possible that the genus may be split into three sections thus reducing the tedium of subsequent identification of individuals considerably.

Primarily, the genus may be separated into two groups, one with a reticulate venation, and the other comprised of the bulk of forms with a non-reticulate venation.

Reticulate-veined forms have not hitherto been described in this genus, but it might be significant to report that the two species of this type are both restricted to Madagascar.

The non-reticulate-veined forms represent a large group divided perhaps evenly between those with simple female genitalia wherein the "ventral valve"—although frequently making an abrupt angle upwards at about a third of the way along the

total length—is unmodified, and those in which the ventral valve possesses a more or less well-developed but characteristic ventral bulge.

All of the present species are non-reticulate veined types with unmodified female genitalia.

In providing identity for these species, the forensic technique of the comparator microscope has been used with particular reference to the wing characters. A sufficient range of additional material has been examined so that it can now be declared with absolute certainty, that the characters revealed by this technique are always specific.

Adequate descriptions of the micro-details are virtually impossible; it has therefore been found expedient to provide an overall photographic reproduction of the whole wing together with a very much enlarged detailed photograph of the medial cell for each species. The degree of magnification is of no immediate concern, but it is uniform for comparative purposes.

Diaphorina typica, new species

Figs. 4, 5)

This species is the closest of the five to the type of the genus, *Diaphorina putoni*. The radial petiole is approximately twice as long as the medial petiole and cell M is only very slightly larger than cell Cu₁. The whole wing membrane is covered by somewhat irregular and confluent dark pigmental patches, more thickly disposed on the apical cells than at the base. Radular areas are well enough marked, but the overall microsculpturing of the wing membranes (both surfaces taken together) appears of a somewhat uniform and finely reticulate nature, and the pigmental patterns do not appear to be especially associated with this microsculpturing.

The head configuration is not unlike that of *Diaphorina putoni*, although the enae appear to be a little broader and more robust. The disc of the vertex is excavated at either side in wide, shallow and not very obvious depressions, and in this again, the similarity to *Diaphorina putoni* is very well-marked.

This species has been defined on the basis of a series of eight specimens all bearing the following collection data:

Cape Prov.: Cape Town. Rondebosch. 21.I.1951. Loc. No. 156. Swedish South Africa Expedition, 1950–1951. BRINCK–RUDEBECK.

Diaphorina punctipennis, new species

Figs. 4, 6)

In general overall appearance this species is similar to *typica*. Venationally it differs particularly in the medio-cubital/radial petiole ratio which in this case is very clearly outside the range of $\frac{1}{3}$, in the fact that cell M is proportionately much narrower and longer, and in the slightly more angulate wing apex. The microsculpturing is not any thicker but perhaps coarser than in the former species, and the pigmental patches are not so evenly distributed; they tend to be concentrated in larger, darker patches.

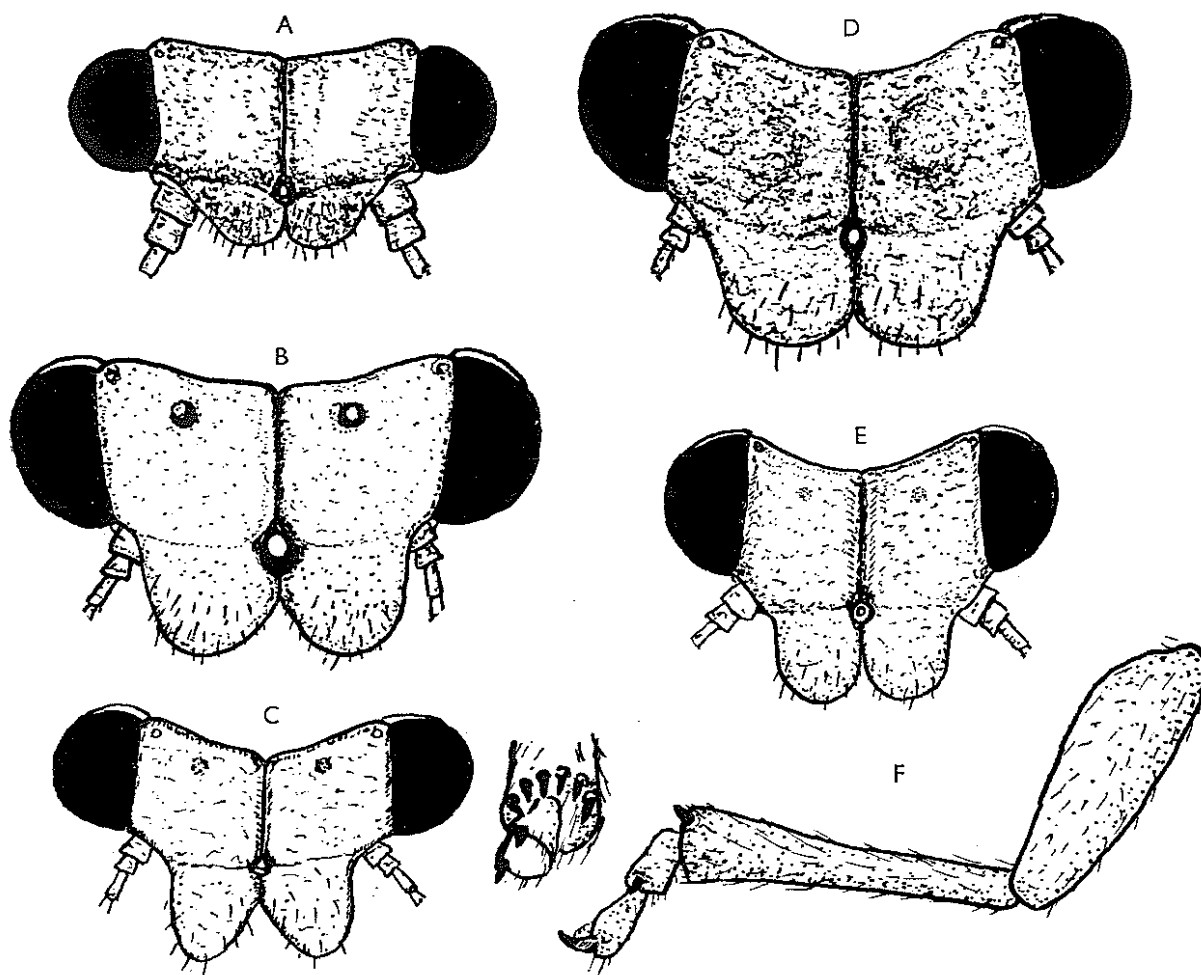


Fig. 4. Details of species of *Diaphorina*. — A. Head of *D. brevigena* n. sp. — B. Head of *D. punctipennis* n. sp. — C. Head of *D. porrigogena* n. sp. — D. Head of *D. typica* n. sp. — E. Head of *D. rubra* n. sp. — F. Hind limb and metatibial spines of *D. typica*.

Two of these are significantly placed along the bases of R_1 and M —a feature characterising both *Diaphorina putoni* and a wide range of additional species of this genus.

The head configuration is not unlike that of *typica*, but the overall surface is much smoother and less reticulated; furthermore, two small but quite distinct foveal impressions occur high up, one on each side of the vertex.

This species has been defined on the basis of two insects bearing the following collection data:

Basutoland: Mokhotlong, 6.IV.51. Loc. No. 266. Swedish South Africa Expedition, 1950–1951. BRINCK–RUDEBECK.

