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PART I.

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THE
HEMIPTERA HOMOPTERA
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.



LONDON:

L. REEVE & CO.,

Publishers to the Home, Colonial, and Indian Governments,

6 HENRIETTA STREET, COVENT GARDEN.

1894.

THE HEMIPTERA-HOMOPTERA
OF
THE BRITISH ISLANDS



THE
HEMIPTERA-HOMOPTERA
(CICADINA AND PSYLLINA)
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P R E F A C E

THE present volume is intended as a descriptive catalogue of the Cicadina and Psyllina of the British Islands, and to that end, my aim throughout has been to avoid attempting to give lengthy word-pictures of the insects under consideration, but rather to direct attention at once to those characters which all the available experience, whether of myself or others, proves to be diagnostic of the several species and larger divisions. The work, being one of a series, it was expedient that its plan should be in conformity with that of the volumes which have preceded it; hence the absence of synonymic and bibliographical references. This omission, however, is almost entirely met by Messrs. Douglas and Scott's "Catalogue of British Hemiptera" issued by the Entomological Society of London at a nominal price; a work from which I have probably derived more assistance than from any other single book. The student who meets with any British species which is not to be identified by means of the present work (and there are, doubtless, many such species still to be found), may consult with advantage Dr. Melichar's "Cicadinen von Mittel-Europa," and Dr. John Sahlberg's "Ofversigt af Finlands och den Skandinaviska halföns Cicadaria," both excellent works and containing between them practically all that is known of the Cicadina of Europe so far as systematics are concerned, although the scattered papers of Prof. Reuter contain many descriptions supplementary to the latter, which, it may be well to mention, has the descriptive portion in Latin. For the Psyllina, recourse must be had to the

numerous writings of the late Dr. Franz Löw, Dr. Puton and others.

In Messrs. Douglas and Scott's "Catalogue," which was published in 1876, the number of British species of Cicadina and Psyllina was given as 268; the number of species dealt with in the present work is about 307, and there is no good reason for assuming that any of these are peculiar to Britain, although a few of them have not yet been recognised on the Continent. The following species are described as new, namely: *Liburnia Thoulessi*, *Psylla concinna*, *Psylla brunnei-pennis*, and *Psylla venata*.

The least satisfactory feature of this work is, probably, the record of localities; but the meagre nature of this arises from a cause quite beyond the control of the author, to wit, the paucity of collectors of these insects. The systematic arrangement which I have adopted is, in the main, the same as that in use on the Continent, the chief difference being in the names applied to some of the larger divisions.

I desire to express my hearty thanks to all who have assisted me in the preparation of this work by information, loan of specimens, or otherwise; and particularly to my old friend, Mr. J. W. Douglas, Messrs. A. Beaumont, W. G. Blatch, E. A. Butler, C. W. Dale, W. R. Robinson-Douglas, J. N. Halbert, Rev. W. F. Johnson, the late M. Lethierry, Rev. T. A. Marshall, Dr. P. B. Mason, Dr. L. Melichar, Dr. A. Puton, Messrs. E. Saunders, H. J. Thouless, and M. Young.

Finally, I venture to express the hope that this work may prove useful to my fellow-students in the determination of their captures, and also lead others to take up the study of these interesting insects.

JAMES EDWARDS.

COLESBORNE, CHELTENHAM,
July 11, 1896.

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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 exuviae 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 Delphacidae and Jassidae, 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 Delphacidae, and, indeed, may be said to form the rule, and in the Jassidae there are several cases in the genera *Athysanus* and *Deltocephalus* ; no instances occur in the Cixiidae, Cercopidae, or Typhlocybidæ, and only one (*Agallia brachyptera*) in the Bythoscopidae. 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 *loræ*, 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 *Typhlocybidae* 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 clypens; 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,

Cixiidae, and certain Delphacidae, 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 *ædeagus*, 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 *ædeagus*. 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 *ædeagus* 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. *Ulopidae.*
20. (19) Forehead occupied by a strong X-shaped keel
with an ocellus in each lateral angle. *Paropiidae.*
21. (18) Hind tibiae multispinose.
22. (23) Ocelli on the frons. *Bythoscopidae.*
23. (22) Ocelli not on the frons.
24. (25) Ocelli on the disc of the crown. *Tettigonidae.*
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. *Acocephalidae.*
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 per-
ceptibly 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. *Jassidae.*
29. (28) Corium with three simple veins only, no trans-
verse vein. *Typhlocybidae.*
30. (1) Tarsi two-jointed. Antennae 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

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further inwards than second, which is widened behind, 3-7 parallel-sided, increasing in width, eighth trapeziform; sub-apical areas five, fourth widened behind. Clavus narrow-lanceolate. Wings hyaline, with six apical and three basal areas.

1. *C. montana*, Scop.—Black, with fine yellow hair-like scales. Crown triangular, apex obtuse, surface very uneven, with a deep transverse impressed line in front. Pronotum with two closely placed parallel fine straight raised lines down the middle in front; disc with three strongly impressed lines on each side, two straight oblique somewhat in front, and one just within its lobate hinder angles, the curve of which it follows. Elytra clear, veins black, costa and the basal accessory membrane yellow-red. Wings coloured as elytra. Abdomen, dorsal segments black, with yellow-red hindmargins, ventral segments in female almost entirely yellow-red. Legs yellow-red; knees, base of front tibiæ, trochanters, and some stripes on the femora, black. Front femora with three teeth, that nearest the base depressed, its apex obliquely truncate, the other two erect, successively smaller. Length (including elytra), 23-28 mm.

