THE

HEMIPTERA-HOMOPTERA

(CICADINA AND PSYLLINA)

OF THE

BRITISH ISLANDS

A DESCRIPTIVE ACCOUNT OF THE FAMILIES, GENERA, AND SPECIES INDIGENOUS TO GREAT BRITAIN AND IRELAND WITH NOTES AS TO LOCALITIES, HABITATS, ETC.

BY

JAMES EDWARDS, F.E.S.

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HEMIPTERA-HOMOPTERA.

(*CICADINA.*)

INTRODUCTION.

THE insects of the Homopterous sub-order of the Hemiptera have the mouth-parts in the form of a short beak arising from the middle of the hinder part of the lower side of the head, close to the base of the fore-legs; the organs of flight are in two pairs, of which the upper are nearly or quite of the same consistence throughout, and in repose are not carried horizontally, but sloping upwards and inwards, meet in a line down the middle of the back, and their inner edges do not overlap towards the apex, except to a trifling extent in certain cases. The insect passes through no quiescent pupa state, but feeds and grows continuously from the time that it leaves the egg. They live exclusively on the juices of plants, and notwithstanding their activity in the preparatory stages, are easily reared, as they spend the greater part of the time with their beaks fixed in the young and tender branches or leaves of plants, and show little or no inclination to wander so long as the food-plant is fairly fresh. The number of times that the young insect changes its skin is variously stated as three or four; but the term *nymph* is in this work applied to the entire state intervening between the egg and the perfect insect. For some little time previous to a moult, the nymph anchors itself to the surface of its food-plant by its beak and claws, and in due course the old skin splits down

the middle of the back and the insect emerges; the exuviæ may frequently be found in the sweeping-net or sticking on plants. Not long since Mr. Edward Saunders caught a nymph of *Liburnia*, from which a male of the rare Strepsipterous insect *Elenchus tenuicornis*, Kirby, was in the act of emerging; and there is some reason to believe that a nymph of *Liburnia Fairmairei*, taken by myself some years ago in Norfolk, had nourished a similar parasite, since its abdomen presents a short, wide tubular projection, similar to that by which the *Elenchus* is represented as emerging in Mr. Saunders' figure on p. 297 of the *Entomologist's Monthly Magazine*, 2nd Series, Vol. III.

In certain families, but more particularly the Delphacidæ and Jassidæ, there is considerable difference in the development of the elytra and wings in different individuals of the same species. Cases of this arrested development of the wings are most numerous in the Delphacidæ, and, indeed, may be said to form the rule, and in the Jassidæ there are several cases in the genera *Athysanus* and *Deltocephalus;* no instances occur in the Cixiidæ, Cercopidæ, or Typhlocybidæ, and only one (*Agallia brachyptera*) in the Bythoscopidæ. Where the two forms occur the macropterous form has generally a very different facies to the brachypterous form, owing to the greater development of the thorax to afford space for the muscles which work the wings, and the elytra generally have the apical areas much longer than wide, and there is frequently a free membranous margin on the inner side of the apex. The conditions which govern the full development of the wings with its attendant modifications are not, I believe, well understood, but fully developed wings are always correlated with elytra having a well-developed membrane; in many species of *Liburnia* the elytra are truncate at about half the length of the abdomen, in others they are lanceolate and as long or longer than the abdomen, but the wings may be in both cases completely aborted. Sometimes, as in *Delphax pulchella* and *Liburnia smaragdula*, the male is always macropterous and the female brachypterous; at others, as in *Liburnia lineola* and its near allies, no brachypterous form is known; whilst there are several species in which we are unacquainted with the macropterous form in either sex. In those Delphacidæ which have the two forms, the mesonotum in the macropterous form is larger and more convex, and its keels are less evident than in the brachypterous form. Amongst the Jassidæ, the species of *Deltocephalus* and *Athysanus* have, as a rule, the elytra and wings shortened in a varying degree, but the latter are never completely aborted; and specimens of both sexes are occasionally met with in which the wings are fully as long or longer than the abdomen and the elytra have an ample membrane, but the corresponding modification of the thorax is much less evident than in the Delphacidæ. The possible causes of this dimorphism certainly merit careful investigation.

Our native Homoptera do not present so much diversity of form as the Heteroptera, and although the genera and higher groups are as a rule well defined and easy of recognition, it sometimes happens that for the absolute determination of certain closely allied species we must have recourse to rough dissection in order to examine the structural characters afforded by the male genitalia; these, however, are extreme cases and not of frequent occurrence.

None of the Homoptera Cicadina can be said to be of any economic importance in Britain; certain species, as *Philænus spumarius*, *Chlorita viridula*, *Eupteryx auratus*, &c., sometimes swarm in gardens, and elm and beech trees are generally tenanted by countless numbers of Typhlocybidæ, but it does not appear that they do any real harm in any stage. The late Mr. C. G. Hall, some years since, sent to me specimens of *Zygina parvula*, which species was swarming to such an extent in a greenhouse at Dover as to disfigure the leaves of the plants with small roundish pale blotches; this, of course, was merely an instance in which this particular species had been subject to exceptionally favourable circumstances,

since it ordinarily occurs but sparingly. The species feed exclusively on the juices of plants, which they obtain by fixing their rostrum, more or less deeply, in the stems and leaves of grasses and sedges or the leaves and young shoots of trees and shrubs. The nymphs are generally more or less protectively coloured, and the assimilation of the tints of the young of *Idiocerus albicans* and *populi* to those of the young shoots of white poplar and aspen respectively, are especially noticeable.

A remarkable contrast to these protectively coloured nymphs is afforded by those whose presence on their food plants is rendered conspicuous by the patch of white froth in which they are enveloped, unless, indeed, we are to assume that insect-eating birds have not yet found out what that very patent spot of froth contains. The most familiar example of these froth makers is, perhaps, the nymph of *Philænus spumarius*, although the habit is common to the whole of the Cercopidæ. Both the perfect insects and those nymphs which do not enclose themselves in froth have a curious habit of promptly retiring to the opposite side of the stem on which they are standing, on the too near approach of an object, thus keeping the stem between themselves and the source of suspicion, like the squirrel and nuthatch; this habit materially increases their chances of escape from the collector and must be even more effective when the insects are assailed by insectivorous birds.

Internal Anatomy.

The internal anatomy of the Homoptera does not differ essentially from that of the Heteroptera. The alimentary canal, which may be said to commence with the channel formed by the rostrum, is a long thick muscular tube, variously dilated and convoluted and subdivided into different parts, to which distinct names are given according to the function which they perform; there are also certain appendages to

the alimentary canal, of which the more important are the salivary and urinary vessels.

The Nervous System.—The two main nerve masses are the cephalic and the thoracic ganglia, the latter being somewhat constricted before the middle, and sending two branches with filamentous ramifications to the extremity of the abdomen.

The Circulatory System.—The blood is usually colourless or but slightly tinged with green, and abounds in large corpuscles; it flows in vessels during a part of its course only, the greater part of the circulation taking place in the cavities of the body not occupied by the internal organs or adipose tissue; its movement originates in a dorsal vessel, usually termed the heart, by the alternate contractions and dilations of which it is propelled.

The Respiratory System consists of a series of air-tubes or tracheæ, which ramify symmetrically in the interior of the body and communicate with the surface by means of certain openings termed spiracles; the latter are generally provided with fringes of hair or other apparatus for the exclusion of dirt, &c.

The Reproductive System.—The organs of the male consist of a number of tubular glands coiled together and forming two apparently compact bodies, the testes; each of these has its efferent duct, and the latter at length unite to form the *ductus ejaculatorius*, into which accessory glands open. In the female there are a pair of ovaries which unite at a short distance from the external opening and form the *vagina;* one or more pouches, in which the reproductive fluid is received and stored, communicate with the latter.

External Anatomy.

The Head.—There is considerable diversity in the form of the head, and in general the three portions—crown, forehead and face—are easily recognisable, but in the Membracidæ the crown is vertical and the rostrum lies at right angles to it,

completely on the underside. With the exception just mentioned, the *crown* is that portion of the head which is visible from above, the whole of the oblique sloping underside of the head constitutes the *face*, and the passage between this and the crown is the *forehead*. The following divisions are usually observable in the face of the *Cicadina*—namely, the *frons*, a large area occupying the principal part of its disc; the *clypeus*, a rectangular area joining the apex of the former; the *lorœ*, a pair of small areas occupying the angles formed by the sides of the frons at their junction with the clypeus; and the *cheeks*, which constitute the remainder of the face; the latter do not usually lie in the same plane as the frons, but slope upwards and outwards. These several divisions are marked off either by keels or more or less distinct impressed sutures. A considerable portion of the sides of the head is occupied by the large compound eyes which are always closely applied to the pronotum. The ocelli, or simple eyes, are three in number in the Cicadidæ, and also in the Cixiidæ, but it seems doubtful whether the third ocellus, found on the middle keel of the face at the junction of the frons and clypeus in the latter, is functionally perfect. In the Typhlocybidæ the ocelli are difficult to observe or altogether absent, and in the remaining families they are two in number; their position is of great use in classification. The antennæ are inserted on the cheeks between the eyes and the frons, or just below the eyes, and in certain cases, where the eyes are reniform, the antennæ are placed in the sinus. The antennæ consist of two large and stout basal joints, which vary considerably in shape and relative length, and between the second of these and the terminal bristle there is a small nodulose joint. The terminal bristle really represents several distinct joints, as may be seen in the Cicadidæ, where the transition from the recognisable joints to the bristle is not abrupt, but the two basal joints are succeeded by four or more distinct joints, gradually decreasing in size until the bristle is reached; the latter is generally simple, but in the males of most species of

Idiocerus, there is a small sub-oval expansion just before the apex. The rostrum, which is carried close to the breast between the bases of the first pair of legs, is three-jointed, but the basal joint is hidden beneath the labrum and clypeus; structurally it is a jointed sheath (supposed to consist of the labium and the connate labial palpi), enclosing four bristles, of which two are supposed to represent the mandibles and two the maxillæ.

The *Thorax* is composed of three segments, the prothorax, mesothorax and metathorax, the upper surfaces of which are respectively referred to as the pronotum, mesonotum and metanotum, and the under surfaces as the prosternum, mesosternum and metasternum. The pronotum, which in the dorsal aspect of the insect is the portion which joins the head, is generally of considerable size, but in the Issidæ, Cixiidæ and Delphacidæ it is reduced to little more than a mere collar; this is the part which assumes such a diversity of curious forms in the exotic Membracidæ, and even in our two native genera it is sufficiently remarkable; in *Centrotus* the sides of the pronotum are drawn out into a pair of sharp triangular processes, somewhat resembling the ears of a vicious horse, and from the middle of the hind margin there proceeds a bisinuate ensiform process which reaches as far as the tip of the abdomen; in *Gargara* the side processes are wanting, and the hind process is straight pointed and sharply trigonate. In the Ledridæ, too, the same part bears a pair of large rounded ear-like processes. The ventral surface of each thoracic segment bears a pair of legs, and the elytra and wings are articulated to the mesonotum and metanotum respectively. The mesonotum, for which the term *scutellum* will be adopted in this work, is the piece adjoining the pronotum on the side farthest from the head; it is generally more or less triangular in outline and in the Cixiidæ and their allies its area is considerably greater than that of the pronotum, but in the other families these proportions are reversed; in general it bears no movable appendages except the elytra, but in Tettigometridæ,

Cixiidæ, and certain Delphacidæ, the articulation of the elytra is covered by a small scale-like piece, called the *tegula*. The elytra are, for the most part, membranous and smooth, but sometimes coriaceous and punctured; that portion of the apex which is marked off from the rest by the angular veins is usually thinner and hyaline, but the difference in the texture of the two parts is neither so abrupt nor so great as in the Heteroptera. In the species with hyaline elytra the veins are usually very distinct, and as they are much used in classification, it is essential that their nomenclature and arrangement should be thoroughly understood. In all references to the elytra and wings in this work, those organs are considered as being spread out at right angles to the long axis of the body, and under these circumstances the anterior margin will be the *costa*, the posterior margin the *inner margin* or *suture*, and the more or less rounded edge farthest from the body the *hind margin*. Typically the elytron is divided into *corium*, *clavus* and *membrane;* the latter consists of those areas which are open to the hind margin, and is in general a little thinner than the remainder. Sometimes there is a narrow extension of the substance of the elytron beyond the vein which bounds the lowermost apical area; this is called the *appendix*. Running obliquely from the base of the costa to the apex of the inner margin will be found a more or less impressed straight line, the claval suture; the part lying in front of this line is called the *corium*, and the part which lies behind it the *clavus*. Leaving all speculations as to the origin and homologies of the veins as unsuited to a work like the present, it is proposed to adopt for the veins and areas the terminology previously employed by the author; this will be rendered intelligible by the figures. In repose the metanotum is entirely hidden by the elytra; it bears the wings. The latter are always membranous and traversed by a more or less complicated system of veins; the direction of these veins and their relation to one another afford useful distinctive characters, especially for the genera

of Typhlocybidæ; in the descriptions which follow, they are numbered consecutively from the anterior margin of the wing backward.