Diaphorina brevigena, new species

(Figs. 4, 6)

In this species there is a more positive relationship between the pigmental patterns of the forewing and the microsculpturing of its surfaces; in some places the small tubercles of the wing surfaces run almost regularly, and when associated with

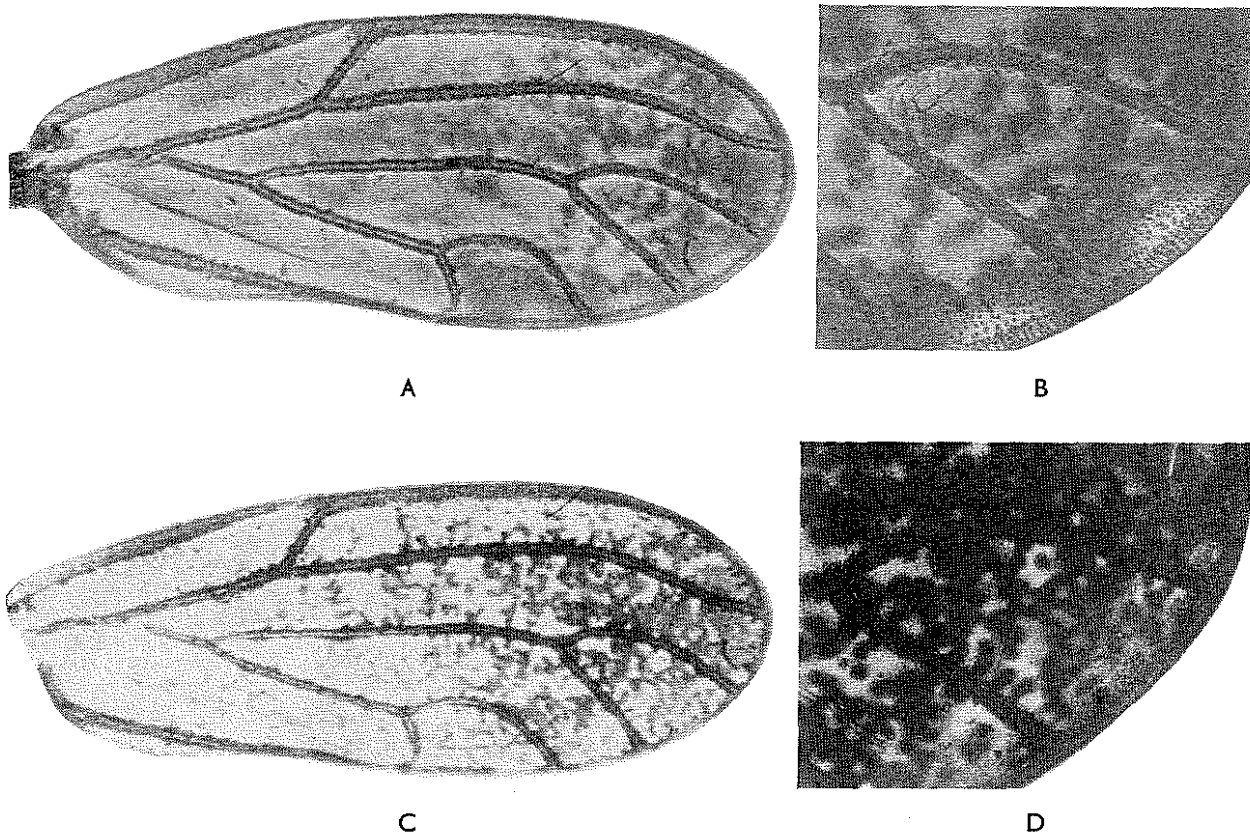


Fig. 5. A. *Diaphorina porrigogena* n. sp., whole wing. — B. *D. porrigogena* n. sp., cell M. — C. *D. typica* n. sp., whole wing. — D. *D. typica* n. sp., cell M.

pigment, an impression of small hexagonal cells is created. The microsculpturing is generally more positive, coarse and quite distinctive. The cubito-medial/radial petiole ratio is approximately $\frac{1}{2}$. Cell M is clearly longer than cell Cu_1 , but the latter is almost quadrate. Radular areas are distinctively placed in clear marginal patches.

In the two preceding species the genae are broad-based and at least three-quarters of the length of vertex. In the present species the genae are short and tapering, although still bluntly rounded at the apex, but distinctly less than half the length of the vertex. There are no very well-marked lateral foveal impressions on the vertex.

This species has been described from a single specimen with the following attached data:

Cape Prov.: Langeberg, Tradouwpas, 4.I.1951. Loc. No. 111. Swedish South Africa Expedition, 1950-1951. BRINCK-RUDEBECK.

Diaphorina porrigogena, new species

Figs. 4, 5)

The pigmental patterns of the forewings of this species are somewhat nebulous, and the wings are semi-opaque or clouded. The veins are stouter than average. The cubito-medial petiole is clearly more than half the length of the radial petiole. Cell M and cell Cu_1 are subequal. Microsculpturing of the membranes is not heavy, small

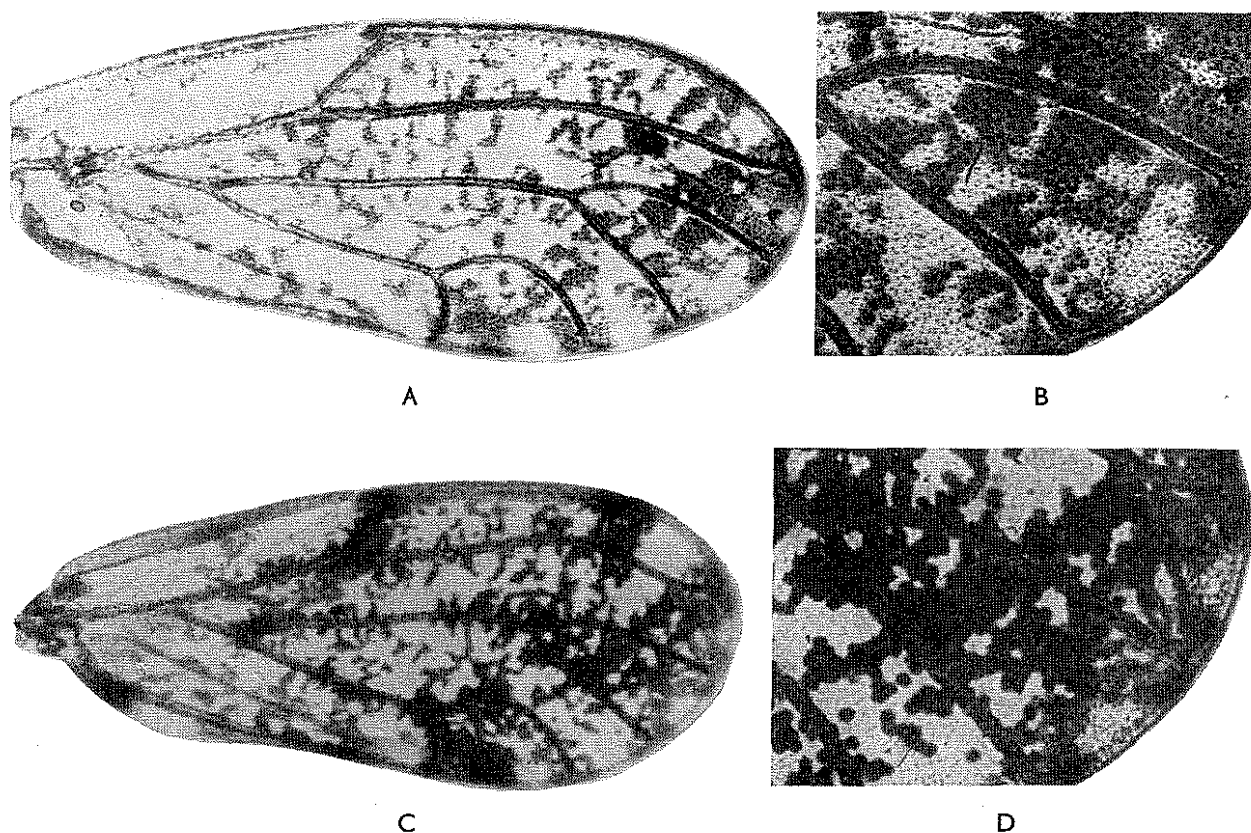


Fig. 6. A. *Diaphorina brevigena* n. sp., whole wing. — B. *D. brevigena* n. sp., cell M. — C. *D. punctipennis* n. sp., whole wing. — D. *D. punctipennis* n. sp., cell M.

tubercles being evenly dispersed over the whole area. Radular areas in distinct clear marginal patches in cells Cu_1 , CuM , M and MR, and seen to be comprised of the thicker disposition of larger thorn-like microtrichia.