This fine species occurs sparingly in the New Forest; it is also recorded from Surrey, where Mr. C. G. Barrett took a specimen in Frillinghurst Wood, near Haslemere; the male has hitherto been much less frequently taken than the female. For a long time it appeared uncertain whether this species possessed any "song," but the sound it produces has, of late years, been heard by more than one collector.

II. MEMBRACIDÆ.

Crown almost vertical. Ocelli two, on the crown. Face much deflexed, nearly horizontal. Pronotum always produced into a process behind, and sometimes with one on each side. Tegulæ wanting. Hind coxæ transverse, reaching nearly to the sides of the breast. Tibæ prismatic.

This family, which is remarkable for the almost endless

variety and grotesqueness of form and anomalous development of the pronotum in its exotic representatives, is but poorly represented in Europe, but we possess two genera out of the three belonging to the Palearctic fauna.

Our two genera may be thus distinguished :

Pronotum with a horn on each side ;

hind process sinuate i. *Centrotus*.

Pronotum without horns at the sides ;

hind process straight ii. *Gargara*.

i. *Centrotus*, *Fab.* (Pl. 1, fig. 11.)

Lateral angles of pronotum acutely produced, hind process long, arching over, but not concealing the scutellum. Elytra with five apical areas.

1. *C. cornutus*, *Linn.*—Black, roughly punctured, with fine yellow pubescence. Pronotum with a fine central keel ; side processes diverging, wide, triangular, deflexed at the apex ; hind process bisinuate, acute, nearly as long as the abdomen. Elytra rugose, fusco-hyaline, veins dark brown, on the hind margin in the fifth apical area a fuscous spot. Wings hyaline, veins dark brown. Abdomen above black, with large shallow punctures. Tibiæ reddish-yellow, edges of hind pair with a close row of black setiferous granules.

♂. Hind margin of pygofer with a strong triangular tooth. Valve wanting. Plates connate, elongate-triangular, with a deep longitudinal impression near the base, and a strong lateral constriction just below their rounded apex. Two last ventral segments with a fine longitudinal keel.

♀. Hind margin of last ventral segment with a wide triangular notch, which reaches quite to its base. Length, 7–8 mm.

Occurs sparingly in woods and hedgerows as far north as the Solway District (Robinson-Douglas) ; the male is very scarce. The species varies somewhat in the form of the hind process of the pronotum, and on the Continent seven varieties have been named by Kirschbaum and Fieber.

ii. *Gargara*, *Am. et Serv.* (Pl. 1, fig. 12.)

Sides of pronotum angulated, but without a distinct horn ; hind process straight, concealing the scutellum.

1. *G. genistæ*, *Fab.*—Head and thorax deep black, shiny, very closely and coarsely punctured. Elytra yellow-brown, veins darker. Thighs and basal half of tibiæ black, apical half of the latter and the tarsi piceous. Head, thorax, and veins of elytra with fine yellowish pubescence. Length, 3 mm.

Notwithstanding its specific name, the majority of the specimens of this scarce species taken in Britain have been found on *Broom*, on which plant it has occurred rather freely to Mr. Saunders and myself at Woking, Surrey. Purfleet, Essex, August, on *Genista tinctoria* (Marshall); Chobham, Kent, on *Genista anglica* (E. A. Butler); West Norfolk, on *Broom* (Norgate). It is noted as occurring in Austria on *Ononis* and *Medicago* as well as *Genista*.

III. TETTIGOMETRIDÆ.

One single representative of this family is, in general appearance, very similar to *Philænus exclamationis*, but it has no real affinity with that species, and may be at once distinguished by its conspicuous tegulæ. At first sight the whole of the face appears to lie in the same plane, with the ocelli close to the lower angle of the eye; the keel, however, which should separate the cheeks from the frons may be distinctly traced, and the ocelli really occupy nearly the same relative position as in the Delphacidæ, &c.; the clypeus is well defined and the loræ are particularly convex. The structure of the antennæ is very remarkable, as the third joint which bears the seta does not occupy a terminal position with regard to the second joint as is usually the case, but lies in an excavation on the upper side of its distal end. The legs are short and stout, the tibiæ triquetrous but without teeth or spines.

Tettigometra, Latr. (Pl. 1, fig. 13.)

There is only one genus in the family; this may be identified by the characters given above. No less than thirty-four species and numerous varieties are described from the Palearctic region, but not more than one of these is likely to be added to our list.

1. **T. impressopunctata**, Sign.—Brown or greenish-brown, closely and deeply punctured, abdomen black. Crown obsoletely tricarinate, side keels parallel. Frons flat above, slightly swollen towards the clypeus; colour above reddish, between the eyes a large ill-defined black spot, from the antennæ to the clypeus white, the latter and the loræ pitch-brown, rostrum black at the apex. Pronotum and scutellum uneven, the hind angles of the former obliquely truncate to make room for the tegulæ. Elytra horny, equally punctured, generally with a short black streak on the suture beyond the apex of the clavus. Wings ample, hyaline, veins fuscous. Legs concolorous, tibiæ with two rows of bristles, claws fuscous. Length, 4 mm.

Very local. The species was first recorded as British by the Rev. T. A. Marshall, who took it in 1865 on the sandhills at Freshwater Bay, Pembrokeshire, on the ground in a sheltered hollow thinly covered with *Thyme* and short grass. Glanvilles Wootton (Dale); Folkestone Warren, one from a tuft of *Teucrium*, August 1876 (Douglas); Shiere, near Guildford, beaten from *Juniper* in September, and hybernating on yew trees in February (Capron).