Each leg consists of five main divisions: first, the *coxa*, the piece by means of which the leg is articulated to the body; second, the *trochanter*, a small piece joining the coxa; third, the *femur*, a rather long piece next to the trochanter, generally simple but sometimes bearing teeth on its lower edge; fourth, the *tibia*, the longest division of the leg, and which in the hind legs is especially long and powerful; and lastly, the *tarsus*, which in these insects is invariably composed of three joints.

The *Abdomen* usually consists of six well-defined segments in the male and five in the female, and these are followed by the compound terminal segment, called the *pygofer*, which is modified in order to accommodate that part of the genital apparatus belonging to the external skeleton. Sometimes, as in the male of *Liburnia*, the pygofer forms a complete chitinous cylinder and its hind margin exhibits much diversity of outline in different species; at others, it forms a chitinous plate, folded somewhat conically so as to leave a slit on its lower side and a small aperture at its apex. The edges of this slit support the *œdeagus*, and are frequently produced into teeth or horns for that purpose; these modifications furnish good specific differences in the genus *Deltocephalus*. In the female the terminal segment is always folded more or less conically, and the slit on its lower side is occupied by the *saw-case*, the base of the latter being sometimes flanked on either side by a small oblong plate (*lateral lobe*); in this sex, too, the outline of the hind margin of the last ventral segment often presents good distinctive characters. The genital appendages of the male are usually the following: a pair of *plates*, of more or less triangular form, placed side by side, their inner margins straight and contiguous, and their bases covered by a single piece, usually of a triangular shape, called the *valve;* affixed to the inner surface of the

plates is a pair of smaller appendages, the *styles*, and just above these, slung as it were by its middle from the roof of the pygofer, is the *œdeagus*. In many groups all these appendages are present as in the *Jassidæ*, but in the genus *Idiocerus* and some others the valve is wanting, whilst in those species where the pygofer forms a complete cylinder, as in Liburnia, the styles and œdeagus only are to be seen. The *anal tube*, bearing the *anal style*, is a supplementary piece of apparatus situate on the upper side of the extreme apex of the abdomen, where there is generally a notch in the pygofer for its reception; it is really the rectal extremity of the alimentary canal, and its lower margin often bears a pair of teeth or other processes as in the male of Liburnia, &c. In any reference to the outline of the upper or hind margin of the pygofer, a lateral aspect is to be understood.

In the males of the Cicadidæ the base of the abdomen beneath is furnished with a sound-producing apparatus concealed beneath a rounded lamellar extension of the hind margin of the metasternum; it consists of a pair of large cavities, each closed by a talc-like membrane with an eccentric corneous thickening Various explanations are given of the way in which the so-called song of these insects is produced, but the better opinion seems to be that the sound is the result of the vibration of a membranous disc, set in motion by a bundle of special muscles.

It should be observed that these introductory remarks apply for the most part to the Cicadina only; the peculiarities of the Psyllina will be dealt with under that head.

Collecting, &c.—There are probably few places where there is vegetation in which Homoptera of some kind are not to be found, but marshy places produce the greatest number of species, although dry, elevated localities, and also woods, have each a few species peculiar to them; wet heaths, marshes near the sea, and the fens of the Eastern Counties of England are all very productive. Many species may be swept up or beaten from herbage into a large and deep brown holland

sweeping net, but certain species which habitually frequent the lower part of a tall and close-growing food-plant, such as the common reed, are only occasionally to be taken in that way; these must be obtained by searching or by the "rescue" method, to be described presently. In the fens one often finds isolated tufts of coarse grass scattered about, and between these the rank herbage grows in some few inches of water; the sweeping net is here of no avail against the insects, which live low down on the stems of the tall grasses and sedges, and searching in such spots is not a convenient process. The author, therefore, has had recourse to the following method of collecting under these circumstances, and succeeded in taking by its means such species as *Deltocephalus costalis*, *Cicadula opacipennis*, and some others which he failed to obtain in any other way. It should be premised that the collector must go on to his ground prepared to wade and provided with a moderately deep water net, made of cheese-cloth on a landing-net ring. With the left foot let him press a part of the herbage down into the water in which it is growing and almost immediately skim the surface with the net, when the denizens of the now prostrate plants may be secured, as they disentangle themselves from the wet *débris* in the bottom of the net or crawl up its sides in a half-drowned condition.

The writer has found the following piece of apparatus of great use in the capture of these wary and agile insects. Take a piece of fairly stout glass tubing about 2 inches long and $\frac{7}{8}$ths of an inch in diameter; next prepare two discs of cork about $\frac{3}{8}$ths of an inch thick, one of which is to be a fixture at one end of the tube and the other is to be made to slide in the tube by means of a wire shaft passing through the centre of the fixed cork; the length of the shaft should be about $2\frac{1}{2}$ inches. To use the "piston," draw up the movable cork until it is in contact with the fixed one, place the tube over the insect, which will (or can be made to) jump backward up the tube, when the latter should be closed with the fore-

finger of the right hand. To transfer the specimen to the killing-bottle (which should have its mouth of the same diameter as the tube), invert the tube over the open mouth of the bottle and press down the movable cork until it covers the mouth of the bottle, driving the insect before it; withdraw the tube from the mouth of the bottle, at the same time stopping the latter with the thumb of the left hand, and afterwards quickly replace the cork. The piston may be used with advantage either to take insects out of the net or off plants or the ground, and it is not necessary to transfer each specimen separately to the killing-bottle. The latter should be carefully lined with white paper, and may be charged with a very small piece of cyanide of potassium wrapt in paper and prevented from rolling about amongst the specimens; the great object is to keep the inside of the bottle so dry that the specimens may not adhere to one another or to the sides of the bottle.

Pinning is undoubtedly the mode of mounting which allows the most complete examination of the specimen without further trouble, and if the pinning is properly conducted no distortion of even the smallest specimens need be produced. The larger species may be simply pinned through the middle of the scutellum, but for the smaller ones the pins in use for micro-lepidoptera, of varnished steel or silver wire, are requisite. The specimen should be laid on its back and the fine pin driven perfectly straight through the middle of the forepart of the mesosternum, and it will then come out through the centre of the scutellum, whence it should project for something less than one-third of its length. In this way the smallest insects may, after a little practice, be pinned without distortion. Insects pinned with these fine pins cannot, of course, be pinned directly into the cabinet, and therefore the fine pin is usually stuck into a block of pith or some other soft substance carried on a stout pin. With insects pinned from below, the point of the pin is not available for permanently sticking into the pith, and in any

case the pins put into the latter sooner or later turn round in it, and a number of specimens each facing in a different direction has a very untidy appearance. These facts, coupled with the difficulty of obtaining pith from which the glistening white cubes in use on the Continent can be cut, has induced the writer, after trying almost every known substitute for pith (and of these *agave* cut across the grain is the best, as cubes of about half an inch with a good smooth face may easily be cut from it, although its colour is against it), to invent a carriage of uniform appearance in which the fine pin may be absolutely fixed and also withdrawn at will. To prepare a carriage of this kind for an insect about 3 mm. in length, take a piece of good cardboard (De la Rue's thin ivory visiting card is of good quality and suitable thickness) 12 mm. long and 3 wide, and fold it in half across its long axis; at a suitable distance from the folded end pierce through both thicknesses of the card a hole to receive the fine pin, as little larger than the diameter of the latter as may be, and at a little distance from the middle of the opposite end pass a moderately long and strong pin also through both thicknesses of the card, and move the latter to within one-third of the top of the pin; on putting the fine pin bearing the insect through the hole in the card it will be found to move freely so long as the inner surfaces of the card are in contact, but on separating these surfaces by sliding the lower half of the folded card down the stout pin, the fine pin will be gradually rendered immovable under any ordinary usage, for there is always a point, short of perceptible bending, at which the fine pin will be fixed; it is best, after slightly separating the surfaces of the card and whilst the fine pin is still movable, to turn the latter so that the insect occupies a suitable position with respect to the card, and then finally to tighten it by separating the arms of the card a trifle more. Complicated as the construction of this carriage may appear from the foregoing account it is really very simple, and, in practice, much more speedy than the cutting and pinning of pith

cubes, and in point of appearance it has the further advantage that both the stout and the fine pins must of necessity lie in the same vertical plane. The necessary modifications in the *modus operandi* will readily suggest themselves when it is desired to make these carriages in quantity. One or more examples of each species should have the elytra and wings spread out; this may either be roughly done by blowing on the insect from behind when it is freshly pinned, or the insect may be pinned on its back on a flat piece of soft cork and the elytra and wings spread out symmetrically and held in position by paper braces until dry, and in the latter case the legs may be arranged at the same time. These insects may also be gummed on small pieces of card, either at haphazard or with their legs, elytra and wings symmetrically spread out; mounted in the latter way they certainly look neater and more picturesque, but after considerable experience the author quite endorses the opinion of an eminent Continental authority that "it is not of use to paste the small Cicadina on card," because that course always involves loss of time when the underside has to be examined. Each specimen should have a ticket on the stout pin giving the locality and date of capture, and also a number referring to a register giving details of the circumstances under which it occurred.

TABLE OF FAMILIES.

1. (30) Tarsi three-jointed. From 1–3 basal joints of the antennæ thick, the remainder forming a terminal seta. *CICADINA.*
2. (3) Front thighs thickened and toothed beneath. *Cicadidæ.*
3. (2) Front thighs neither thickened nor toothed beneath.
4. (5) Pronotum produced into a process behind. *Membracidæ.*
5. (4) Pronotum not produced into a process behind.
6. (13) Antennæ inserted beneath the eyes.
7. (8) Frons nearly on the same level with the cheeks. Elytra horny. *Tettigometridæ.*
8. (7) Frons distinctly projecting beyond the cheeks, with sharp or keeled side margins.
9. (10) Elytra horny, laterally protuberant just below the shoulders. *Issidæ.*
10. (9) Elytra membranous, not laterally protuberant.
11. (12) No spur at the base of first joint of hind tarsi. *Cixiidæ.*
12. (11) First joint of hind tarsi with a spur at the base. *Delphacidæ.*
13. (6) Antennæ inserted between the eyes.
14. (15) Hind tibiæ cylindric, with two spines. *Cercopidæ.*
15. (14) Hind tibiæ not cylindric.
16. (17) Pronotum with a compressed ear-like process on each side. *Ledridæ.*
17. (16) Pronotum without any process.
18. (21) Hind tibiæ unarmed, or only with weak bristles on the angles.