The distinctive feature of the head of this species is the porrect appearance of the genae. They are contiguous only for a third of their length and although the outer margins are more or less parallel they appear as if strongly divergent because the inner margins taper outwards from the contiguous bases in a striking and unusual fashion. Each half of the vertex has a small but quite distinctive foveal impression in the same position as in the species *punctipennis*.

The carded specimen on which this species has been raised bears the following data:

Cape Prov.: Maanschijkop 7 miles E Hermanus. 21.XII.50, Loc. No. 93. Swedish South Africa Expedition. 1950–1951. BRINCK–RUDEBECK.

Diaphorina rubra, new species

(Figs. 4, 7)

Pigmental pattern of the forewing appearing very similar to that of the form *typica*, but a little heavier, particularly in the region of the radial petiole and to some extent along the apical margins of the principal veins. General venational

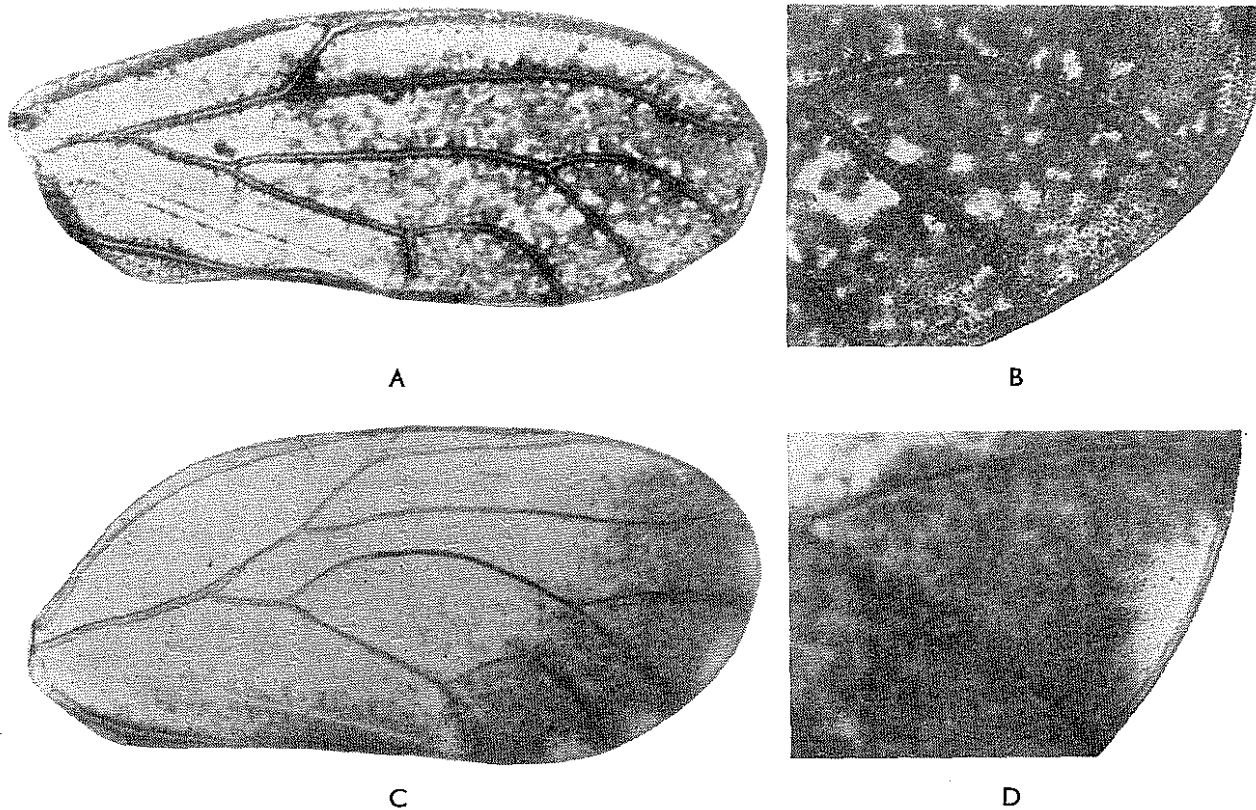


Fig. 7. A. *Diaphorina rubra* n. sp., whole wing. — B. *D. rubra* n. sp., cell M. — C. *Retroacizzia antennata* n. sp., whole wing. — D. *R. antennata* n. sp., cell M.

attern also very similar to that of *typica* and seemingly only differing in minor details. The microsculpturing is more positive, however, and the pustules themselves are uniformly spaced and generally larger. Radular areas marked particularly by a heavier disposition of these pustules in the apical borders of cells Cu_1 , CuM , M and IR .

The head is much narrower than any of the other four species in proportion to its total length; the genae are more tubular and quite smoothly rounded at the apices. Very small, but quite distinct foveal impressions are located high up on each half of the vertex.

This species has been represented by two examples bearing the following data:

Cape Prov.: Swartbergpas, Platberg. Alt. about 5000 ft., 5-6.1.51, Loc. No. 120. In *Protea* flowers. Vedish South Africa Expedition, 1950-1951. BRINCK-RUDEBECK.

Parapsylla, new genus

Head: Together with the compound eyes, approximately the same width as the rostrum; horizontal. Genae conical and inclined slightly from the plane of the vertex; depressed below the latter. Vertex with each half roughly pentagonal, owing to the positioning of the antennae. Bordered laterally by the inner margins of the compound

eyes but separated partially or completely from the latter by distinct ante-occipital sclerites. Ante-occipital lobes present, small. Frons obscured by the anterior ocellus and the bases of the genae. Anterior ocellus placed dorsally between the genal bases. Lateral ocelli small, not prominently placed. Compound eyes of moderate size, globular. Antennae long, slender, considerably longer than the width of the head.

Thorax: Bulging upwards slightly, robust. Pronotum extending laterally to the lateral extremities of the compound eyes, ribbon-like and parallel-sided. Propleurites subequal; suture more or less vertical.

Wings: Membranes unthickened. Veins of moderate development. Venation psylline. Costal nodal break present. Pterostigma present. Radular areas not evident.

Legs: Well-developed. Metatibia with distinct basal spur. Meracanthi present and well-developed. Basal metatarsus with two strong spines.

Genitalia (male): Proctiger unipartite, but developed laterally into wing-like lobes. Parameres simple.

Genitalia (female): Simple acuminate.

Type of the genus: *Parapsylla relictæ*, new species.

When I came to deal with this curious genus as represented by its single species, I was very strongly inclined to place it in the Spondyliaspinae, as no authentic psylline genera were known to possess distinct ante-occipital lobes. Since then, however, I have had a chance to revise my opinions, and I now link this genus with a new Peruvian genus, *Jenseniella* TUTHILL (1959), which has similar ante-occipital developments; the latter also creates a curious spondyliaspine impression.

In the present instance it is not merely the presence of distinct ante-occipital lobes which create this impression, but the fact that the single known species possesses an overall wing configuration which is decidedly of spondyliaspine facies. Moreover, the metatibial base is let into the metafemoral apex in such a fashion that distinct lateral flanges of spondyliaspine character are formed. On the other hand, the proctiger of the male is not bipartite as it is in all known true spondyliaspine genera, and meracanthal spurs of normal psylline development are present.

However, the spondyliaspine character of this genus is undeniable and quite significant.

Parapsylla relictæ, new species

(Figs. 8, 9, 10)

A larger species than average with long, narrow, smoky wings, slender antennae, and of an overall brownish facies.

Colour

Head, thorax, abdomen and legs: Darker pigmental patterns are restricted to the disc of the prescutum and to the region of the mesoscutum, although all the sutures on the thorax are darkly filled in, particularly in the lateral regions. The general colour is brownish-yellow.