IV. ISSIDÆ.

I have followed Messrs. Douglas and Scott in placing our sole representative of the genus *Issus* in a separate family, believing that this is the better course in dealing with our limited fauna. Fieber, in his "Katalog der Europäischen Cicadinen," 1872, indicated the family Issidæ, placing in it the

genera *Ommatidiotus*, *Mycterodus*, *Conosimus*, *Issus*, and *Hysteropterum*; but the family is not recognised by Dr. Puton, who places its components in a much more comprehensive group which he names *Fulgorini*. Eighteen species of *Issus* are included in the Palearctic fauna; of these we possess one (*I. coleoptratus*, Fab.), which occurs throughout Europe, and none of the others are at all likely to be found here. Our insect may be easily recognised by the bulging out of its elytra near the shoulders.

***Issus*, Fab. (Pl. 1, fig. 14.)**

Body short, ovate. Head with the eyes distinctly narrower than the pronotum. Ocelli wanting. Pronotum as long as the crown, hind margin subtruncate. Sides of elytra strongly subangularly dilated before the middle, tegulae large and conspicuous. Outer side of hind tibiae with two spines on the lower half.

1. ***I. coleoptratus*, Geoffr.**—Very variable in colour and markings. Uniform leaden-grey reticulated with black, with or without an ill-defined black patch near the suture of each elytron, or more or less dark brown, with a wide pale band across the widest part. Front pairs of tibiae in all the forms pale, with the apex and a more or less distinct median ring dark brown; hind tibiae narrowly dark at the extreme apex only. Length, 6–7 mm.

This species is said to occur commonly on grassy banks and on trees and shrubs in woods. Norfolk (where I have always found it on ivy growing in hedges, and more frequently in the nymph than in the perfect state); London district; Epping Forest (Marshall); Southgate (Walker); Hastings district (E. A. Butler); Wotton-under-Edge (Perkins); Llanferis, Denbighshire, Dove Dale, Derbyshire (B. Booke); Chobham (Saunders).

V. CIXIIDÆ.

Body wide, depressed. Head with the eyes distinctly

narrower than the pronotum. Ocelli three, two on the sides of the head, and a third, which is nearly obsolete, near the apex of the middle facial keel. Pronotum very short, strongly subangularly notched behind. Elytra ample, hyaline, widely rounded at the apex, subhorizontal, veins strongly raised. First joint of hind tarsi elongate.

The female of *Cixius* bears at the apex of the abdomen a large tuft of fine snow-white matted filaments which are said to be of a crystalline waxy nature; these tufts are very easily removed, and are therefore fully present in only a small proportion of the specimens captured; it seems probable that they are connected with the function of oviposition.

The two British genera may be thus distinguished:

- | | |
|------------------------------------|---------------------|
| Scutellum with five keels | i. <i>Oliarus</i> . |
| Scutellum with three keels | ii. <i>Cixius</i> . |

i. *Oliarus*, *Stal.* (Pl. 1, fig. 15.)

Hind margin of crown angularly notched. Veins of the elytra without the large black granules so conspicuous in the following genus. Of the twenty-one species of this genus included in Palearctic fauna, we have but two; these may be easily distinguished as follows:

- | | |
|--------------------------------|-----------------------|
| Crown longer than wide | 1. <i>leporinus</i> . |
| Crown transverse | 2. <i>Panzeri</i> . |

1. *O. leporinus*, *Lin.*—Crown about one and a half times as long as broad, its breadth somewhat less than the length of the hind margin of the eye; black, with pale keels. Eyes red. Pronotum black, with white keels and hind margin. Scutellum black. Elytra lacteo-hyaline, stigma well marked, veins fine, pale fuscous; angular veins and those beyond much darker, almost black. Legs pale, front pairs of tarsi and the claw-joint of the hind pair, black. Length, 5–6 mm.

“Coarse grass by the side of the Avon, Clifton.”—(Curtis); Lulworth, Isle of Purbeck, Ryde (Dale).

2. *O. Panzeri*, *Löw.*—Crown broader than long, its length

about one and a half times and its breadth about twice the length of the hind margin of the eye ; black, with pale keels. Eyes, black. Elytra lacteo-hyaline, stigma well marked ; veins fine, fuscous, becoming darker towards the apex. Length, $4\frac{1}{2}$ –5mm.

Deal, Herne Bay, on *Tamarix*, Bromley, Kent, by beating willows (Saunders.)

ii. *Cixius*, Latr. (Pl. 1, fig. 16.)

Hind margin of the crown roundly notched. Veins of the elytra more or less closely set with large black setigerous granules. We have eight species of this genus, some of them bearing great superficial resemblance to one another.

TABLE OF SPECIES.

1. (2) Costal granules not, or scarcely, larger than those of the other veins. 1. *pilosus*.
2. (1) Costal granules distinctly larger than those of the other veins.
3. (12) Vein granules round or roundish.
4. (11) Costal granules more than 10.
5. (6) Elytra with a broad transverse fuscous band proceeding from the stigma to the inner margin, an ill-defined fuscous spot in the apex of the wings. 2. *cunicularius*.
6. (5) Elytra without a transverse band proceeding from the stigma.
7. (8) Anal tube with two long curved sharp teeth at the apex. 3. *nervosus*.
8. (7) Anal tube without teeth.
9. (10) Styles (viewed from the side) hatchet-shaped. 4. *stigmaticus*.
10. (9) Apical lobes of the styles (viewed from the side) wide, triangular, with rounded angles. 5. *brachycranus*.
11. (4) Costal granules 8–10. 6. *similis*.

12. (3) Vein granules distinctly oblong.
 13. (14) 12-14 costal granules. 7. *Scotti*.
 14. (13) 9 or 10 costal granules. 8. *remotus*.