19. (20) Forehead simple, ridge-like. *Ulopidæ.*
20. (19) Forehead occupied by a strong X-shaped keel with an ocellus in each lateral angle. *Paropiidæ.*
21. (18) Hind tibiæ multispinose.
22. (23) Ocelli on the frons. *Bythoscopidæ.*
23. (22) Ocelli not on the frons.
24. (25) Ocelli on the disc of the crown. *Tettigonidæ.*
25. (24) Ocelli not on the disc of the crown.
26. (27) Crown always distinctly separated from the face, generally by a well-defined border, its disc more or less excavated or bearing impressions, frequently rugose in front parallel with the forehead, or at least distinctly sculptured. *Acocephalidæ.*
27. (26) Crown and face passing gradually the one into the other. Disc of the former never distinctly excavated, nor bearing impressions, nor rugose in front parallel with the forehead, rarely perceptibly sculptured.
28. (29) One or more transverse veins standing on the brachial vein, at least the lower branch of the cubital vein forked towards the apex. *Jassidæ.*
29. (28) Corium with three simple veins only, no transverse vein. *Typhlocybidæ.*
30. (1) Tarsi two-jointed. Antennæ ten-jointed, joints 1 and 2 short and stout, remainder filiform, apex of the terminal joint with two unequal projecting hairs. *PSYLLINA.*

CICADINA.

I. CICADIDÆ.

Species of comparatively large size with a subconical body. Head short and wide; eyes prominent; frons very convex; ocelli three, on the crown. Elytra subelliptic, longer than the body, transparent, with strong branching veins; tegulæ wanting. Anterior femora thickened and strongly toothed; posterior coxæ subconical, not reaching the sides of the breast; tibiæ subcylindrical, with fine bristly pubescence and a few weak spines; no pulvilli between the tarsal claws. The male is provided with a sound-producing apparatus at the base of the abdomen, which is concealed beneath a lamellar extension of the hind margin of the metasternum on either side.

Six genera, comprising about fifty species, of this interesting family are included in the Palearctic fauna, but the greater number of these are found in Southern and Eastern Europe, though several are found in Spain. Our solitary representative of the family is distributed over Europe generally, and occurs as far north as Sweden and Finland.

Cicadetta, *Am.* (Pl. 1, fig. 10.)

Antennæ inserted in a strong depression beneath a fold of the temples, apparently 7-jointed, by reason of the articulation of the robust seta. Elytra lanceolate, much longer than the abdomen, membranous, hyaline; apex with a narrow, free margin; veins strong, raised. Basal area of corium oblong, narrow, the brachial and cubital veins springing from its lower apical angle; apical areas eight, narrow, first reaching

PSYLLINA.

The typical Psyllina are suctorial insects with filiform ten-jointed antennæ, two-jointed tarsi, and a superficial resemblance to a *Cicada* in miniature. The following are the chief characteristics of the group: Head produced in front into two conical lobes, or thin and flat in front, with a more or less distinct notch in the middle of its edge. Rostrum springing from the hinder edge of the underside of the head, its apex issuing from between the front coxæ and the front edge of the mesosternum, giving it the appearance of arising near the middle of the breast. Eyes usually globose and prominent, but flat in Livia. Ocelli three, one near the hinder edge of each eye, and one between the bases of the facial cones, or occupying a corresponding position when the cones are wanting. Antennæ inserted in front of the head next the front edge of each eye, ten-jointed, two basal joints short and stout, remainder filiform, the last joint with two unequal bristles at the apex; in Livia the second joint is narrowly obovate and equal in length to joints three to nine inclusive. Pronotum narrow and collar-like. Mesonotum large, generally suborbicular; a portion of its area in front in the shape of a broadly truncate triangle (the *dorsulum*), separated from the remainder by a distinct suture, and a small, somewhat crescent-shaped piece projecting from the middle of its hind margin (the *scutellum*) also marked off by a suture. Mesosternum produced behind into two large sharp spines. Elytra homogeneous, of a much firmer substance than the wings, usually hyaline, with the veins darker, sometimes with a colour

pattern, rarely opaque and corneous, their periphery, except a small strip near the basal angle of the inner margin, bounded by a vein; claval suture present, but feeble; venation comparatively simple and dividing the surface of the elytron into seven cells which are irregular in shape and each open to the margin. The veins of the elytra are as follows: the *subcostal*, which passes obliquely from the middle of the base to the costa, near the middle, where it frequently spreads out along the marginal vein towards the apex to form the *stigma*; the *cubital* is given off from the first angulation of the subcostal and divides into two branches, each of which is furcate. generally the first bifurcation of the cubital occurs at a short distance from its base, but sometimes it takes place directly from the subcostal without the interposition of any stalk. The *radial* is always simple and given off from the subcostal about mid-way between the base of the cubital and the costa. In certain genera the marginal vein gives off three very short free veinlets at equal distances on the outer half of the inner margin of the elytron. The wings are membranous, and their venation is, for the most part, very simple and of one type. A vein runs obliquely from the upper basal angle of the wing to near the middle of the inner margin, shortly before which it is very unequally furcate; at a short distance from its base this oblique vein gives off, at a short distance from each other, two straight simple veins which run to the hind margin; in Livilla the oblique vein springs from the lower outer angle of an oblong basal cell, and the lowermost of the two longitudinal veins is furcate at the apex. The front pair of legs are rather short and feeble, but the hinder pair are longer and formed for jumping; the tibiæ are subterete and finely ciliate, the hinder pair with a few blunt spines at the apex; the tarsi are two-jointed, the basal joint of the hinder pair with a short blunt spine on each side of the apex beneath; claws two. Abdomen with five visible segments above and six beneath, exclusive of the genital segment. The genital

segment of the male is oblong, broadly rounded behind and deeply concave; its front edge bears a generally upright but movable piece, the *genital plate*, and its hinder edge a pair of *forceps;* the latter are in many cases simply falcate, but are also found of more complicated forms; the *œdeagus* is formed of two nearly straight pieces hinged near the middle by a somewhat bulb-shaped joint. The female genitalia consist of two elongate, triangular, more or less acuminate valves, the upper and lower *genital valves.*

The young of many species are covered with a white, cotton-like secretion, and some produce gall-like malformations on various parts of their food-plants. None, however, are of economic importance, except, perhaps, the species affecting pear and apple trees which are said to occasion damage in orchards.

Speaking generally, the exact determination of these insects is a matter of great difficulty, and regard should always be had to structural characters and especially those of the male genitalia. On reaching the imago state, they require several days to develop their full colouration, and specimens which have lived through the winter are always much darker in colour than specimens of the same species taken in summer or autumn. In the genus Trioza, the males are differently coloured to the females, and there are many species of which the males can only be distinguished by the form of their genitalia, whilst the females are absolutely indistinguishable. To obtain really trustworthy knowledge of any given species, it is necessary to rear the insects and preserve specimens in each stage. I give tables of species in this as in the other groups, but enough has been said to show that the student must not expect to determine his specimens with anything like certainty from a table alone.

TABLE OF FAMILIES.

1. (6) Cubitus petiolate.
2. (5) Facial cones absent.
3. (4) First two joints of antennæ one third to one half of the entire length. *Lividiidæ.*
4. (3) First two joints of antennæ less than one fourth of the entire length. *Aphalaridæ.*
5. (2) Facial cones present. *Psyllidæ.*
6. (1) Cubitus sessile. *Triozidæ.*

I. LIVIIDÆ.

Head flat, as long as its width at the base; crown produced in front into two rounded lobes; eyes flat, not projecting from the sides of the head. Frontal cones absent. Foremost ocellus only visible from beneath. Antennæ but little longer than the head, joints one and two one third to one half of the entire length, second joint much the longest, in the British species more than twice as long as the first. Pronotum transversely oblong, about one third longer than the dorsulum, without lateral impressions. Outline of the crown pronotum and mesonotum in the lateral aspect continuous. Elytra coriaceous, long oval, nearly flat; stalk of the cubital about one half longer than the middle piece of the subcostal.

Livia. (Pl. II., fig. 25.)

The characters of the single genus are those of the family. Only two species are known for the European fauna, our British species, and *L. limbata*, Waga. The latter is recorded from France and Germany (I have it from Corsica) and is distinguished by having the second joint of the antennæ about one third longer than the first.

1. **L. juncorum**, *Latr.*—Crown pronotum and mesonotum pale brown more or less tinged with carmine-red, irregularly

punctured and rugulose. Joints one and two of antennæ carmine, joint three fuscous, joints four to eight white, nine and ten black. Elytra testaceous, transversely rugulose, veins concolorous, the marginal vein chequered with black and white between veins two and five. Legs pale sordid yellow. Breast black. Abdomen above reddish yellow, darker towards the base, beneath pale. Length, 2¼–2⅔ mm.

On rushes, common and generally distributed.

APHALARIDÆ.

Head broader than long, eyes globose, prominent. Frontal cones absent. Foremost ocellus visible from the front. Antennæ nearly as long as the head and thorax, joints one and two terete short and stout, remainder filiform, third joint the longest. Pronotum with lateral impressions, generally much shorter than the dorsulum. Elytra flat, hyaline with or without a colour-pattern or subcoriaceous without a colour-pattern.

Our two British genera may be thus distinguished.

Stigma present. . . . *Rhinocola.*
Stigma wanting. . . . *Aphalara.*

In a few species of Aphalara, none of which are at present known to be British, there is an evident stigma, but in these the apical portion of the radial curves upward towards the costa.

Rhinocola, *Först.* (Pl. II., fig. 26.)

Elytra rugulose, semitransparent, distinctly but bluntly pointed. Radial ending in the longest point of the elytron (less distinctly so in *ericæ* than in *aceris*). Stigma well developed.

We have two species of this genus and there is but one other of the twelve species given by Puton for the Palearctic fauna which is likely to occur here. This is *R. speciosa*, Flor, which is found on *Populus alba* and *P. nigra* from June to August and (overwintered specimens) also in the spring.

TABLE OF SPECIES.

1. (2) Elytra pointed oval, radial ending just above the longest point of the elytron. Lives on ling. 1. *ericæ.*
2. (1) Elytra subrhomboidal, radial ending in the longest point of the elytron. Lives on maple. 2. *aceris.*

1. **R. ericæ**, *Curt.*—Sordid greyish yellow, the apex of the antennæ, the apex of the rostrum and the claws black. Wings lacteo-hyaline. Length, 1–1¼ mm.

Found by sweeping on heaths, apparently local, but possibly overlooked on account of its small size.

Norwich district. London district, (Douglas); Bournemouth (Dale).

2. **R. aceris**, *Lin.*—Head and thorax deep yellow inclining to orange (the autumn tint of maple leaves), apex of the rostrum black, apex of the antennæ and the claws fuscous. Length, 2–2¾ mm.

On maple, rather local.

Norwich district, Cotswold district. London district (Douglas); Glanvilles Wootton (Dale).

Aphalara, *Först.* (Pl. II., fig. 27.)

Elytra widest behind the middle, rounded at the apex, not evidently rugulose, hyaline, with or without a colour-pattern. Radial ending above the longest point of the elytron. Stigma wanting.

Seventeen species of this genus are given by Puton for the Palearctic fauna; of these we have six in Britain, and it does not appear that any of the others are likely to occur here.

The usual dark markings on the head and thorax in this genus are as follows:

A suffused spot on each side of the crown; two points on

each side of the pronotum and sometimes a spot in the middle of it; a spot in the middle of the front edge of the dorsulum; and a pair of stripes on each side of the mesonotum, of which the inner one is elongate oval in shape and does not reach the front margin.

TABLE OF SPECIES.