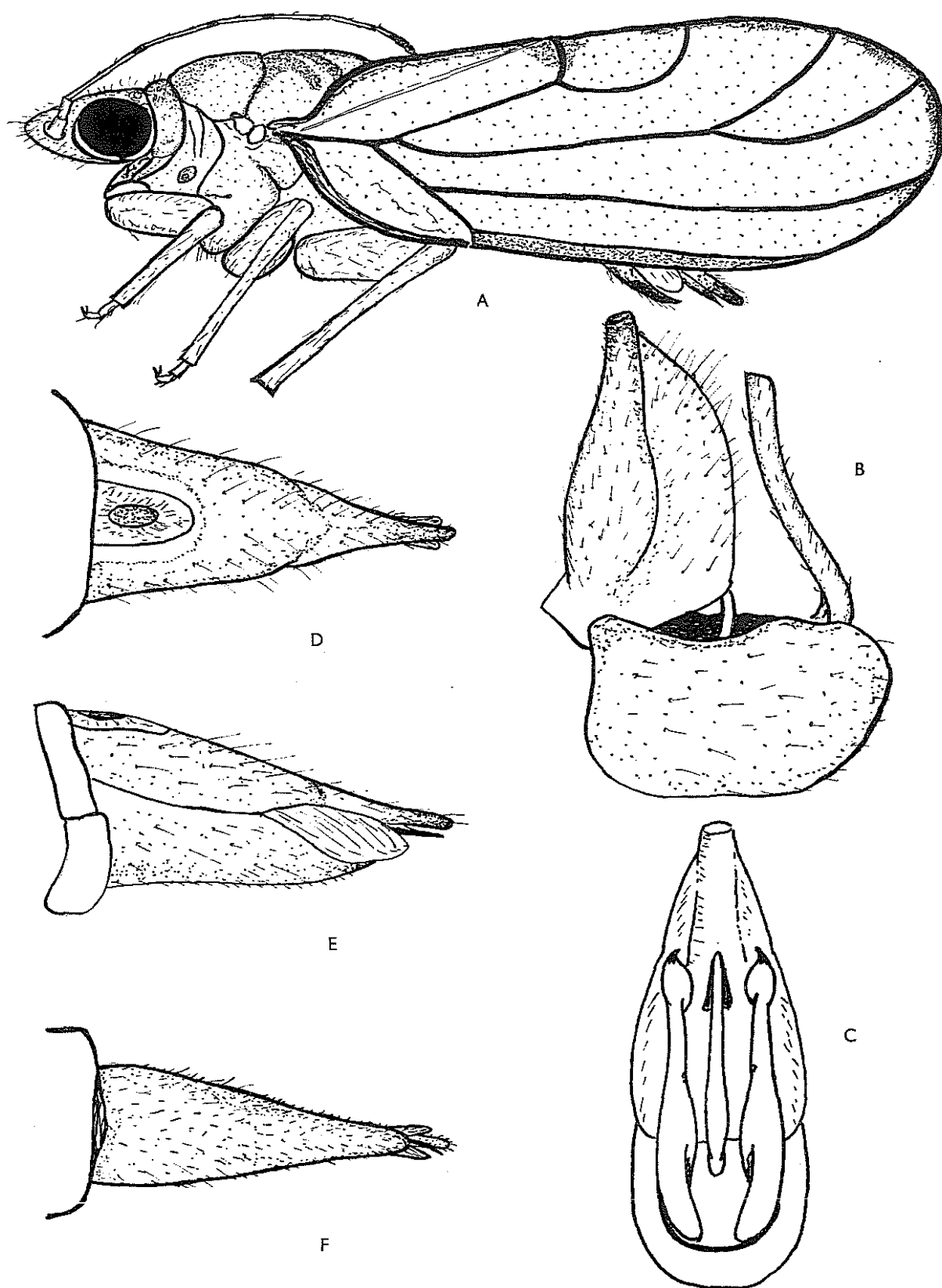


Fig. 8. Details of *Parapsylla relictæ* n. sp. — A. Lateral view of the whole insect. — B and C. Lateral and posterior views of male genitalia. — D, E and F. Details of female genitalia.

Compound eyes dark with darker centres; probably reddish in life. Anterior and lateral ocelli pale orange and not contrasting very strongly against their background. Genae paling towards their apices, and laterally and ventrally quite light. Vertex darker than the genae but without any darker central areas. Antennae with segments nine and ten wholly black; apical third of segment eight and a narrow apical band on segments seven, six, five, four and three black. Segments one and two a little darker than the region of the vertex from which they arise.

Pronotum with indistinct darker lateral impressions in terminal and subterminal positions. Prescutum with a median discal darker patch. Scutum with the usual darker W-markings, but these are obscure and more or less confluent. Legs paler than the sides of the insect; claws darker, but not entirely black. Metatibial spines black. Basal metatarsal spines black. Tip of basal metatibial spur black. Meracanthi very contrastingly lighter and quite shiny.

Apices of the valves of the female genitalia quite dark, sides pale, anal aperture darker in the centre. Male genitalia darker only at apex of the proctiger, parameres concolourous with the rest.

Wings: Membranes more or less uniformly semi-opaque, fumate, with darker pigmented areas in the vicinity of Cu_{1b} and along the base of the claval area. Pterostigma opaque, white by contrast. Veins with darker brown centres and paler lateral margins.

Structure

General body surfaces finely shagreened. Dorsal surfaces of the head, the whole of the genae, legs and genitalia hirsute, with the hairs tending to become longer and thicker towards the extremities. Ventral aspect of abdominal tergites with a fringe of longish hairs.

Head: Horizontal, and with the compound eyes the same width as the thorax. Compound eyes prominent, globular. Occipital sclerites extending round the sides of the compound eyes to become slightly dilated anteriorly as distinct but small ante-occipital tubercles. In the dried specimens there has been a tendency for this structure to collapse, so that these lobes project as small epiphyses in front of the eyes, and the discal connective portions become partially overlaid by the small lateral tubercles which carry the lateral ocelli. Vertex with each half slightly inclined laterally from the central suture and somewhat pentagonal. Antennal shelves not strongly developed. Genae small and conical, depressed below the plane of the vertex. Contiguous at their bases. Frons concealed wholly by the dorsally located anterior ocellus and the contiguous genal bases. Anterior ocellus small. Lateral ocelli small, placed in the extreme postero-lateral angles of the vertex on small tubercles. Antennae long and slender, inserted in prominent antero-lateral positions just beneath the lateral extremities of the halves of the vertex. More than two and one-half times as long as the width of the head. Third segment equal in length to segments four and five together; segments three to eight subequal, and nine and ten together scarcely as long as segment eight. Rostrum short, stout.