1. **C. pilosus**, *Ol.*—This species occurs in three well-marked forms; the first, and commonest, has the elytra pale grey with feeble traces of various fuscous markings; the second has the elytra entirely dark brown, except a pale spot at the stigma; and the third (*albicincta*, Germ.) has pale elytra with a dark brown stripe occupying the sutural half. The three short black lines on the costa, however, will always serve to separate this species from its congeners, and it is, moreover, the only species we possess in which the margin of the membrane is granulate between the veins. Crown and face black with brownish-yellow keels. Pronotum brownish-yellow suffused with black behind the eyes. Scutellum black. Stigma inconspicuous. Legs brownish-yellow, thighs darker. Length, 4-4½ mm.

Common and generally distributed.

2. **C. cunicularius**, *Lin.*—Head and pronotum brownish-yellow; crown between the keels, and the scutellum, black. Face more or less suffused with black in its upper half. Elytra hyaline, a narrow band before the middle (more or less interrupted and sometimes entirely obliterated), a broad curved band before the apex, a roundish spot on the costa beyond this, and some of the angular veins, fuscous; or entirely brown, except a pale space before the base of the stigma (var. *Dionysii*). Length, 4-7 mm.

Widely distributed but not very common. Norfolk; Cotswold district; Perth; Newcastle-on-Tyne; Guestling, Loughton (E. A. Butler); Glanvilles Wootton (Dale); London district.

3. **C. nervosus**, *Lin.*—Head and face as in *cunicularius*, pronotum brownish-yellow more or less suffused with black behind the eyes. Scutellum black, keels sometimes brownish-

yellow. Elytra hyaline, with faint traces of two fuscous bands, one (broad) at the base, and the other (narrow) before the middle; angular veins and stigma black; some of the costal granules generally united. Legs brownish-yellow, sometimes suffused with darker. Length, 6-7 mm.

Common and generally distributed.

4. **C. stigmaticus**, *Germ.*.—Crown scarcely twice as broad as long. Face between the keels black. Pronotum pale, scutellum black. Elytra grey with various ill-defined pale brown spots, some of which, towards the apex, are more or less confluent, and others serve to indicate an antemedian band; vein-granules small, closely and irregularly placed, in great part obliquely in pairs; stigma brown, inconspicuous. Wings fusco-hyaline. Thighs piceous, their extreme apex, the tibiae and tarsi brownish-yellow; apical joint of the latter black. Styles (when viewed from the side) hatchet-shaped, that is, having the apical expansion all on the upper side of the stalk. Length, $4\frac{1}{2}$ -5 mm.

Deal, on *Hippophäe rhamnoides* (Douglas); Inverness-shire (Buchanan-White).

5. **C. brachycranus**, *Fieb.*.—Crown twice as broad as long. Elytra hyaline, with the base, the angular veins, and a straight band somewhat before the middle, fuscous; granules black, stigma piceous. Face and legs entirely brownish-yellow. Length, 5-6 mm.

Not uncommon in woods. Norfolk; Cotswold district; Gosforth, near Newcastle-on-Tyne (Bold); Penzance (Saunders); Hirst Wood, Tunbridge Wells (Douglas).

Very likely to be passed over as a small *nervosus*, but wants the long curved teeth to the anal tube of the male.

6. **C. similis**, *Kbm.* (*nec. Scott.*).—Head black, with brownish-yellow keels. Pronotum brownish-yellow, beyond the side keels, black. Scutellum black. Elytra pale brown, sometimes mottled with darker. Veins whitish, their granules roundish, moderately close; costal granules large, distant,

roundish, 8-10 in number, not occupying the whole width of the nerve, but placed at irregular intervals, rather on its inner edge. Legs brownish-yellow, thighs black, except at the extreme base and apex. Styles brownish-yellow, hatchet-shaped, their hind margin straight. Anal tube black, its apical ring oblique, without teeth, aperture roundish. Length, $4\frac{1}{2}$ -5 mm.

Apparently confined to heath districts. Drayton and St. Faiths, near Norwich; Hastings district (Butler); Woking (Saunders).

Not likely to be confounded with anything but the entirely brown form of *C. pilosus*, from which it is easily distinguished by the larger size and smaller number of its costal granules.

7. *C. Scotti*, *Edw.* (**simplex**, *Scott*).—Head black with brownish-yellow keels. Pronotum brownish-yellow, beyond the side keels, black. Scutellum black, the middle keel generally brownish-yellow. Elytra lacteo-hyaline, veins white, stigma black, apical areas frequently with fuscous blotches; the inner margin generally with two black streaks, one adjoining the apex of the axillary vein, and the other a little nearer the base; opposite to the latter streak there is frequently a trace of a fuscous transverse band; vein granules oblong, narrowed at each end; costal granules, 12-14, occupying the whole width of the vein. Anal tube and styles similar to those of *C. remotus*, but the aperture of the former is transversely oval. Length, 5 mm.

Bonchurch, Isle of Wight, &c. (Dale); Penzance (Saunders).

8. *C. remotus*, *Edw.* (**similis**, *Scott*).—Head black with brownish-yellow keels. Pronotum brownish yellow, beyond the side keels, black. Scutellum black. Elytra lacteo-hyaline, veins white, stigma blackish; vein granules oblong, distant, those of the costa nine or ten, occupying the whole width of the vein. Styles brownish-yellow, their inner angle bluntly prominent, and their hind margin rounded. Anal

tube black, the lower half of the apical ring brownish-yellow, and produced into two large, blunt, triangular, spreading, dusky, recurved teeth; aperture roundish. Legs brownish-yellow, more or less striped with fuscous. Length, $4\frac{1}{2}$ –5 mm.