1. (10) Head and thorax glabrous.
2. (9) Elytra without a fuscous spot in the middle of cell 1.
3. (6) Vein 2 not ending in a black point.
4. (5) Length $2\frac{1}{2}$–$3\frac{1}{2}$ mm. Head and thorax sordid greenish yellow. 1. *picta*.
5. (4) Length 2–$2\frac{1}{4}$ mm. Head and thorax emerald green. 6. *nervosa*.
6. (3) Vein 2 ending in a black point.
7. (8) Subcostal not ending in a black point; elytra unbanded. 4. *calthæ*.
8. (7) Subcostal ending in a black point; elytra with a fuscous subapical band. 3. *exilis*.
9. (2) Elytra with a fuscous spot in the middle of cell 1. 2. *nebulosa*.
10. (1) Head and thorax pilose. 5. *artemisiæ*.

1. **A. picta**, *Zett.*—Head and thorax sordid yellow, in some specimens inclining to green, in others to orange. Antennæ concolorous with the head, joints 9 and 10 black. the others narrowly black at their apices. Mesonotum with four more or less distinct dusky stripes. Elytra pale fusco-hyaline with a yellow tinge, irrorated with pale fuscous towards the apex, veins sordid yellow. Abdomen green, dorsal segments blackish, with their hind margins narrowly pale. Legs sordid yellow, apex of the tarsi blackish.

This species is very variable in colour; sometimes the head and thorax are dull pale green and the four stripes on the

pronotum and the veins of the elytra are brown. Length $2\frac{1}{2}$–$3\frac{1}{2}$ mm.

Food plants, *Leontodon autumnalis*, *Crepis biennis*, *Hypochœris radicata*, and *Chrysanthemum leucanthemum*. Paisley (Young); Corfe Castle (Dale); Craigour, Perthshire (Norman.)

2. **A. nebulosa**, *Zett.*—Head and thorax bone-white, with the usual markings brown; antennæ yellow, joints 1 and 2 dusky, 9 and 10 black. Elytra hyaline; veins yellow, sometimes fuscous beyond the middle; a fuscous spot in the middle of cell 1, an irregular fuscous band, frequently broken up into spots, from the apex of the subcostal to the apex of vein 2; another irregular fuscous band from the costa near the apex to the apex of vein 3, giving off branches to the margin along the courses of the veins. Abdomen above brown, hind margins of the segments narrowly yellow. Legs yellow, apex of the tarsi fuscous. Length $2\frac{1}{4}$–$2\frac{3}{4}$ mm.

On *Epilobium angustifolium*, locally abundant.

Cotswold district (Marshall; Edwards). Cerne, Dorset (Dale); Boxhill (Scott).

3. **A. exilis**, *Web. & Mohr.*—Head and thorax bone-white with the usual markings rust-red. Antennæ sordid yellow, first and second joints dusky, 9 and 10 black. Elytra whitish-hyaline irregularly speckled with fuscous, the speckling confluent near the apex to form a more or less distinct inwardly oblique fuscous band from near the apex of cell 6 to the distal half of cell 3; veins sordid yellow, subcostal and vein 2 each ending in a distinct black dot, the marginal vein between the base and vein 2 with two short dark streaks. Abdomen above dusky, hind margins of the segments narrowly pale. Legs pale, apex of the tarsi fuscous. Length 2–$2\frac{1}{4}$ mm.

Found at roots of low plants in dry places. Food-plant *Rumex acetosella*.

Norwich district. Weybridge (Power); Scarborough (Wilkinson); Addington Hills (Douglas); Paisley (Young); Newtown-Hamilton, Ardara, Ireland (Johnson); Dublin district (Halbert); Parley Heath, Mount Edgecombe, Deal (Dale).

4. **A. calthæ**, *Lin.* (**polygoni**, *Scott*).—Head and thorax bone-white with rust-yellow markings, of which the most distinct are the four stripes on the mesonotum. Antennæ yellow with the last two joints black. Elytra pale fusco-hyaline; veins brown, marginal vein black next the apex of vein 2, and having a short blackish streak near the apex of the clavus, vein 4 decurved and therefore reaching the margin below the longest point of the elytron. Abdomen above black, hind margins of the segments narrowly yellow. Legs yellow, apex of the tarsi fuscous. Length 1¾–2⅓ mm.

Norwich district. Glanvilles Wootton (Dale); Birchwood (Power); London district (Douglas); Esher (Scott).

Food-plants; *Polygonum aviculare*, *P. amphibium*, *P. hydropiper*, and *Rumex acetosella*. It has also been found on the flowers of *Caltha palustris*.

5. **A. artemisiæ**, *Först.*—Head thorax and elytra clothed with erect white scale-like hairs. Head, thorax, antennæ, and legs sordid whitish yellow, abdomen very pale green. Antennæ with the tip blackish and the apex of some of the distal joints narrowly fuscous. Elytra white, semitransparent, more or less closely irrorated with fuscous. Length 2–2¼ mm.

Weybourne, Norfolk, on *Artemisia maritima*. Portland (Dale).

6. **A. nervosa**, *Först.*—Body and legs bright emerald-green, the legs becoming more or less yellow after death. Antennæ sordid yellow, dusky at the tip and at the apex of some of the distal joints. Elytra hyaline, veins whitish, two, three, four and five, a piece of the stalk of the two latter and

the apical fourth of vein 6, irregularly bordered with fuscous. Length 2–2¼ mm.

Food-plant *Achillea millefolium*.

Norwich district. Bromley (Douglas); Lee (Scott); Glanvilles Wootton (Dale).

PSYLLIDÆ.

Head short, as broad or broader than the thorax, eyes globose, prominent. Facial cones well developed, longer and narrower in the female than in the male. Foremost ocellus visible from the front. Antennæ much longer than the head and thorax, joints one and two terete short and stout, remainder filiform, third joint the longest. Pronotum with lateral impressions, shorter than the dorsulum, the latter at most two thirds as long as broad. Elytra either flat and hyaline, with or without a colour pattern, or coriaceous and strongly convex. The normal dark markings on the head and thorax are similar to those found in Aphalara, *cf.* p. 229.

TABLE OF GENERA.

1. (6) Elytra membranous, flat.
2. (5) Stigma present.
3. (4) Stalk of the cubitus as long as the basal piece of the subcostal. *Psyllopsis.*
4. (3) Stalk of the cubitus much shorter than the basal piece of the subcostal. *Psylla.*
5. (2) Stigma wanting. *Arytæna.*
6. (1) Elytra coriaceous, strongly convex. *Livilla.*

Psyllopsis, *F. Löw.* (Pl. II., fig 28.)

A genus of four European species, separated from *Psylla* on account of the stalk of the cubitus being as long as the basal piece of the subcostal, the hind margin of the genital plate in the male produced on each side into a broad rounded lobe, and the lower genital valve in the female having a deep

narrow notch at the apex. We have in Britain two species, and a third *P. discrepans*, Flor, which is very similar to *P. fraxini*, Lin, but distinguished by the hammer-shaped forceps of the male, may possibly be found in this country, as it has occurred in France and Scandinavia.

Our two species of this genus may be distinguished as follows:

Upper foreparts whitish-yellow, without markings . . . . . 1. *fraxinicola.*
Upper fore-parts red-yellow, with black markings . . . . . 2. *fraxini.*

1. **P. fraxinicola**, *Först.*—Body and legs whitish-yellow or very pale greenish-yellow; the claws sometimes fuscous. Antennæ about half as long as the costa; their apex black, and the apices of some of the distal joints more or less broadly blackish. Elytra hyaline, with a feeble fuscous tinge towards the apex, veins concolorous with the body. Length, 3 mm.

On ash; common, and widely distributed.

Norwich district, Cotswold district. Isle of Wight, Lee (Scott); Balmuto, Fifeshire (Power).

2. **P. fraxini**, *Lin.*—Crown red-yellow, the disk more or less broadly black, facial cones generally black. Antennæ red-yellow, more than half as long as the costa; joints 4–6 black at the apex, 7–10 black. Pronotum pale yellow. Mesonotum red-yellow, with a pair of broad black stripes on each side, the members of each pair frequently confluent, and a black spot near each hinder angle of the dorsulum, the latter with a large triangular black spot on each side in front. Elytra hyaline with an irregular suffused dark fuscous band round the apex, one end of which is produced from the dorsum as far as the apex of the stalk of veins 4 and 5; veins yellowish, except where they cross the fuscous part, where they are black; vein 2 suffusedly blackish.

Abdomen above black, hind margins of the segments more or less broadly yellow. Legs red-yellow, hind thighs with a black or piceous streak, apex of the tarsi and the claws black. Length, 2½–3 mm.

Common on ash.

Norwich district, Cotswold district. London district (Scott); Glanvilles Wootton, Ambleside (Dale).

Psylla, *F. Löw.* (Pl. II., fig. 29.)

Crown deflexed with two feeble impressions behind, slightly raised next the eyes; facial cones distinct from the the crown, porrect or deflexed. Antennæ much longer than the breadth of the head; filiform except the two basal joints, sparingly pubescent. Thorax more or less convex, dorsulum generally well developed, as long or longer than the crown. Elytra membranous, more or less broadly rounded at the apex, at least twice as long as broad; usually broadest beyond the middle, their longest point between the radius and vein 4; cell 6 (radial cell) more than three times as long as broad; cells 2 and 4 of nearly equal size, veins not set with long hairs, vein 4 ending in or before the apex. Stigma present or wanting.

Twenty-three species of this genus are found in Britain, out of sixty-three given by Dr. Puton for the Palearctic fauna. The late Dr. Franz Löw did much valuable work in the way of putting the nomenclature and classification of the Psyllina on a firm basis, but it may be doubted even now whether all the described European species of Psylla and Trioza are well ascertained.

TABLE OF SPECIES.

1. Elytra brown, becoming colourless towards cell 7. 2.
   Elytra simply hyaline, with several irregular sharply-defined black spots 1. *concinna.*
   Elytra not as above. 3.

2. Length, 2 mm. Species lives on blackthorn. 2. *pruni.*
   Length, 2½–3 mm. Species lives on sallow. 3. *brunneipennis.*
3. Dorsum (*i.e.*, the margin of the elytron opposite to the costa), with a short black or dusky streak near the middle. 4.
   No black or dusky streak near the middle of the dorsum. 8.
4. Margin of elytra not spotted between veins 2 and 6. 5.
   Margin of elytra with about nine dark spots between veins 2 and 6. 4. *cratægi.*
5. Extreme apex of the clavus filled up with fuscous. 6.
   The dark dorsal streak confined to the marginal vein. 7.
6. A broad fuscous streak occupying almost the whole length of cell 1. 5. *simulans.*
   A short narrow fuscous streak in cell 1 near the apex of the clavus. 6. *pyricola.*
7. Length 2½–3 mm. Species lives on sallow. 7. *salicicola.*
   Length 3–3½ mm. Species lives on *Rhamnus.* 8. *rhamnicola.*
8. Stigma well developed. 9.
   Stigma obsolete or wanting. 15.
9. Veins of elytra neither black nor broadly rust yellow. 10.
   Veins of elytra broadly rust-yellow. 9. *venata.*
   Veins of elytra black 10. *melanoneura.*
10. Species not living on mistletoe, sea-buckthorn, or sallow. 11.
    Species living on mistletoe. 11. *visci.*
    Species living on sea-buckthorn. 12. *hippophaes.*
    Species living on sallow. 13. *ambigua.*
11. Elytra simply hyaline. 13.
    Elytra more or less smoky-hyaline. 12.
    Elytra testaceous. 14. *Hartigii.*

12. Length 2–3 mm. Lives on conifers. 15. *pineti.*
    Length 2½–4 mm. Lives on birch. 16. *betulæ.*
13. Thorax above, and abdomen (in greater part) pale. 14.
    Thorax above brown-red, abdomen in greater part black. 17. *costalis.*
14. Head and thorax very pale green. Species lives on whitethorn. 18. *peregrina.*
    Head and thorax greyish-yellow or pale brownish-yellow. Species lives on crab-apple. 19. *mali.*
15. Elytra flavo- or testaceo-hyaline, veins not black. 16.
    Elytra simply hyaline, veins in greater part black. 20. *alni.*
16. Antennæ not more than two-thirds as long as the costa. 17.
    Antennæ nearly or quite as long as the costa. 21. *Forsteri.*
17. Length 3½ mm. Species lives on box. 22. *buxi.*
    Length 2½ mm. Species lives on broom. 23. *spartii.*

1. **P. concinna,** *Sp. n.*—Head and thorax bone white with reddish brown markings. Facial cones pubescent, of moderate length, their greatest divergence about equal to the width of the base of one. Antennæ about half as long as the costa, brownish yellow, first joint, the basal half of the second, joint 10 and the apices of the intermediate joints (of joints 3 and 4 very narrowly) black. Elytra simply hyaline, vein 2 standing in a large irregular sharply defined black spot, the latter with two other oblong irregular black spots, forming an oblique interrupted macular band which ends at the apex of vein 6, a black spot next the apex of the stigma, and a short piece of the apices of veins 3, 4 and 5 bordered with blackish. Stigma half as wide as the basal two thirds of cell 6; radius (vein 6) sinuate decurved near its apical third, recurving to the apex. Abdomen above black, the connections of the segments pale red. Genitalia of the male blackish, forceps simple, about as long as the

genital plate. Legs brownish yellow, hind thighs blackish except at the apex. Length, 2 mm.