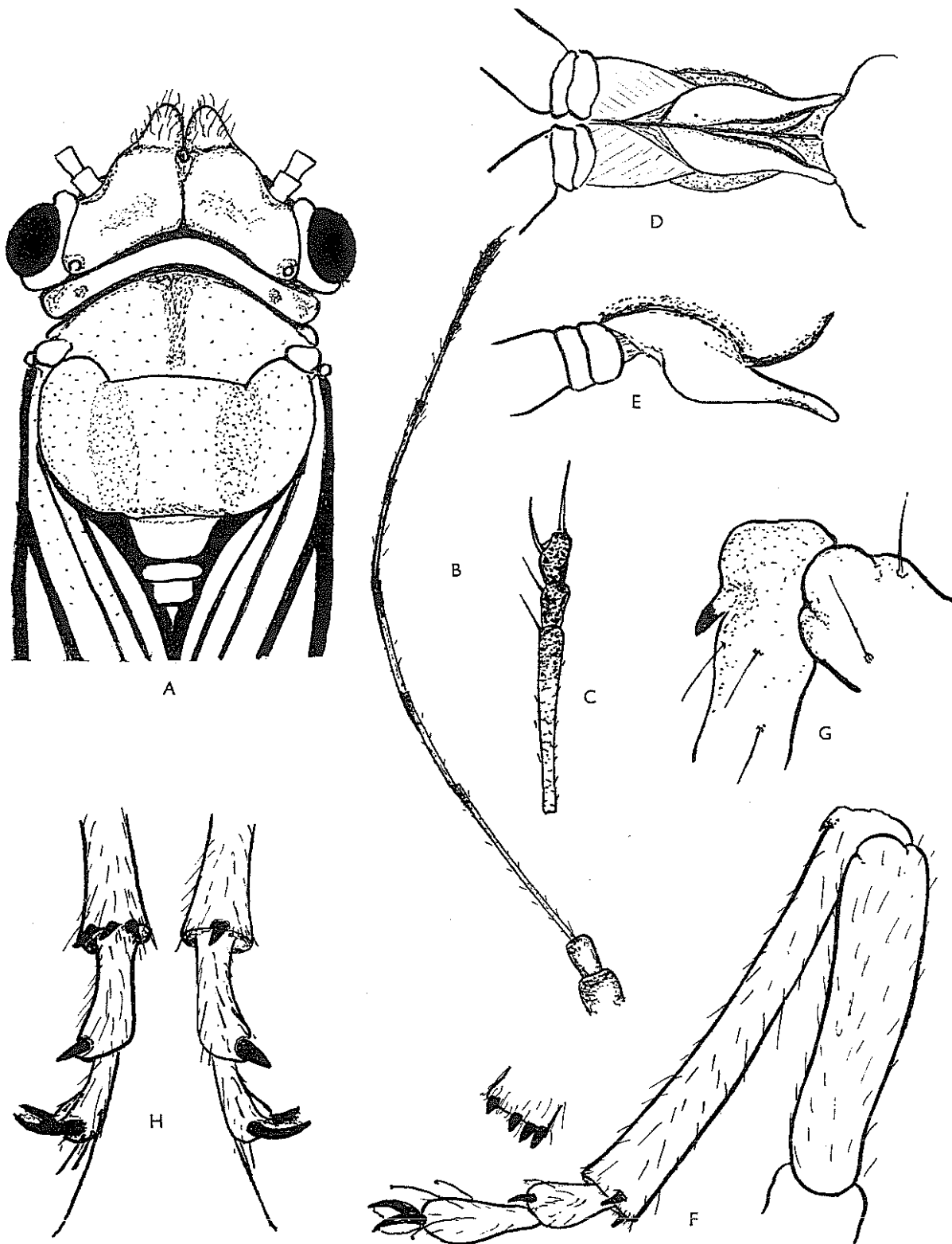


Fig. 9. Details of *Parapsylla relictia* n. sp. and *Lindbergiella* (*Palaeolindbergiella*) *primitiva* n. sp. — *Parapsylla relictia*. A. Dorsal view of head and thorax. — B. and C. Details of antenna. — D and E. Ventral and lateral views of meracanthi. — F and G. Details of hind limb. — *Lindbergiella* (*Palaeolindbergiella*) *primitiva*. H. Apical metatibial spines and basal metatarsal spines.

Thorax: Stout and robust, not strongly arched. Pronotum curved forward to fit into the posterior curve of the vertex. Transversely quite long, but narrow and ribbon-like with parallel sides. Laterally terminating in slightly raised carinae preceded by small, subterminal foveae. Propleurites small, subequal. Divided by an imperfect suture. Prescutum narrower than the pronotum, and roughly ellipsoidal. Approximately twice as wide as long down the centre. Scutum almost the same length as the prescutum down the middle, but proportionately about half as broad again. Of a somewhat unusual shape resulting from the extreme squareness of the prescutal insertion on its anterior border. Tegulae not very large, pear-shaped with flattened dorsal surfaces.

Abdomen: With no unusual features.

Wings: Slightly less than three times as long as broad, with the broadest point in the apical third. Smoothly rounded apically. Costal marginal vein dilated basally. Costal nodal break distinct but close into the base of the pterostigma. Pterostigma sinuate, extremely long and narrow and extending for more than half of the total length of the wing to terminate subapically. Opaque. R/MCu basal petiole ratio 2/1, but both petioles are quite short. Rs separates from the radial stem at the mid-point and pursues a smooth but gently curved path parallelling the costal wing margin to terminate at the very apex. M follows a slightly divergent path to the wing apex, continuing without changing this course to the wing margin as M_{3+4} . M_{1+2} branches upwards to form a wedge-shaped cell with M_{3+4} . Cu_1 is a long and perfectly straight vein before it bifurcates, diverging from M at an angle of 30 degrees. Cu_{1b} recurves to join the anal margin of the wing at a point near the claval nodus. Cu_{1a} arches upward slightly before curving back to the wing margin. Cell Cu_1 , which is enclosed between these secondaries, although it does not appear so, is basally three times as long as high. The claval suture forms a clear, white, diagonal line, in contrast against the fuscous claval area. Radular areas are present in cells RM, M, MCu and Cu_1 but they are not very obvious, the thicker microtrichiation marking their presence being masked by the overall fine microtrichiation and the fumate membranes.

The method of convergence of the principal veins onto the common basal petiole, their long, more or less straight but gently diverging paths across the disc of the wing, and the subterminal dilation of the latter in its greatest width, all contribute strongly to the spondyliaspine impression.

Legs: Long and slender. Meracanthi well-developed, finely tapering and characteristically curved outward and downward. Metafemora with small but distinct lateral flanges at the point of insertion of the metatibia. Metatibia with a distinct, black-tipped basal spur, and one inner and four outer apical black spines. Basal metatarsus with two strongly developed black spines.

Genitalia (female): Long and acuminate; at least twice as long as broad at the base. Proctigal segment somewhat constricted subapically and darker at the tip. Ventral valve not quite so long, and terminating in a finely pointed uptilted tip. Palps large but not gaping widely. Ovipositor structure seemingly permanently exerted, finely pointed, not extending beyond the apex of the proctiger.

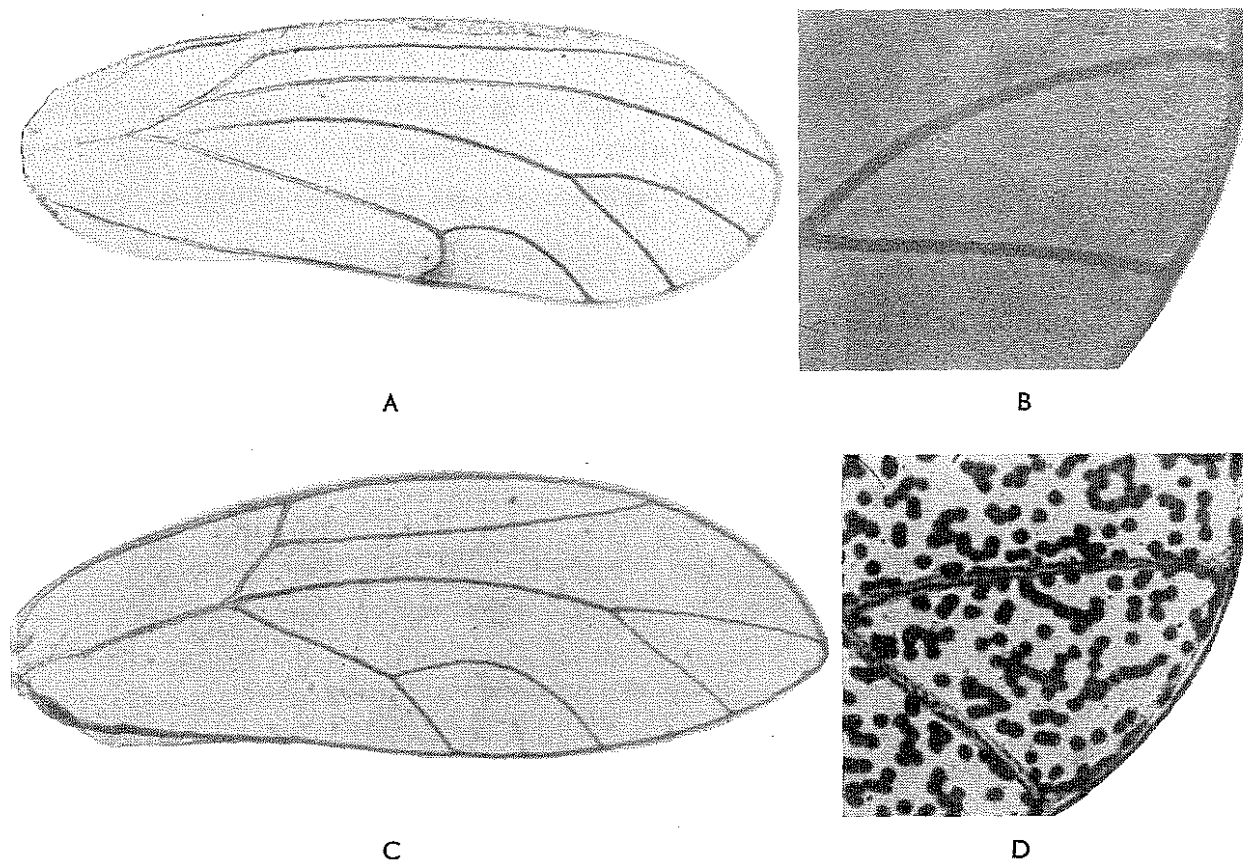


Fig. 10. A. *Parapsylla relictata* n. sp., whole wing. — B. *P. relictata* n. sp., cell M. — C. *Trioza similis* n. sp., whole wing. — D. *Floria (Brinckitia) annosa* n. sp., cell M.