Bonchurch (Dale); Deal, on *Hippophæ rhamnoides* (Douglas).

VI. DELPHACIDÆ.

This rather numerous family is exceptionally well represented in Britain; we have between sixty and seventy species, and there are doubtless many more to be discovered when these somewhat difficult insects shall have received from collectors the attention which they merit. They are for the most part small and very active insects, with plump, generally sub-cylindrical bodies, and frequently have the elytra not much more than half as long as the abdomen; they have one or two keels on the disc of the frons, a single one being generally more or less forked above, but when there are two they are always simple and often indistinct. There are two ocelli placed on the cheeks, and the antennæ, of which the second joint is always cylindrical and bears several tubercles, are inserted near the lower margin of the eye, which is hollowed out for their reception. One of the most remarkable features of these insects is the large movable serrulate spur which is found at the base of the hind tarsi; this organ probably compensates in some measure for the want of fully-developed wings in the brachypterous forms, which individually vastly outnumber the macropterous ones. The tegulæ are small, but generally observable. *Delphax pulchella* and two species of *Liburnia*, the latter remarkable for the bright green colour of the brachypterous females, are found on reeds, and the remainder occur on grasses, rushes, and other low herbaceous plants, for the most part in damp places, and many are more easily obtained by searching than by sweeping. The nymphs of many, probably all, of the species of *Liburnia* have two sharp keels on the disc of the frons, and in the channels

between these and the sides of the frons some six or seven tubercles; this is the structure proper to the adult insect in the genus *Achorotile*, Fieb., and its occurrence in the nymph of *Liburnia* doubtless led the late Mr. Scott to describe *Achorotile albosignata*, Dahl. as British on the strength of some nymphs sent to him by Mr. Dale. It is, however, quite possible that *A. albosignata* will be found in Britain some day, as it is found, according to Dr. J. Sahlberg, in Sweden and Lapland on *Festuca ovina*, &c., in company with *Thamnotettix torneella*, which latter insect is very widely distributed with us.

TABLE OF GENERA.

1. (4) Basal joint of antennæ much longer than second.
2. (3) Frons with two middle keels. i. *Asiraca*.
3. (2) Frons with one middle keel. ii. *Delphax*.
4. (1) Basal joint of antennæ much shorter than second.
5. (8) Frons with one middle keel.
6. (7) Frontal keel entire or only forked on the forehead. iii. *Liburnia*.
7. (6) Frontal keel forked much before the forehead. iv. *Dicranotropis*.
8. (5) Frons with two middle keels. v. *Stiroma*.

i. *Asiraca*, Latr. (Pl. 1, fig. 17.)

First joint of antennæ triangular-prismatic, of equal width throughout, about thrice as long as second. Front thighs and tibiæ much flattened. Scutellum with four keels. Hind tibiæ with three spines on their outer side. Spur at the base of hind tarsi subulate.

There is only a single species in this genus; it occurs at roots of grass and other low plants in dry places.

A. clavicornis, Fab.—Crown pale, about one-half longer than broad, pronotum somewhat darker, scutellum black,

the two latter with pale scale-like hairs. Elytra grey, with traces of a white band at base; veins brown, strongly raised, sparingly set with large setiferous granules, some fuscous markings on the costa towards the apex and on the membrane. Front pairs of legs black, with some band-like spots and the apex of the tibiae broadly white; hind tibiae brown, paler towards the apex. Abdomen above black. Length, 4 mm.

Widely distributed but not common. The Rev. T. A. Marshall, writing in 1865, says: "Not uncommon in grassy places, clover fields, &c., in spring and summer." Henstead, Suffolk (Curtis); Sandown, Isle of Wight (Marshall); Dartford (Rye, Douglas, and Scott); Norwich district; Swanage, Teignmouth, Croxton, Norfolk (Dale).

ii. *Delphax*, *Fab.* (Pl. 1, fig. 18.)

First joint of antennae triangular-prismatic, gradually narrowed to the base; second about two-thirds as long as the first. Fore legs simple. Scutellum with three keels. Hind tibiae with two spines on their outer side. Spur at the base of hind tarsi flat, triangular.

Of this genus, which is the *Aræopus* of Puton's Catalogue, there are three Palearctic species, of which only one has at present been found in Britain, although a second (*crassicornis* *Fab.*) is found in Sweden and Finland; it occurs on the common reed in August, and may be distinguished from our species by the broad dark-brown stripe on the disc of the corium.

D. pulchella, *Curt.*—Crown nearly square. Pronotum and scutellum pale, narrowly brown at the sides. Elytra pale yellowish, with a narrow stripe just above the claval suture, a broad curved stripe occupying about the lower half of the membrane, and a line along the vein dividing the second and third apical areas, dark brown. Legs pale, tarsi of the front pairs and claw-joint of the hind pair dark brown.

Abdomen above black, its base, the sides narrowly, and a narrow dorsal line brownish-yellow.

♀. Brachypterous; elytra half as long as the abdomen, yellowish without dark markings. Length, $5\frac{1}{2}$ –6 mm.

On *Arundo phragmites*; common in the Norfolk Fens, but not generally common; it is the largest of our indigenous Delphacidæ, and the macropterous female seems to be undescribed. I have never seen a brachypterous male. Isle of Wight (Curtis); Sandwich, September (Marshall); Lee, August, September (Scott); Bexhill, at the base of the cliffs on the coast (Butler).

iii. *Liburnia*, Stal. (Pl. 1, fig. 19.)