Dorsetshire (Dale).

Described from a single male ex. coll. Dale, where it was mixed with *Aphalara nebulosa*, a species to which it bears some superficial resemblance on account of the black spotting of the elytra.

2. **P. pruni,** *Scop.*—Head and thorax varying from pale red to brownish red. Facial cones shorter than the crown down the middle, triangular, their divergence moderate. Antennæ distinctly less than half as long as the costa, brownish yellow, joints 5 to 8 black at the apex, 9 and 10 black. Elytra brunneo-hyaline becoming paler towards the base, cell 7 simply hyaline, veins a little paler than the ground colour; stigma half as wide as the basal two thirds of cell 6. Abdomen blackish, sides narrowly red. Legs brownish yellow, hind thighs black except at the apex. Length, 2 mm.

Lives on blackthorn. Widely distributed but somewhat local.

Norwich district, Cotswold district. Esher (Power).

3. **P. brunneipennis,** *Sp. n.*—Head and thorax brownish yellow with yellow brown markings, pronotum blackish. Facial cones as long as the crown down the middle, the inner edges straight, the outer edges concave, their divergence very slight. Antennæ about half as long as the costa, brownish yellow, joints 8 to 10 black, the apices of joints 3 to 7 increasingly black. Elytra dark smoky-hyaline becoming simply hyaline in and towards cell 7, veins brownish yellow becoming blackish on the distal half, dorsum with a blackish streak before the apex of the clavus; stigma about half as wide as the basal two thirds of cell 6. Abdomen above blackish in the male, green in the female; connections of the segments paler. Male genital plate simple,

about twice as high as the forceps, the latter about twice as high as their basal width, the anterior half of the apex produced into a wide blunt tooth. Female with the upper genital valve one third longer than the lower. Length, $2\frac{1}{2}$–3 mm.

Found sparingly on *Salix pentandra* at Colesborne, Gloucestershire.

Full-coloured specimens of this species bear considerable superficial resemblance to *P. pruni*, but are at least one half larger.

4. **P. cratægi,** *Schr.*—Head and thorax bone-white with pale rust-red markings. Facial cones triangular regularly rounded at the apex, shorter than the crown down the middle, bone-white with the apical third pale rust-red. Antennæ yellow, longer than half the costa, joints 9 and 10 and the apices of joints 4 to 8 more or less broadly black. Elytra hyaline, the veins and stigma reddish white or pale reddish yellow, the dorsum at the apex of the clavus suffusedly blackish, vein two suffusedly bordered with fuscous, veins 3 to 6 each ending in a black point, a small blackish spot on the middle of the apex of cells 2 to 5; stigma rather more than half as wide as the basal two thirds of cell 6. Abdomen above blackish, hind margins of the segments narrowly, and the sides broadly, bright red. Legs red yellow, tarsi dusky at the apex. Length 3 mm.

Lives on whitethorn. Widely distributed, but somewhat local.

Norwich district, Cotswold district. London district (Douglas & Scott); Glanvilles Wootton, Bournemouth (Dale).

I have taken the greater number of specimens by beating beech in the Autumn.

5. **P. simulans,** *Forst* (*Pyri*, *Scott*).—Head and thorax bone-white or reddish white with lighter or darker red brown markings. Facial cones about as long as the crown down

the middle, their divergence moderate. Antennæ yellow, about half as long as the costa, first joint brown red, joints 3 to 5 more or less widely black at the apex, 6 to 10 black. Elytra hyaline or lacteo-hyaline, the disk of the cells feebly and suffusedly fuscous, a broad fuscous stripe occupying almost the entire length of cell 1, apex of the clavus blackish, veins blackish; stigma pale, about half as wide as the basal two thirds of cell 6. Wings with the apex of the clavus blackish. Abdomen dark brown or black, hind margins of the segments narrowly red. Legs brownish yellow, thighs black, except at the apex, apex of the tarsi blackish. Length, 2½ mm.

Lives on apple and pear. Widely distributed but not common.

Norwich district, Cotswold district. Glanvilles Wootton (Dale).

6. **P. pyricola**, *Först.*—Head and thorax brownish yellow with dark brown markings. Facial cones shorter than the crown down the middle, white passing into brown towards the base, their divergence moderate. Antennæ yellow, at least half as long as the costa, joints 4 to 8 more or less broadly black at the apex, 9 and 10 black. Elytra hyaline with a feeble testaceous tinge, the apex of the clavus and a short streak just above it in cell 1 blackish; veins concolorous, stigma pale, about half as wide as the basal two-thirds of cell 6. Wings with the apex of the clavus blackish. Abdomen and legs as in *P. simulans*. Forceps of the male when seen from behind about two-thirds as high as the genital plate, of nearly equal width in their basal half, then bent inwards and drawn out into a blackish point. Length, 2½ mm.

Lives on apple and pear. Widely distributed and apparently commoner than the last. Norwich district, Cotswold district.

The number of British species of Psylla which live on

apple and pear trees is not well ascertained; Curtis gives *P. pyri*, Lin., but it seems more probable that his species was *P. pyricola*, Först., and Scott includes *P. pyrisuga*, Först. with a query in his revised list of British Psyllidæ (*Ent. Mo. Mag.* vol. xviii. p. 254, April 1882). *P. pyrisuga* is a little larger than *P. pyricola*, and without dark markings on either elytra or wings. The true *P. pyri*. Lin., is best distinguished from *P. pyricola* by the form of the forceps in the male; the latter, when seen from the side, are nearly as high as the genital plate, narrow, sharply pointed, sickle-shaped with the point bent towards the front, the front edge with a projecting angle at the base.

P. salicicola, *Först.*—Head and thorax bone white with rust-yellow or pale red markings. Facial cones as long or slightly longer than the crown down the middle, their divergence moderate. Antennæ yellow, joints 3 to 8 more or less broadly black at the apex, 9 and 10 black. Elytra hyaline, veins lighter or darker brown becoming paler towards the base, the dorsum fuscous from the apex of the claws almost to the base of the elytron, stigma about half as wide as the basal two-thirds of cell 6. Abdomen yellow, or brown with the hind margins of the segments narrowly pale. Legs yellow, apex of the tarsi black. Length 2½–3 mm

Lives on sallow. Widely distributed and not uncommon.

Norwich district. London district (Scott); Glanvilles Wootton (Dale).

P. rhamnicola, *Scott.*—Head and thorax bone white or sordid yellow with red or red-brown markings. Facial cones about as long as the crown down the middle, the inner edge straight, the outer edge indented near the middle, apex rounded, the latter sometimes whitish preceded by a brown band. Antennæ yellow, about half as long as the costa, joints 4 and 5 more or less broadly black at the apex, 6 to 10 black. Elytra feebly lacteo-hyaline, veins lighter or

darker yellow-brown, dorsum fuscous from the apex of the claws about half-way to the base of the elytron, a short suffused fuscous line running inwards from the hind margin in each of cells 2 to 5, stigma about half as wide as the basal two-thirds of cell 6. Abdomen above lighter or darker brownish-red, the disk of the basal segments somewhat darker. Legs sordid yellow, apex of the tarsi blackish. Length 3–3½ mm.

Lives on *Rhamnus catharticus.*

Cotswold district. Sanderstead (Douglas & Scott).

P. venata, *n.s.*—♀. Head and thorax reddish-testaceous, the lateral punctures on the pronotum blackish. Facial cones rather short, their inner and outer edges straight. Antennæ brownish yellow, joints 8 to 10 black, the apices of joints 4 to 7 more or less broadly dusky. Elytra lacteo-hyaline, the veins rather broadly bordered with dull rust-yellow; radius feebly sinuate; stigma at the base more than half as wide as cell 6, gradually narrowed. Abdomen above black, the connections of the segments red. Lateral genital valves elongate triangular, as long as the remainder of the abdomen, their lower edge straight, the upper edge curved. Legs brownish yellow. Length 2½ mm.

Described from one female taken off birch at Stratton Strawless, Norfolk, 24th August, 1895.

P. melanoneura, *Först.*—Head and thorax bone-white with dull red-brown markings. Facial cones shorter than the crown down the middle, narrowly pointed, their outer edge sinuate. Antennæ less than half as long as the costa, black, becoming reddish towards the base. Elytra hyaline, becoming yellow-brown towards the apex; veins dark brown or black; stigma brown, about half as wide as the basal two-thirds of cell 6. Abdomen above dark brown or black. Legs brownish yellow, thighs piceous except at the apex. Length 2½ mm.

Lives on whitethorn; apparently local.

Colesborne, Gloucestershire, on old whitethorns 28th April 1894. A single male was sent by Walker to Förster.

P. visci, *Curb.*—Head and thorax pale green with red-yellow markings. Facial cones as long or longer than the crown down the middle, sharply pointed, the inner edge straight, the outer edge sinuate, their divergence at the apex about equal to half the width of the base of one. Antennæ nearly as long as the costa, yellow, joints 4 to 8 more or less broadly black at the apex, 9 and 10 black. Elytra hyaline, faintly fumose, broadest beyond the middle, widely rounded at the apex; veins yellow-brown becoming yellow towards the base; stigma about half as wide as the basal two-thirds of cell 6. Abdomen green. Legs yellow, tarsi dusky at the apex.

In the dark form the head and thorax are yellow with dark brown markings, the abdomen above is dark brown with the hind margins of the segments narrowly yellow, and the hind thighs are brown except at the apex. Length, 3½–4 mm.

Lives on mistletoe.

Norwich District. Hereford (Dale). I have taken both light and dark forms together in June.

P. hippophaës, *Först.*—Head and thorax greenish white with pale rust-yellow markings. Facial cones a little longer than the crown down the middle, their inner edge straight, the outer edge sinuate, the divergence small. Antennæ about half as long as the costa, yellow, the first two joints greenish white, joints 9 and 10 and the apices of joints 4 to 8 more or less broadly, black. Elytra whitish hyaline with a very feeble fuscous tinge, veins whitish, becoming yellowish towards the apex; stigma very narrow, about one-fourth as wide as the basal two-thirds of cell 6. Abdomen very pale green, dusky at the apex in the female. Legs greenish white, claws dusky. Length, 3 mm.

Lives on *Hippophaë rhamnoides.*

Deal (Scott); Winterton, Norfolk (Edwards).