Genitalia (male): Segment nine boat-shaped, and about twice as long as deep. Proctiger unipartite, and of a simple tubular structure although bearing broad lateral rings which give it a somewhat elongated pear-shape in lateral view. Parameres seen laterally as long, slender, sinuate and parallel-sided structures ten times as long as broad at the base and nearly as long as the proctiger. From posterior view seen as dilated at the bases but constricted a third of the way up into definite shafts and then swollen out apically into opposing pads, each with a finepointed inwardly-directed terminal epiphysis.

Cape Prov.: Maanschijkop, 7 miles E of Hermanus, 2 ♂♂ + 2 ♀♀, 21.XII.50. Loc. No. 93. On small ream at water fall. Swedish South Africa Expedition, 1950–1951. BRINCK–RUDEBECK.

***Agmapsylla*, new genus**

Head: With the compound eyes, slightly wider than the thorax; horizontal. Genae conical, with the dorsal surfaces held in the same plane as the vertex although slightly depressed below. Vertex much wider than long, with each half more or less pentagonal. Frons wholly concealed under the contiguous bases of the genae and the anterior ocellus. Anterior ocellus visible in dorsal view. Compound eyes large and globular, somewhat emarginate in front and at the inner sides—possibly with in-

ipient ante-occipital lobes. Antennae moderately long and much longer than the width of the head.

Thorax: Robust, but apparently quite flat dorsally. Pronotum extending almost to the lateral extremities of the compound eyes, narrow and ribbon-like. Propleurites separated by a vertical suture, but unequal in shape and size; proepimeron quadrate.

Wings: Not available.

Legs: Quite well-developed. Meracanthi well-developed. Metatibia with a distinct basal spur and an apical fringe of closely set, rather small, even black spines. Basal metatarsus with two black spines. Terminal claws on all legs weakly developed.

Genitalia (female): Simple, acuminate.

Genitalia (male): Unknown.

Type of the genus: *Agmapsylla aureus*, new species.

Although the insertion of a pin through the thorax has caused the detachment of the wings with their consequential loss, I have had no hesitation in describing the single insect available. The new genus to which I refer it is apparently not unrelated to *Parapsylla*, and this is likely to become more evident when winged examples become available. The arrangement of the propleurites, indications of the ante-occipital tubercles, the type of basal metatibial spur and the flanges on the apex of the metafemur suggest much. Whilst the general configuration of the head and thorax and female genitalia may suggest congeneric affinities, the peculiar arrangement of the metatibial armament suggests otherwise.

Agmapsylla aureus, new species

(Fig. 11)

Of approximately the same size as the preceding species, with slightly shorter antennae. Bright orange in general colour with a thick adornment of long golden hairs.

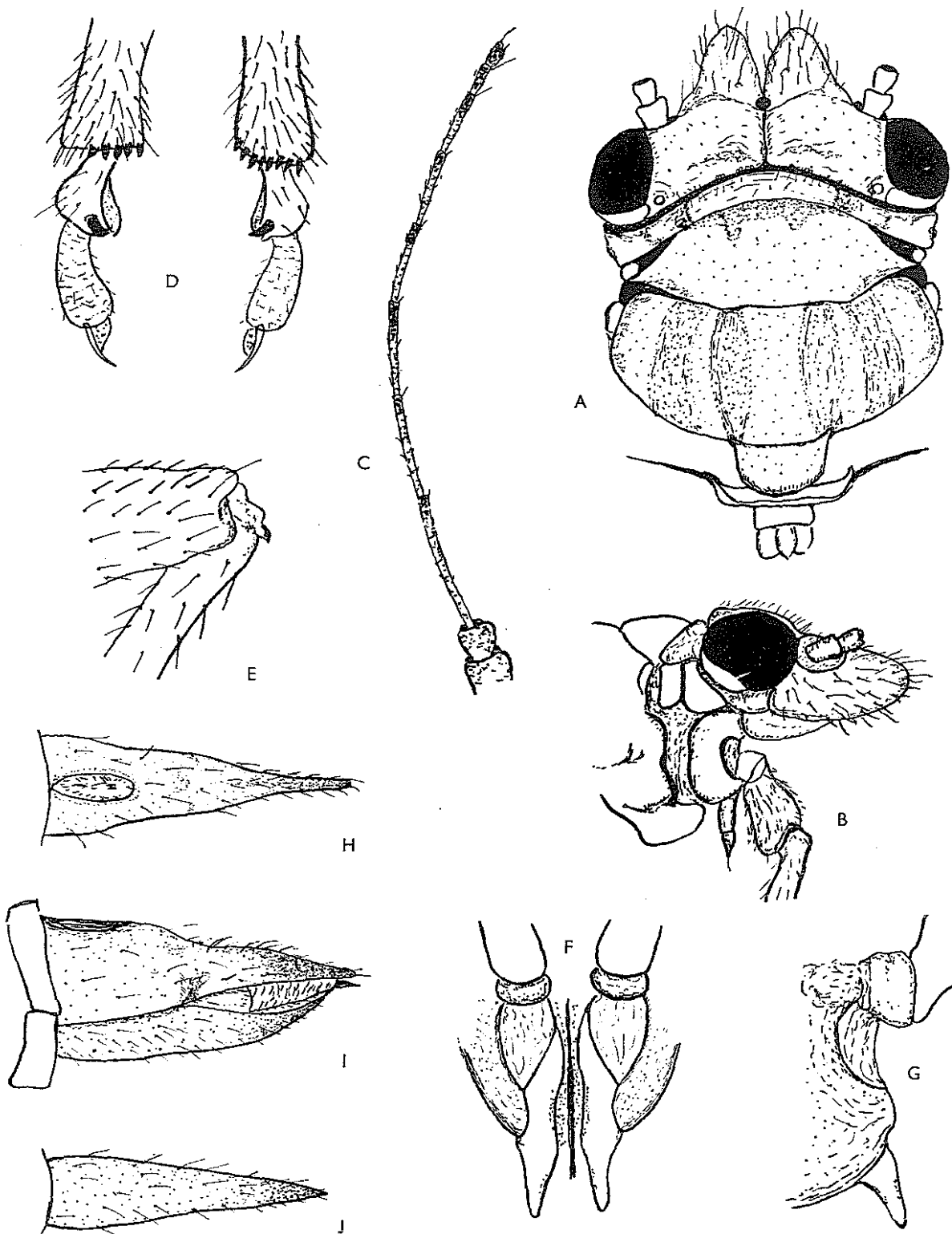
Colour

Head, thorax, abdomen and legs: Unfortunately the insertion of a pin through the thorax has destroyed much of the area where pigmental patterns would be borne.

Compound eyes quite dark. Anterior and lateral ocelli bright shining orange. Genae orange, with long golden hairs. Vertex more or less uniformly orange, and thickly clothed with shorter golden hairs. Antennae: ground colour dirty-yellow; apices of segments three to eight becoming progressively darker, segments nine and ten black.