I have followed Messrs. Douglas and Scott in adopting this generic name for the group of small species which agree in having on the frons only one more or less distinct middle keel which is never forked for half its length although it is sometimes divided on the forehead. The genus, as here limited, thus includes the following of Fieber's genera, namely, *Megamelus*, *Stenocranus*, *Kelisia*, *Delphacinus*, *Chloriona*, *Euides*, *Euryusa* and *Conomelus*, and the application of these names to our species is indicated in the Table of Species. Good structural characters for the separation of the species are found in the male genital armature, the form of the styles being especially valuable in this respect, but it is almost impossible for the student, at the outset, to understand their correct form without dissecting them out; and this course is always the more reliable, although the binocular microscope with a low-angled one inch objective gives a splendid view of the parts *in situ* if the specimens are fresh or have been thoroughly cleaned; the dissection, however, is a very simple matter if the parts are first softened by boiling for a few minutes in *liquor potassæ*. It is in some cases impossible to identify with certainty female specimens which are unaccompanied by their males. The species usually occur in con-

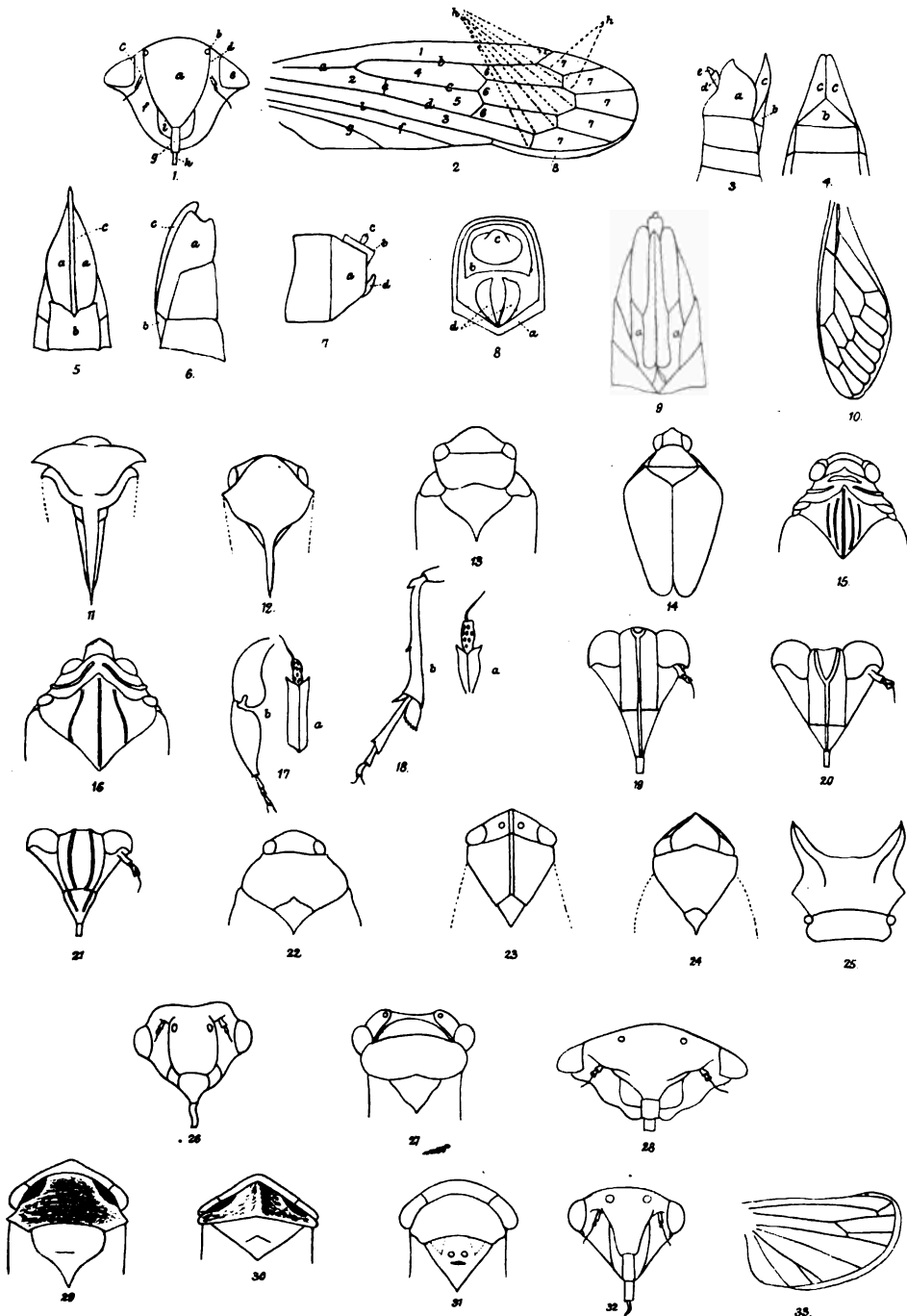
siderable numbers when found, but some are very local and uncertain in their appearance. It should be borne in mind that the sexes of these insects are in many cases very dissimilar, and that there is much difference in appearance between the brachypterous and macropterous forms of the same species. Dr. Puton's Catalogue gives 81 species of *Liburnia* proper for the Palearctic fauna, but some of these, as *æmulator*, Scott, *extrusa*, Scott, and *V-flava*, Scott, are synonyms of older species, and *stigmatalis*, Lew, is not a Delphacid but is the same as *Idiocerus adustus*.

TABLE OF SPECIES.