P. ambigua, *Först.* (**stenolabis**, *F. Löw.*)—Head and thorax pale orange with darker markings. Facial cones nearly as long as the crown, the inner edge straight, their outer edge concave, their divergence distinctly less than the basal width of one. Antennæ about half as long as the costa, third joint one-half longer than the fourth. Elytra yellowish-hyaline, paler towards the base, veins yellow, becoming darker towards the apex; stigma about one-fourth as wide as the basal two-thirds of cell 6. Abdomen pale green. Genital plate in the male without any process, scarcely higher than the forceps; forceps straight, very narrow, gradually attentuate to their acute apex, nearly as high as the genital plate, their height five or six times as great as their basal width. Lower genital valve in the female gradually acuminate, as long as the two preceding segments, one-sixth shorter than the upper valve. Length, 2–2½ mm.

Lives on *Salix caprea*.

This species was introduced to our list by Scott in 1882, without particulars, under the name of *stenolabis*, F. Löw.

P. Hartigii. *Flor.* (**sylvicola**, *Scott*).—Head and thorax dull ochre-yellow, the latter sometimes yellow-red. Facial cones triangular, distinctly shorter than the crown down the middle. Antennæ less than half as long as the costa, dull yellow, points 8 to 10 and the apices of joints 3 to 7 broadly, black. Elytra ochreo-hyaline, becoming paler towards the base, veins brownish yellow; stigma wide and long, its base as wide or wider than the base of cell 6. Abdomen above dark brown, the sides and hind margins of the segments ochreous. Legs dull yellow, apices of the tarsi black. Length 2½–3 mm.

Not common. Food plant unknown.

Norwich, off Scotch fir in July. London District (Scott); Weybridge, off birch (Power).

P. pineti, *Flor.*—Head and thorax bone-white with dark markings varying from rust-yellow to red-brown. Facial cones elongate triangular, slightly excavated on the outer side,

a little shorter than the crown down the middle. Antennæ about half as long as the costa, yellow, joints 6 to 10, and the apices of joints 3 to 5 more or less broadly, black. Elytra hyaline, with a greater or less smoky tinge; veins varying from brownish yellow to piceous; stigma well developed, about half as wide as the basal two-thirds of cell 6. Abdomen above dark brown or black, margins of the segments more or less widely pale; sometimes entirely pale. Legs lighter or darker brownish yellow, apex of the tarsi black; tibial and tarsal spines and the claws black; thighs sometimes blackish, except at the apex. Length, 2¾ mm.

Very common on Conifers, especially in winter and spring.

Norwich district, Cotswold district. London district (Douglas); Holm Bush, Mickleham (Power); Glanvilles Wootton (Dale).

P. Löwii, *Scott.*—I transcribe the original description of this, for me, doubtful species. I have authentic specimens which I am unable to separate from *P. pineti*. "Red or somewhat brownish red, generally with pale streaks on the mesonotum. Face—lobes as long as the crown down the centre; base broad, rapidly narrowing to the middle, from thence to the apex almost parallel, where they become somewhat divergent. Antennæ short, barely reaching to the base of the stigma. Elytra smoky-testaceous, or almost clear, transparent; nerves, in fresh examples, yellow, inclining to orange, in others dark brown; stigma moderate, almost regularly narrowed from the base to the apex; upper arm of the cubitus long, very convex. *Head: crown* red, posterior margin distinctly concave. Face: lobes reddish or yellowish; base broad, rapidly narrowing to the middle from thence to the apex almost parallel: apex rounded or slightly acute, somewhat divergent. *Antennæ* reddish yellow, short, barely reaching to the base of the stigma; 3rd joint short, scarcely longer than the 1st and 2nd together; 4th about four-fifths of the 3rd; 1st frequently black, or the base of 1 to 2

black; 4 to 8 at the apex narrowly brown; 9 to 10 black. *Thorax: pronotum* generally yellowish; *mesonotum* red or brownish red; in the latter case the posterior portion with four slightly indistinct pale longitudinal lines, the two exterior curving round and enclosing the inner, which are on each side of the centre. *Elytra* smoky-testaceous, or almost clear, transparent; greatest breadth before the apex of the stigma, length equal to about two and a half times the breadth; nerves yellow, inclining to orange or dark brown; stigma moderate, almost regularly narrowed from the base to the apex; upper arm of the cubitus long, twice the length of the bifurcation, very convex and approaching the base of the radius. *Legs* reddish yellow. *Thighs:* 3rd pair sometimes brown at the base. *Tibiæ* yellowish. *Tarsi:* apex of the 2nd joint very narrowly and *claws* dark brown. *Abdomen* above, in both sexes, deep pitchy brown, shining; posterior margin of the segments very narrowly red, or sometimes the ♂ reddish, with a dark band across the segments; ♂ genitalia pale chestnut; ♀ frequently green. Length, 1¼–1½ line nearly. Taken abundantly by Mr. Douglas beginning of November, at Addington, on fir and birch, and by Dr. Power in February, at Esher."

P. betulæ, *Lin.*—Head and thorax brownish yellow with red-brown markings. Facial cones about as long as the crown down the middle, the divergence about equal to half the base of one. Antennæ long, at least two thirds as long as the costa, yellow, joints 8 to 10 and the apices of joints 4 to 7 more or less broadly, black. Elytra whitish hyaline, sometimes with a very faint fuscous tinge, veins yellow-brown; stigma about one-fourth as wide as the basal two-thirds of cell 6. Abdomen yellow, the middle dorsal segments more or less broadly dark brown. Legs brownish yellow, hind thighs except at the apex, and the apices of the tarsi, piceous. Length, 2½–4 mm.

Lives on birch.

Stratton Strawless, Norfolk. London District (Douglas).

P. costalis, *Flor.*—♂. Crown sordid yellow, dusky on the disk. Thorax lighter or darker yellow-brown paler at the sides, the usual dark markings not discernible. Facial cones rather sharply triangular, shorter than the crown down the middle. Antennæ about half as long as the costa, yellow, joints 9 and 10 and the apices of joints 4 to 8 more or less broadly, black. Elytra hyaline, sometimes with a very feeble fuscous tinge, veins almost concolorous with the disk; stigma at the base half as wide as the basal two-thirds of cell 6. Abdomen above black, the sides narrowly and a band across the base carmine-red, genital segment green or yellow. Legs sordid yellow, claws black. Length, 2–2½ mm.

The food plant of this species is, apparently, unknown; I have beaten it from an elm fence, also from mixed hedges, sometimes from whitethorn alone; Flor's specimens were taken on *Pinus abies* at the end of August.

Norwich district, Cotswold district, not uncommon. Glanvilles Wootton (Dale).

P. peregrina, *Först.* (**cratægicola**, *Scott*).—Very pale green. Facial cones elongate-triangular as long or longer than the crown down the middle. Antennæ rather more than half as long as the costa, joints 9 and 10 black. Elytra whitish hyaline, veins concolorous; stigma at the base two-thirds as wide as the basal two-thirds of cell 6. Tibial and tarsal spines and the claws black. Length, 3 mm.

Very common on whitethorn in June. The imago does not hibernate.

Norwich district, Cotswold district. London district (Scott); Glanvilles Wootton, Killarney (Dale).

P. mali, *Schmdbg.*—Pale sordid yellow, or brownish yellow. Differs from *P. peregrina* in colour, in being distinctly stouter in build, and in its food-plant. The light and dark forms occur together as in *P. visci*. Length, 3 mm.

Abundant on *Pyrus malus*.

Norwich district, Cotswold district. London district (Scott); Glanvilles Wootton (Dale).

P. alni, *Lin.*—Head and thorax sordid yellow with lighter or darker red-brown markings, or green without markings. Facial cones broadly and bluntly triangular, a trifle shorter than the crown down the middle. Antennæ in the male nearly as long as the costa, in the female about two-thirds as long as the costa, yellow, basal two-thirds of joints 1 and 2 dusky, joints 6 to 10 and the apices of joints 3 to 5 more or less broadly, black. Elytra whitish hyaline, costal vein and stigma green, the other veins, except the basal piece of the subcostal, black; stigma very narrow, a mere thickening of the costal vein. Abdomen green, or sometimes with the dorsal segments more or less broadly brown. Legs green or yellow, front tibiæ frequently with a black spot on the outer side at the base, tibial and tarsal spines and the claws black. Length, 5 mm.

Lives on alder.

Norwich district, Cotswold district, locally abundant. London district, "not common" (Scott); Glanvilles Wootton (Dale).

Aberrations of venation are more frequent in this species than in any of its congeners.

P. Försteri, *Flor.*—Head and thorax dull yellow, inclining to ochreous. Facial cones broadly and bluntly triangular, a very little shorter than the crown down the middle. Antennæ nearly as long as the costa, yellow; joints 9 and 10 and the apices of joints 4 to 8 more or less broadly, black. Elytra hyaline with a feeble ochreous tinge, veins dull yellow; stigma a mere thickening of the costal vein. Abdomen and legs green or yellow; tibial and tarsal spines and the claws black. Length, 3–4 mm.

Lives on alder; very common.

Norwich district, Cotswold district. London district (Scott); Glanvilles Wootton (Dale).

P. buxi, *Lin.*—Head and thorax very pale greyish green with rust-yellow markings. Facial cones broadly triangular, subtruncate at the apex, a trifle longer than the crown down the middle. Antennæ in the male about two-thirds, in the female about one-half as long as the costa, yellow, passing gradually into brown on joints 4 to 10. Elytra dull yellowish hyaline, whitish hyaline in cell 7, veins concolorous with the disk, the costal vein sometimes green; stigma a slight thickening of the costal vein. Abdomen green. Legs sordid yellow, the thighs sometimes brown except at the apex, tibial and tarsal spines and the claws black. Length, 3½ mm.

Very common on box bushes.

Norwich district, Cotswold district. London district (Scott); Glanvilles Wootton (Dale).

P. spartii, *Guér.* (**spartiophila**, *Först*).—Head and thorax sordid yellowish white with yellow-brown markings, the foveæ on the crown and pronotum blackish. Facial cones very short and broad, rounded triangular, about half as long as the crown down the middle. Antennæ about two-thirds as long as the costa, yellow, the apical half of joint 3 and the succeeding joints entirely black. Elytra testaceo-hyaline, becoming simply hyaline in and towards cell 7, veins brownish-yellowish; stigma a slight thickening of the costal vein. Abdomen above black, hind margins of the segments narrowly, and the genital segment, pale. Legs sordid yellow, last joint of the tarsi and the claws black, thighs sometimes piceous except at the apex. Length, 2½ mm.

Lives on broom.

Norwich district, local. London district (Scott).

Livilla, *Curt.* (Pl. II. fig. 30.)

Head and thorax impunctate. Facial cones longer than the crown. Elytra coriaceous, strongly convex, transversely rugulose, broadest in the middle.

There is but one European species of this genus. It is a small ovate convex shining brown insect, bearing, in life, a remarkable resemblance to a small seed.

1. **L. ulicis**, *Curt.*—Lighter or darker pitch-brown, shining. Facial cones blackish, about one-third longer than the crown down the middle, nearly parallel-sided to their narrowly rounded apex. Antennæ nearly as long as the costa, yellow, joints 5 to 10 and the apical half of joint 4, black. Legs yellow; tibial spines and the claws black. Length, 2–2½ mm.

Local. Occurs on furze bushes.

Annis, West Camel, and Higham Hill, Langport, both in Somersetshire, in June (Dale); Malvern, September (Blatch). It was also taken by Mr. T. V. Wollaston and Dr. F. B. White.

Arytæna, *Scott.* (Pl. II. fig. 31.)