Thorax apparently darker discally. Pronotum with a lighter raised discal portion, and some browner pigment creating a ripple effect in the lateral foveal impressions.

Legs paler yellow but strongly clothed in golden hairs. Basal metatibial spur with a black tip. Apical metatibial spines black. Basal metatarsal spines black. Claws on all legs quite pale in contrast. Meracanthi quite light with smooth shining surfaces.



g. 11. Details of *Agmapsylla aureus* n. sp. — A. Dorsal view of head and thorax. — B. Lateral view of head and prothorax. — C. Antenna. — D. Apical metatibial spines and basal metatarsal spines. — E. Basal metatibial spur. — F and G. Ventral and lateral views of meracanthi. — H, I and J. Details of female genitalia.

Female genitalia: Yellow-orange, darkening to black at the tip. Quite thickly clothed in golden-yellow hairs becoming longer towards the apex.

Structure

General body surfaces coarsely shagreened, appearing somewhat rugose. Quite hirsute.

Head: Horizontal and together with the compound eyes slightly wider than the thorax. Compound eyes quite large and spherical. Occipital sclerites clearly separated behind the compound eyes, but as the compound eyes appear to be somewhat emarginate, there is a possibility that narrow ante-occipital sclerites are present. Vertex with each half somewhat corrugated discally, but with a distinct dividing suture down the middle; comparatively short in relation to the total width. Antennal shelves scarcely evident. Genae of moderate conical development, contiguous at their bases and tapering to blunt points. Of considerably greater dorso-ventral thickness than lateral. Frons wholly concealed between the genal bases and under the anterior ocellus. Anterior ocellus wholly visible in dorsal view. Lateral ocelli slightly larger, and placed in the outer posterior angles of each half of the vertex. Not mounted on large tubercles. Antennae only of moderate length and not appearing so slender as in the preceding species although at least twice as long as the width of the head. Segment three slightly longer than segment four, and segments four to eight more or less equal. Segments nine and ten short and together scarcely equalling the length of segment eight. Rostrum not evident.

Thorax: Obviously quite stout and robust; quite flat. Pronotum appearing to have had a discal raised portion which descended at each side into foveal impressions. Transversely, long; but quite narrow across the centre. Ribbon-like. Propleurites divided by a vertical suture. Proepimeron roughly pentagonal and extending forward beneath the lateral extremities of the compound eyes. Proepisternum quadrate, and smaller.

Legs: Quite well-developed. Meracanthi strongly developed. Metafemur with apical flanges. Basal metatibia with a well-developed spur, and fringed apically with a semi-circular row of fifteen small black spines. Basal metatarsus with two black spines, each much larger than the fringing metatibial spines. Terminal claws on all legs poorly developed and lacking in strong pigment.

Female genitalia: Quite similar in general appearance to that of *Parapsylla relict*a, only a little more slender. Simple, acuminate. Dorsal valve (proctiger) with a slight lateral constriction about half-way along; somewhat sinuate, but terminating in a long narrow point. Ventral valve curved upwards at the tip and terminating in a very fine point just beneath the dorsal valve. Palps enclosed. Tip of the ovipositor projecting a little beyond the valves.

Cape Prov.: Cape Peninsula, Hout Bay, Skoorsteenkop, 1 wingless ♀ 2.II.51. Loc. No. 166. Insect trap. Swedish South Africa Expedition, 1950-1951. BRINCK-RUDEBECK.

2. TRIOZINAE

Genae developed into conical swellings of variable length or as rounded swellings, hummocks. Antennal bases not concealed by the swollen genae. Frons usually appressed in dorsal view, but always clearly visible in the space between the genal lobes and the clypeus behind or beneath the head. Venation usually of the type known as triozone, that is, with R, M and Cu₁ petioles coming together at the same point on a common basal petiole. Very rarely M and Cu₁ may have a very short common petiole before diverging, as in *Ceropsylla* RILEY and *Hemitrioza* CRAWFORD, but this condition does not destroy the general triozone facies. A true pterostigma is never present, and so far, a costal nodal break has never been detected in any triozone form. The male proctiger is never bipartite, although there are many forms known from which it is possible to gain some impression as to the probable fate of the terminal abdominal segment of the male. The antennae are filiform, usually only of moderate length and always ten-segmented. The pronotum is always constricted laterally, and the terminal portions together with the attached propleurites are turned forward and upward to lie in positions just beneath the lateral margins of the compound eyes. Ante-occipital tubercles are not known to occur in any known triozone genus. Basal metatarsal spines are always absent.

The Triozinae is probably the most recent subfamily; it is certainly the most numerous, and although with comparatively few adequately defined genera, the subfamily is of universal distribution.

Trioza FÖRSTER, 1848

Although of universal distribution and appearing abundantly in one form or other in nearly all collections, this is possibly the least understood "genus" of the psyllidae. I say this because I am convinced that it is being consistently misused by authors. The reason, of course, is that it is composite—there does not seem to be any doubt about that—but there are hitherto unsurmounted difficulties attending previous attempts at the separation of effective generic segregates. This is possibly a natural expectation considering the "newness" of the genus. It is still actively evolving and none of its parts seem to have stabilised as yet, and even in some instances the species (?) are still polyphagous.

Considering the exceptionally high degrees of host specificity normally expected amongst the members of the Psyllidae, it is strange, to say the least, that there could remain some lacking in this respect in the Triozinae. I would suggest, however, that this is not all it seems to be and that the fault lies in our inability to recognise the several parts of what may, in actuality, be a series of complexes. This is almost certainly so in the case of the European *Trioza nigricornis* FÖRST. for which there are no fewer than thirty-seven different and unrelated hosts recorded. These cover a very wide range of natural orders ranging from the Liliaceae to the Compositae and Solanaceae.

Head: Either nearly as wide as the thorax or much less than the width of the thorax, never broader. More or less deflexed. Vertex broader than long. Genae conical, of variable length and character, but usually divergent. Compound eyes large and spherical. Antennae of variable length, usually quite slender, and in most species with the third segment considerably longer than any of the others.

Thorax: Usually strongly arched, but of variable development. Pronotum always constricted laterally, with the propleurites and the lateral apices turning upward and forward beneath the compound eyes in a characteristic fashion. Discal portion of the pronotum usually descending beneath the posterior margin of the head. Prescutum as long or longer than broad; in some species hitherto referred to this genus (e.g. as in *Trioza alacris* FÖRST.) forming a distinctive "neck".

Wings: Petiolate; usually quite pointed apically and carrying the typical triozone type of venation. Pterostigma absent. Costal nodal break absent. Claval suture well developed. Apical cells with definitive radular areas. Membranes clear and glassy, only occasionally (e.g. as in *Trioza proxima* LÖW) semi-opaque, and only occasionally with a distinctive pigmental pattern (e.g. as in *Trioza arizonae* AULMANN). In some species which are still to be referred to the genus as it is at present defined, the hind-wings may be reduced to mere halteres (e.g. as in *Trioza diptera* CRAWFORD). Two such species are known to me from Africa; both await description.

Legs: Slender, often quite long. With or without basal metatibial spurs. Metatibial spines two or three inner, and one outer more prominent. Basal metatarsal spines always absent.

Genitalia: In both sexes somewhat variable. In some cases so much so that there is evident lack of syngenesia on this basis alone. It is possible that the segregates, which it is very necessary to recognise for reasons of identification, will ultimately warrant generic or subgeneric status when more is known about them.

Type of the genus: *Chermes urticae* LINN. This has been an unfortunate choice, for the *Trioza urticae* Auctt. can scarcely be regarded as representative of many species, but it is a choice that cannot be altered now. Closely syngenetic species and forms with the type, however, have a wide distribution, but always on *Urtica* spp. Two occur in North America, one in North India (Nani Tall) and another in Tasmania at high altitude on Mount Wellington.

Trioza similis, new species

(Figs. 10, 12)

Described from a single teneral female in spirit, no colour details of significance can be afforded. It is a nondescript species and one which may be described as "just another new *Trioza*", for there are so many like this from the African region awaiting description.