1. (26) Side keels of pronotum straight, reaching the hind margin.
2. (7) Basal joint of antennæ half or more than half as long as second. Basal joint of hind tarsi longer than the other two together. (*MEGAMELUS*.)
3. (4) Pygofer, viewed from above, with an ovate accessory lobe on each side. 1. *notula*.
4. (3) Pygofer simple, without any accessory lateral lobes.
5. (6) Styles long, thickened and incurved at the apex, their base with a long, straight, erect horn which is about half as long as the style. 2. *quadrimaculata*.
6. (5) Styles short and wide, simply pincer-shaped. 3. *Thoulessi*.
7. (2) Basal joint of antennæ one-third as long as second.
8. (13) Frons more than three times as long as its width in the middle. (*STENOCRANUS*.)
9. (12) Front pairs of tibiæ simple, not widened towards the apex.
10. (11) Face between the keels pale. 4. *lineola*.
11. (10) Face between the keels black or blackish. 5. *fuscovittata*.

PLATE I.

- FIG. 1. Face of a Jassid; *a* frons, *b* ocellus, *c* antenna, *d* temple, *e* eye, *f* cheek, *g* clypeus, *h* rostrum, *i* lora.
- „ 2. Elytron of a Jassid. Veins: *a* cubital, *b* its upper branch, *c* its lower branch, *d* brachial, *e* transverse, *f* anal, *g* axillary, *h* angular, *i* claval suture. Areas: 1 costal, 2 basal, 3 brachial, 4 subcostal, 5 suprabrachial, 6 subapical, 7 apical, 8 appendix.
- „ 3. Terminal segments of a ♂ Jassid viewed from the side; *a* pygofer, *b* valve, *c* plate, *d* anal tube, *e* anal style.
- „ 4. The same (ventral aspect side), *b* valve, *cc* plates.
- „ 5. Terminal segments of a ♀ Jassid (under side), *a* a pygofer, *b* last ventral segment, *c* saw-case.
- „ 6. The same, viewed from the side.
- „ 7. Side view of the terminal segments of a ♂ Delphacid (*Liburnia Signoreti*), *a* pygofer, *b* anal tube, *c* anal style, *d* style.
- „ 8. Pygofer of a ♂ Delphacid (*Liburnia venosa*), seen from behind; *a* pygofer, *b* anal tube, *c* anal style, *d* styles.
- „ 9. Terminal segments of a ♀ Delphacid (under side): *a* basal plates.
- „ 10. *Cicadetta*, elytron.
- „ 11. *Centrotus*, pronotum and scutellum.
- „ 12. *Gargara*, crown, pronotum, and scutellum.
- „ 13. *Tettigometra*, crown, pronotum, and scutellum.
- „ 14. *Issus*, outline of upper side.
- „ 15. *Oliarus*, crown, pronotum, and scutellum
- „ 16. *Cixius*, „ „ „
- „ 17. *Asiraca*, *a* antenna, *b* fore leg.
- „ 18. *Delphax*, *a* antenna, *b* hind leg
- „ 19. *Liburnia*, face.
- „ 20. *Dicranotropis*, face.
- „ 21. *Stiroma*, face.
- „ 22. *Trieiphora*, crown, pronotum, and scutellum.
- „ 23. *Aphrophora*, „ „ „
- „ 24. *Philenus* „ „ „
- „ 25. *Ledra*, head and pronotum (front view)
- „ 26. *Ulopa*, face.
- „ 27. *Megophthalmus*, crown, pronotum, and scutellum.
- „ 28. *Macropsis*, face.
- „ 29. *Bythoscopus*, crown, pronotum, and scutellum.
- „ 30. *Pediopsis*, „ „ „
- „ 31. *Idiocerus*, „ „ „
- „ 32. *Agallia*, face.
- „ 33. *Evacanthus*, wing.



J. Edwards del, R. Morgan lith.

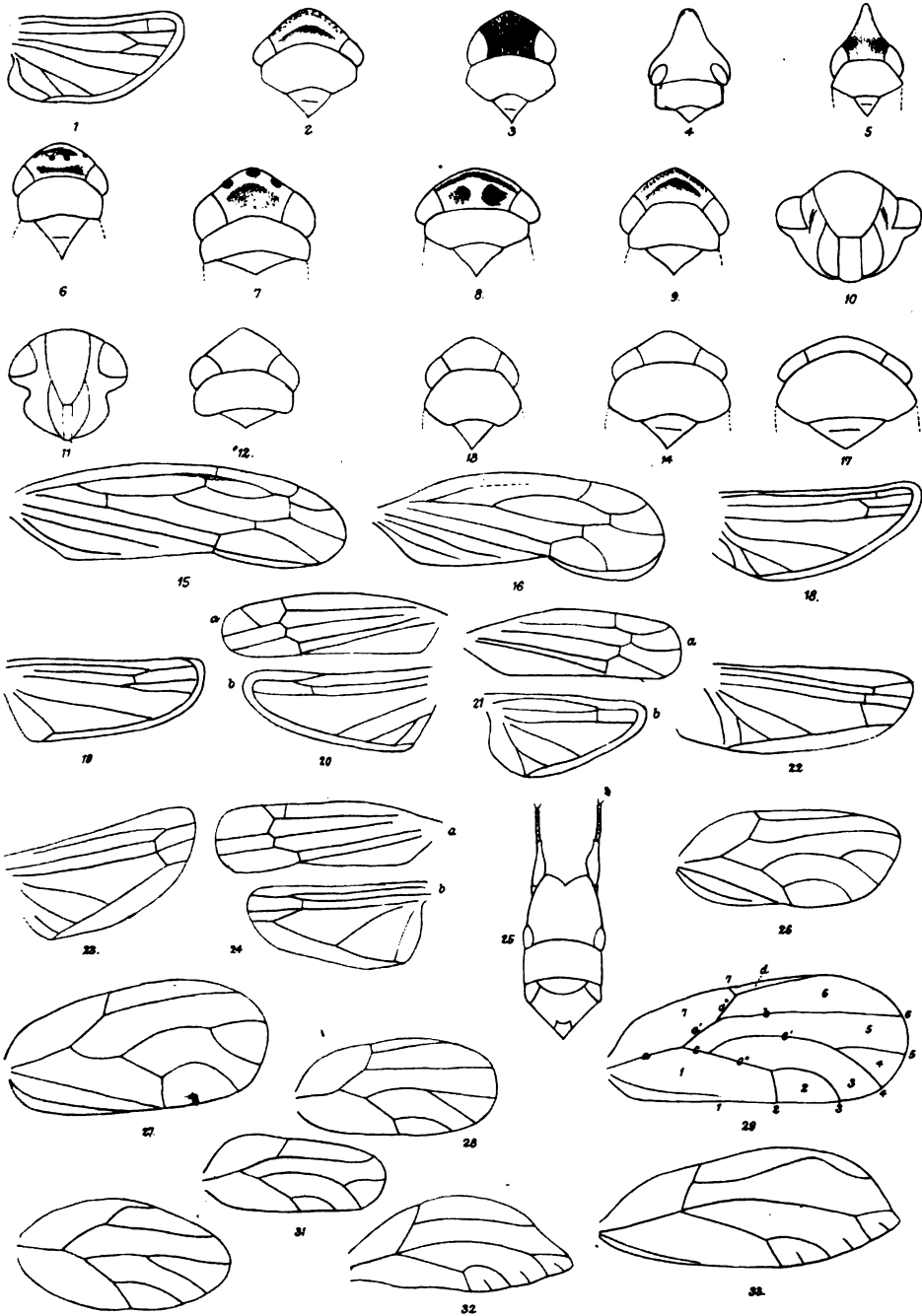
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PLATE II.