Head, with the eyes, somewhat broader than the thorax. Crown flat with two punctures in the middle. Facial cones porrect, shorter than the crown, broadly rounded at the apex. Thorax very feebly convex; crown pronotum and dorsulum lying nearly in the same plane, the latter shorter than the crown; pronotum as wide at the sides as in the middle. Elytra of nearly even breadth throughout, somewhat narrowly rounded at the apex, vein 5 ending in the apex; stigma wanting.

Besides the British species there is but one other species of this genus recorded for the Palearctic Fauna; this is *A. adenocarpi*, Löw, which has the elytra hyaline with yellowish veins, but without fuscous markings, and occurs in the South of France on *Adenocarpus commutatus*, a leguminous shrub allied to *Spartium* and *Ulex*.

1. **A. genistæ**, *Latr.* (**ulicis**, *Scott*).—Head and thorax pale green or yellow, with lighter or darker brown markings.

Facial cones broadly rounded at the apex, about one-third shorter than the crown down the middle. Antennæ nearly as long as the costa, yellow, joints 6 to 10 and the apex of joints 3 to 5 more or less broadly, black. Elytra whitish hyaline, a fuscous stripe occupying nearly the whole of cell 5, a feeble fuscous stripe in cell 1 becoming obsolete towards the base, and a fuscous cloud (originating in a small fuscous spot next the dorsum) in the apex of each of cells 2 to 4; veins brownish yellow, becoming fuscous at the apex. Abdomen green or yellow, the dorsal segments more or less broadly brown in the middle; genital segment in the female blackish. Legs green or yellow, tibial and tarsal spines and the claws black. Length, 3 mm.

Lives on furze-bushes; locally common.

Norwich district. London district (Scott); Bournemouth (Dale).

TRIOZIDÆ.

Head, with the eyes, as wide as the thorax, eyes globose, prominent. Facial cones well developed. Foremost ocellus visible from the front. Antennæ about as long as the head and thorax, joints 1 and 2 terete short and stout, remainder filiform, third joint the longest. Pronotum very short, about one-third as long as the crown, with lateral impressions. Dorsulum as long or nearly as long as wide, somewhat triangularly produced in front, rounded behind. Elytra flat, more or less pointed at the apex, with or without a colour-pattern; stigma and stalk of the cubitus wanting; a short dorsal veinlet in each of the cells 2 to 4.

TABLE OF GENERA.

1. (2) Upper side of head and thorax pubescent. *Trichopsylla.*
2. (1) Upper side of head and thorax bare. *Trioza.*

Trichopsylla, *Thoms.* (Pl. II. fig. 32.)

The single species contained in this genus was separated by C. G. Thomson from the species of Trioza, Förster, mainly on account of its pubescent head and thorax; it is certainly much further removed in its characters from the remaining species of Trioza than the latter are from each other. The shape of the elytra is peculiar, the costa is not evenly curved throughout, but is suddenly and obliquely deflected near its apical third, beyond which it is straight or very feebly concave.

1. **T. Walkeri**. *Först.*—Head and thorax lighter or darker red-brown or yellow-brown with dark red-brown markings, with a sparse short fine pale pubescence. Facial cones about one-third shorter than the crown down the middle, rather narrowly rounded at the apex. Antennæ short, about as long as the costa from the base to the point where it is joined by the subcostal; yellow, the two basal joints red-brown, joints 9 and 10 and the apex of joints 5 to 7 narrowly, black. Elytra brown, and, except on the white parts, closely and irregularly punctured with darker brown; an irregular suffused white band from the costa to the dorsum just beyond the apex of the clavus, constricted and almost interrupted in the middle, and a semi-ovate white spot next the costa just before the apex; the dorsum narrowly dark brown between the apex of the clavus and vein 2; veins concolorous with the disk. Abdomen above lighter or darker red-brown, connexivum red. Legs brownish yellow, tibial and tarsal spines and the claws black. Length, 3½–4 mm.

Local; recorded as having been found on *Prunus spinosus*, *Euonymus europæus*, and *Rhamnus catharticus*.

Cotswold district, on *Rhamnus catharticus*. Mickleham, on *Prunus spinosus* (Douglas and Scott); London district (Beaumont); Addington, on *Euonymus europæus* (Power); Glanvilles Wootton (Dale).

Trioza, *Först.* (Plate II. fig. 33.)

This is a rather large and well-marked genus distinguished from the preceding by the want of pubescence on the head and thorax, and by the shape of the elytra, which have the costa convex in its apical third.

Dr. Puton gives forty-eight species for the Palearctic Fauna; of these we have thirteen, and it is probable that several of the others remain to be discovered in this country. They are, on the whole, a very difficult group of insects; the males in many cases are only to be distinguished with certainty by their genitalia, and the females of several species, unless taken *in. cop.* or bred, are absolutely indistinguishable. Many of the species pass their early stages on herbaceous plants, on which they cause various malformations.

TABLE OF SPECIES.

1. Apex of cell 7 reaching beyond the base of cell 4; radius sinuate. 2.
   Apex of cell 7 not reaching so far as the base of cell 4; radius arcuate, with its concavity towards the costa, or straight. 6.
2. Costa rounded throughout; or if straight in the middle, then the abdomen beneath not entirely pale. 3.
   Costa straight in its middle third; abdomen beneath entirely pale. 1. *albiventris*.
3. No black points on dorsum of elytra. 4.
   The three veinlets each ending in a black point on the dorsum. 2. *rhamni*.
4. Hind margin of the genital plate in the male not produced into a long horizontal process. 5.
   Hind margin of the genital plate in the male produced on each side into a long horizontal process. Species lives on *Crithmum maritimum*. 3. *crithmi*.

5. Forceps of the male long, simple. Species lives on nettles. 4. *urticæ.*
   Forceps of the male unequally bilobed at the apex, the front portion broadly rounded, the hinder portion narrow and pointed. Species lives on *Valerianella* and *Centranthus.* 5. *centranthi.*
6. Greatest width of cell 6 about equal to the least width of cell 5. 7.
   Greatest width of cell 6 about one and a half times as great as the least width of cell 5. 6. *remota.*
   Greatest width of cell 6 three or four times as great as the least width of cell 5. 7. *galii.*
7. Head and thorax pale green or orange-red. 8.
   Head and thorax neither pale green nor orange-red. 9.
8. Head and thorax pale green. 8. *viridula.*
   Head and thorax orange-red. 9. *salicivora.*
9. Hind margin of the genital plate in the male simple. 10.
   Hind margin of the genital plate in the male produced on each side into a horizontal process. 10. *acutipennis.*
10. Forceps of the male simple. 11.
    Forceps of the male as high as the genital plate, constricted just before their truncate apex, their front margin produced below the middle into a short rounded lobe. 11. *munda.*
11. Middle portion of the costa nearly straight. 12. *abdominalis.*
    Costa evenly curved throughout, vein 3 running parallel to the upper branch of the cubital. 13. *chenopodii.*

1. **T. albiventris,** *Först.*—Head and thorax varying from bone-white to pale red, with markings which vary from red-brown to black. Facial cones black, narrowly and

sharply pointed, as long as the crown down the middle. Antennæ less than half as long as the costa, black, joints 2 to 4 pale. Elytra hyaline, faintly fumose, the veins but little darker; costa straight, except in its basal and apical fourths, radius straight and nearly parallel with the costa in its basal two-thirds, afterwards sinuate. Abdomen above black or blackish, beneath pale; genital segment of the male black, the forceps yellow. Legs brownish yellow, thighs frequently with a black or piceus stripe, front pairs of tarsi blackish. Length, 3 mm.

Not uncommon on conifers in winter; its food plant according to Löw is various species of Salix.

Norwich district. Cotswold district. Addington, on fir and birch, in October (Douglas); Glanvilles Wootton (Dale).

1. **T. rhamni,** *Schrk.*—Disk of the head and thorax blackish, sometimes with a slate-blue bloom. Facial cones entirely pale, rather blunt, and but little divergent, about two-thirds as long as the crown down the middle. Antennæ about one-fourth as long as the costa, pale brownish yellow, joints 5 and 6 dusky at the apex, 9 and 10 black. Elytra hyaline, their apex blunt; veins pale yellow, the three veinlets each ending in a black point on the dorsum, a minute black spot on the dorsum near the base; radius bisinuate. Abdomen pale, the middle of some of the dorsal segments dusky; male genitalia pale, the forceps narrow and simple. Legs sordid yellow, the tibial spines and the claws, black. Length, 2–2½ mm.

Food-plant *Rhamnus catharticus;* it also occurs sparingly on conifers in winter. This species was originally described by Förster as *T. abieticola* from a British specimen sent to him by Walker under the name of *Psylla abietis.*

Norwich district, Cotswold district. Glanvilles Wootton (Dale).

3. **T. crithmi,** *F. Löw.*—Head and thorax pale, with blackish markings. Facial cones pale, about two-thirds as

long as the crown down the middle. Antennæ less than half as long as the costa, black; the three basal joints whitish, second joint narrowly dusky at the base. Elytra hyaline, with a very faint brownish tinge; veins brownish yellow; radius in its basal two-thirds nearly straight and gradually approaching the costa, afterwards deflexed. Abdomen above black or blackish, genital plate of the male yellow, its hind margin produced on each side into a long blunt horizontal process. Legs pale, thighs sometimes with a dusky stripe, claws blackish. Length, 2½–3 mm.

Lives on *Crithmum maritimum*.

Anstey's Cove, near Torquay (P. H. Gosse); Portland, Lulworth (Dale).

4. **T. urticæ**, *Lin.*—Head and thorax bone-white or yellow, with lighter or darker rust-yellow or red-brown markings. Facial cones black, narrow and sharply pointed, as long as the crown down the middle. Antennæ less than half as long as the costa, black, joints 2 to 4 and the base of joint 5 white, basal joint blackish. Elytra hyaline, veins brownish yellow. Abdomen above brown, the hind margins of the segments narrowly pale. Male, forceps narrow and unusually long, distinctly higher than the genital plate, six to seven times as high as the width of the base, narrowed only shortly before the apex, which is black; side margins of the genital plate convex behind. Female: lower genital plate long acute, distinctly longer than broad and nearly or quite as long as the three preceding segments. Legs brownish yellow, thighs more or less piceous in the middle, apex of the tibiæ blackish, tarsi black. Length, 2½–3 mm.

A very variable species, very abundant on nettles.

Norwich district, Cotswold district. Glanvilles Wootton (Dale).

5. **T. centranthi**, *Vall.*—Body above black or brown, a band across the abdomen near the base, and the hind margin

of the last dorsal abdominal segment narrowly, snow-white. Legs testaceous, thighs more or less piceous. Elytra faintly fusco-hyaline veins slightly darker, middle piece of the subcostal vein subequal in length to the costal piece, radial vein subparallel with the upper cubital for rather more than its basal third. Antennæ black, joints 3 and 4 pure white. Forceps of the male with the anterior apical angle bluntly rounded, and the posterior apical angle produced into a black triangular tooth. Length, 2½ mm.

On *Valerianella dentata*, Bretby, Derbyshire, August 1894 (Gibbs).

The nymph lives on *Centranthus ruber*, and various species of *Valerianella*, causing a crowding together of the flowers and great broadening of the bracts, the latter being reflexed and each sheltering a nymph.

6. **T. remota**, *Först.*—Head and thorax bone-white or yellowish white with lighter or darker red-brown markings. Facial cones dusky in the male, about as long as the crown down the middle, in the female somewhat longer and more divergent, pale, sometimes blackish at the apex. Antennæ less than half as long as the costa, black, joints 1 to 3 and the basal portion of joint 4, yellowish. Elytra hyaline with a very faint fuscous tinge, veins brownish yellow; radius arcuate with its concavity towards the costa, the greatest width of cell 6 about one and a half times as great as the least width of cell 5. Abdomen above blackish, the margins of the segments more or less broadly reddish yellow. Legs brownish yellow, thighs sometimes with a brown stripe, tarsi often blackish at the apex, tibial spines and the claws black. Length, 2½–3 mm.