Structure

Head: Approximately the same width as the thorax. Vertex more or less horizontal, each half nearly quadrate. Genae conical, and projecting ventrally and at

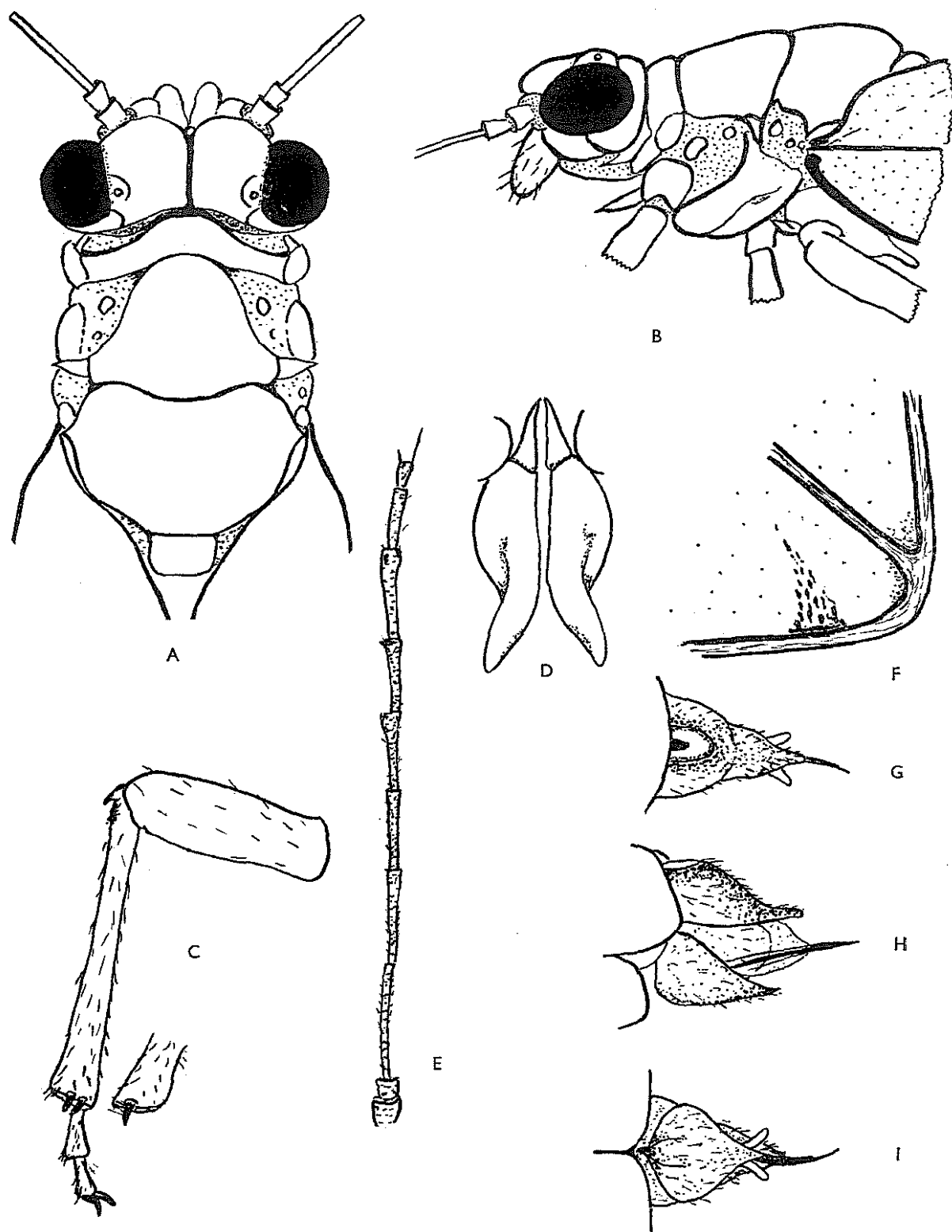


Fig. 12. Details of *Trioza similis* n. sp. — A. Dorsal view of head and thorax. — B. Lateral view of head and thorax. — C. Details of hind limb. — D. Ventral view of meracanthi. — E. Antenna. — F. Radular area of wing apex. — G, H and I. Details of female genitalia.

right angles to the plane of the vertex. Compound eyes almost spherical and quite prominent. Anterior ocellus visible in dorsal view between the bases of the genae. Lateral ocelli set on tubercles some distance back from the postero-lateral corners of the halves of the vertex. Antennae, of moderate length—more than twice the width of the head, but with the basal third segment not especially well-developed although distinctly longer than any other segment.

Thorax: Narrow and elongated; strongly arched. Pronotum of typical triozone development although more ribbon-like than usual. Prescutum narrow, long and strongly arched both dorsally and anteriorly. Scutum of the same length, but nearly twice the width, not so strongly arched.

Wings: Long and narrow and of typical triozone development. Apex pointed and not rounded as in *Trioza urticae*. Two and three-quarters times as long as broad. Veins not strongly developed, pale. Cubital petiole half as long as the medial petiole, and twice as long as the radial petiole. Cubital and medial cells subequal; the latter wedge-shaped and just taking in the wing-apex. Radular areas distinct in cells M, MCu and Cu₁. Membranes clear and transparent, and, except for the radular areas, devoid of significant microsculpturing.

Legs: All legs well developed. Meracanthi apparently subdivided into coxa-vera and coxa-meron in megatriozone fashion; spurs well developed. Metatibia with a well-developed basal spur associated with inferior carinae. Apical spines three in number, two inner and one outer. Claws poorly developed.

Genitalia (female): Short. Comparatively broad at the base, narrowing to an acute point. Dorsal valve constricted to about half the width mid-way. Ventral valve also acutely pointed; pear-shaped, but bearing a small anteriorly projecting epiphysis at the base. Valves gaping widely. Palps open. Ovipositor long and finely pointed and projecting considerably beyond the apex of the valves.

Cape Prov.: Tzitzikama Forest, Stormsrivierpiek, 1 very teneral ♀ in spirit. 13.I.51. Loc. No. 137. In indigenous forest. Swedish South Africa Expedition, 1950–1951. BRINCK–RUDEBECK.

SOUTH AFRICAN ANIMAL LIFE

RESULTS OF THE LUND UNIVERSITY EXPEDITION

IN 1950-1951

Edited by

BERTIL HANSTRÖM - PER BRINCK

GUSTAF RUDEBECK

VOL. VIII



ALMQVIST & WIKSELL

GÖTEBORG • STOCKHOLM • UPPSALA

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PRINTED IN SWEDEN BY

Almqvist & Wiksells

BOKTRYCKERI AKTIEBOLAG

UPPSALA 1961

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List of Authors and their Addresses

- H. ANDREAE, Dr. Phil., South African Museum, Cape Town, South Africa.
- A. C. VAN BRUGGEN, Biol. Drs., Port Elizabeth Museum, Port Elizabeth, South Africa.
- J. CARAYON, Sous-Directeur, Entomologie Agricole Coloniale, 57, Rue Cuvier, Paris 5^e, France.
- G. FAGÈL, Mr., Inst. Royal des Sciences Naturelles de Belgique, Rue Vautier 31, Brussels, Belgium.
- G. HESLOP-HARRISON, Dr. Phil., Department of Agricultural Zoology, Kings College, University of Durham, Newcastle upon Tyne, 1, England.
- J. C. VAN HILLE, Dr. Phil., Department of Zoology and Entomology, Rhodes University, Grahamstown, South Africa.
- F. M. HULL, Professor, P.O. Box 413, University P.O., Mississippi, U.S.A.
- H. KAURI, Ph.D., Zoological Institute, Lund, Sweden.
- R. LINNAVUORI, Ph.D., Somersoja, Raisio, Finland.
- A. G. SOIKA, Dr. Professor, Museo Civico di Storia Naturale, Venezia, Italy.
- B. R. STUCKENBERG, Mr., Natal Museum, Pietermaritzburg, South Africa.
- B. TJEDER, Ph.D., Nybrogatan 6, Falun, Sweden.