Lives on oak, also occurs on Conifers in winter.

Norwich district. Addington (Douglas); Esher (Power); Glanvilles Wootton (Dale).

7. **T. galii**, *Först.*—Head and thorax pitch-black. Facial cones about one half as long as the crown down the middle.

Antennæ in the male about one-third, in the female about one-half as long as the costa, black, joints 3 and 4 white. Elytra hyaline with a very faint fuscous tinge, costa almost evenly curved throughout, veins brownish yellow; radius straight or arcuate with its concavity towards the costa, the greatest width of cell 6 three or four times as great as the least width of cell 5. Abdomen above black, in life with a narrow pure white band across the base, hind margins of the segments narrowly red. Legs white with the thighs pitch-black, claws blackish. Length, 2–2½ mm.

Lives on various species of *Galium*.

Norwich district, Cotswold district. Ireland (Haliday); Darenth (Power); Glanvilles Wotton, Bude (Dale).

8. **T. viridula**, *Zett.*—Body and legs entirely pale green. Facial cones not so long as the crown down the middle. Antennæ yellowish white, joint 8 blackish at the apex, 9 and 10 black. Elytra clear hyaline, veins but little darker. Male: genital plate with its hind margin produced on each side into a broad triangular tooth. Forceps subequal in height to the plate, about four times as high as broad at the base, scarcely narrowed to the apex, the hind margin very feebly convex. Female: lower genital plate acuminate, distinctly longer than broad, as long or longer than the two preceding segments together. Length, 3 mm.

Lives on various Umbelliferæ, such as *Daucus carota*, *Anthriscus sylvestris*, and *Petroselinum sativum*; also occurs on Conifers in winter.

Lee (Scott); Glanvilles Wootton (Dale).

9. **T. salicivora**, *Reut.*—Head and thorax orange-red, abdomen and legs orange-yellow. Facial cones orange-yellow, not quite so long as the crown down the middle. Antennæ white, joints 1 and 2 fuscous at the base, joints 3 and 4 narrowly brown at the apex, 8 to 10 black. Elytra

hyaline with a faint brownish tinge, veins but little darker. Tarsi fuscous at the apex, claws black.

Balmuto, Fifeshire (Power), one male.

According to Scott this species occurs on *Salix caprea* in August.

10. **T. acutipennis**, *Zett.*—Head and thorax black. Facial cones about as long as the crown down the middle. Antennæ yellowish white, joints 4, 6 and 8 brown at the apex, 1 and 2, 9 and 10, black. Elytra brownish hyaline, acute at the apex, veins brownish yellow; radius straight or but slightly sinuate before the apex. Abdomen above black. Male: genital segment pale brownish yellow; plate very low, its hind margin produced on each side into a long horizontal tooth, which is rounded at the apex and reaches the base of the forceps. The latter subequal in height to the plate, about three times as high as broad at the base, gradually narrowed from the base with a sharp point somewhat curved towards the front, the front margin produced into a small tooth below the middle. Female: lower genital plate acuminate, about as long as broad, narrower than the preceding segment and about two-thirds as long. Length, 2½ mm.

Lives on *Alchemilla vulgaris*.

London district (Scott).

11. **T. munda**, *Först.*—Head and thorax yellow or brownish with dark markings, which are frequently confluent. Facial cones about half as long as the crown down the middle, very little narrowed on the outer side, scarcely diverging. Antennæ about half as long as the costa, yellow, the first joint, the apex of the eighth, and the last two joints black. Elytra hyaline, veins yellow, their arrangement as in *T. viridula*, Zett. Abdomen green, hind margins of the segments pale. Male: genital plate as long as the genital segment, its hind margin somewhat roundly produced near the base. Forceps broad somewhat curving towards the front,

very unequally bilobed, the front lobe short and rounded reaching about half their height, the hind lobe acuminate, constricted just below its obliquely truncate apex. Female: lower genital plate about as long as the two preceding ventral segments. Legs yellow or greenish yellow. Length, 2 mm.

This species appears to have been sent to Förster by Walker and Haliday. According to F. Löw its food-plant is *Knautia sylvatica*.

12. **T. abdominalis**, *Flor.*—Head and thorax black, paler at the sides. Facial cones sharply pointed, about two-thirds as long as the crown down the middle. Antennæ less than half as long as the costa, white, joints 1, 9 and 10, and the apical portion of joint 8, black. Elytra simply hyaline, veins but little darker, middle portion of the costa nearly straight, greatest width of cell 6 about equal to the least width of cell 5; radius straight, scarcely visibly curved in its apical third. Abdomen green with only the middle of the basal ventral segments black, or entirely black. Male genitalia green or sordid yellow, genital plate simple, forceps scarcely so high as the genital plate, broad at the base, gradually sharply pointed and having their very narrow black point somewhat curved towards the front so that their hind margin is feebly convex and their front edge slightly concave. Legs yellow, thighs with a black stripe, last tarsal joint brown, the claws black. Length, 2 mm.

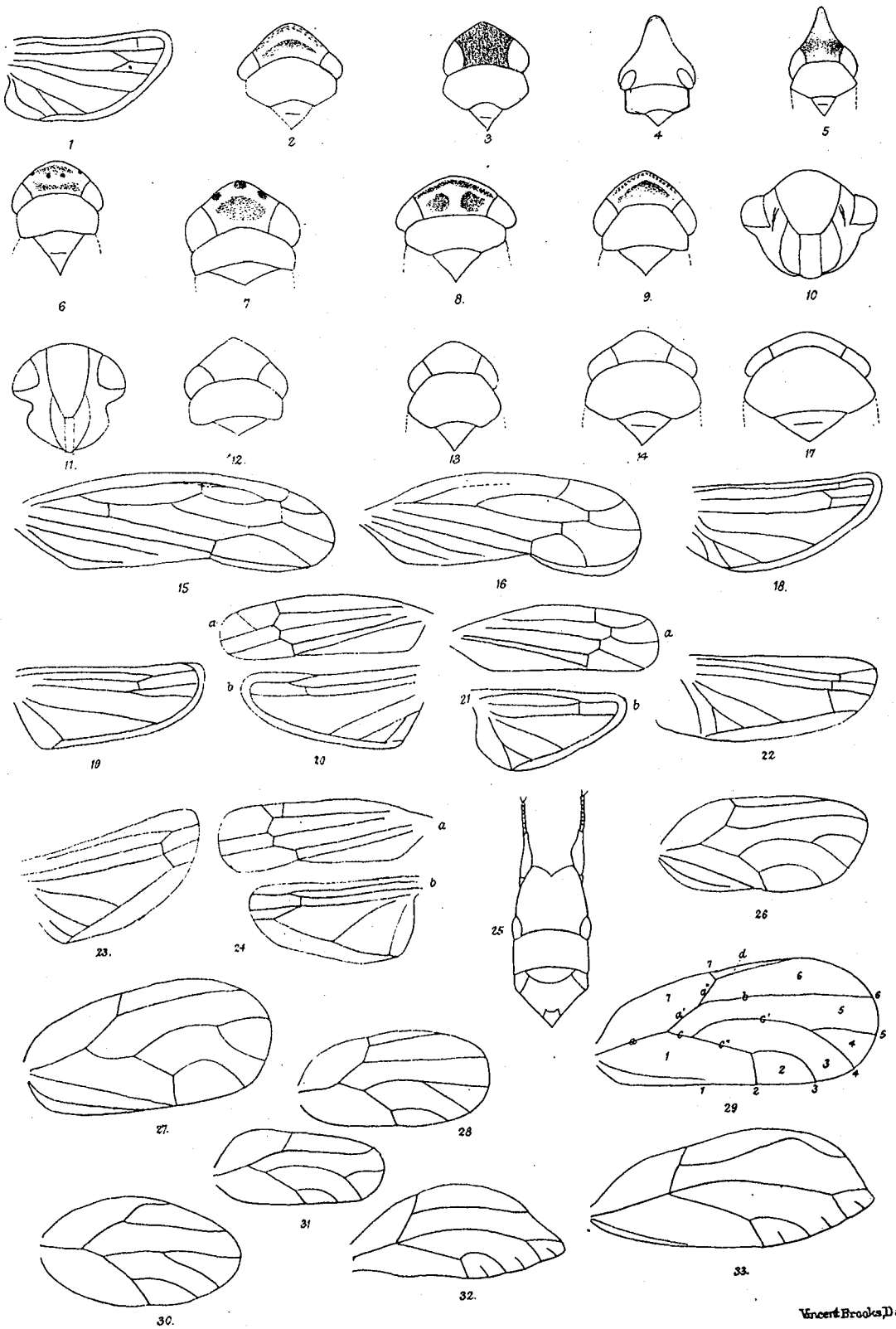
This species, according to F. Löw, is found on silver fir in August. It was introduced by Scott, without remark, in his list of 1882.

13. **T. chenopodii**, *Reut.* (**Dalei**, *Scott*).—Head and thorax sordid yellow with pitch-brown markings which are frequently confluent. Facial cones pitch-black, nearly as long as the crown down the middle. Antennæ less than half as long as the costa, white, joint 1 and the base of joint 2 pitch-brown, apical portion of joint 8 and joints 9 and 10 black.

Elytra fusco-hyaline, the veins pale brown, costa evenly curved throughout, the curve of vein 3 parallel to that of the upper branch of the cubital. Abdomen above pitch-brown, margins of the segments narrowly pale. Male: genital plate simple rather broad at the base, about one-third higher than wide, forceps simple, about two-thirds as high as the plate. Legs yellow, thighs sometimes with a dark stripe, apex of the tarsi and the claws black. Length, 2 mm.

A coast species living on *Atriplex patula* and *Chenopodium*.

Isle of Wight, on thrift (J. C. Dale); Abbotsbury, Hastings (C. W. Dale).



J.E.dwards del R.Morgan lith.

Vincent Brooks, Day & Son Imp.

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PLATE II.

FIG. 1. *Tettigonia*, wing.
„ 2. *Strongylocephalus*, crown, pronotum, and scutellum.
„ 3. *Acocephalus*, „ „ „
„ 4. *Eupelix*, „ „ „
„ 5. *Platymetopius*, „ „ „
„ 6. *Graphocræus*, „ „ „
„ 7. *Doratura*, „ „ „
„ 8. *Paramesus*, „ „ „
„ 9. *Glyptocephalus*, „ „ „
„ 10. *Athysanus*, face.
„ 11. *Stictocoris*, „
„ 12. *Deltocephalus*, crown, pronotum, and scutellum.
„ 13. *Allygus*, „ „ „
„ 14. *Thamnotettix*. „ „ „
„ 15. *Limotettix*, elytron.
„ 16. *Cicadula*, „
„ 17. *Gnathodus*, crown, pronotum, and scutellum.
„ 18. *Alebra*, wing.
„ 19. *Dicraneura*, „
„ 20. *Kybos*, *a* elytron, *b* wing.
„ 21. *Chlorita*, „ „
„ 22. *Eupteryx*, wing.
„ 23. *Typhlocyba*, „
„ 24. *Zygina*, *a* elytron, *b* wing.
„ 25. *Livia*, crown, pronotum, and scutellum.
„ 26. *Rhinocola*, elytron.
„ 27. *Aphalara*, „
„ 28. *Psyllopsis*, „ veins
„ 29. *Psylla*, „ „ *a a' a''* subcostal, *a* basal piece, *a'* middle piece, *a''* costal piece; *b* radial; *c c' c''* cubital, *c* the stalk, *c'* upper branch, *c''* lower branch, *d* stigma. The veins which reach the margin and the cells are numbered consecutively.
„ 30. *Livilla*, elytron.
„ 31. *Arytæna*, „
„ 32. *Trichopsylla*, „
„ 33. *Trioza*, „