- FIG. 1. *Tettigonia*, wing.
- „ 2. *Strongylocephalus*, crown, pronotum, and scutellum.
- „ 3. *Acocephalus*, „ „ „
- „ 4. *Eupelix*, „ „ „
- „ 5. *Platymetopius*, „ „ „
- „ 6. *Graphocrærus*, „ „ „
- „ 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*, „

PLATE 2



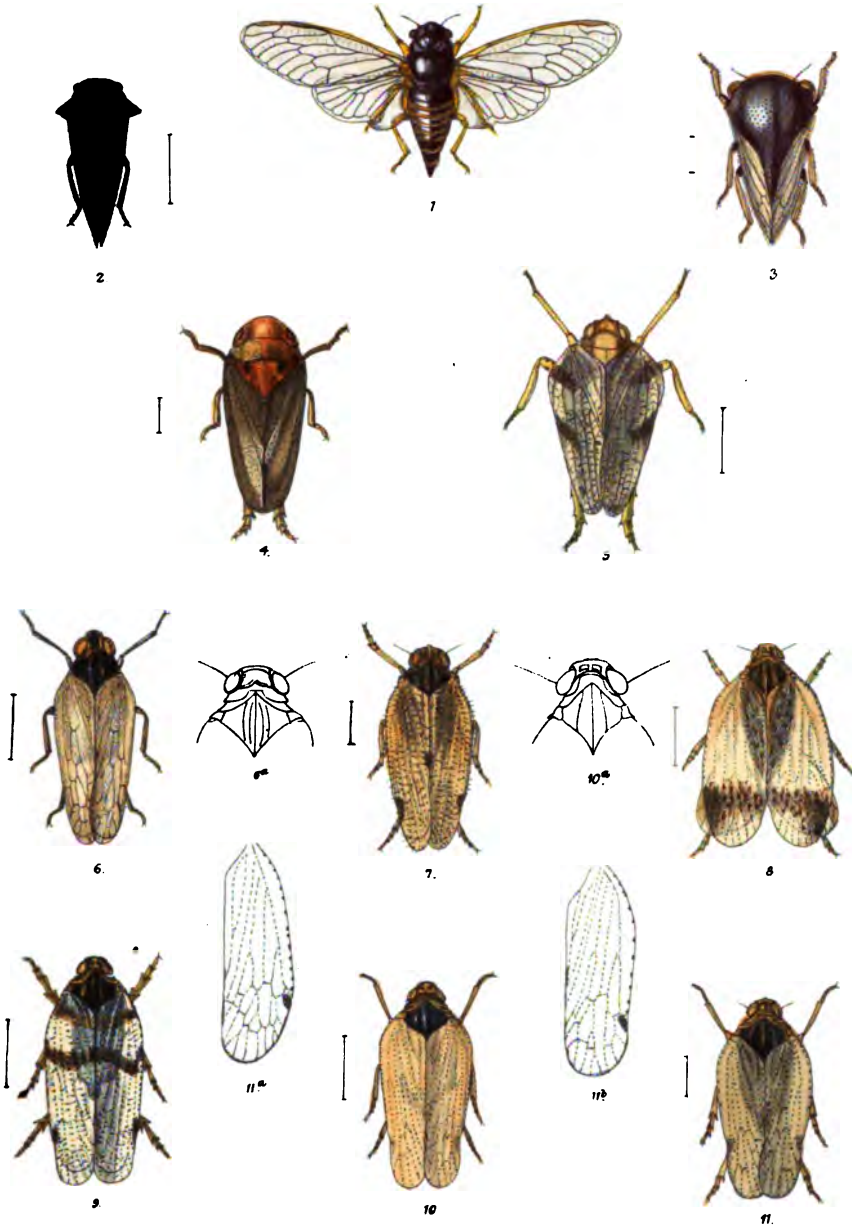
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PLATE III.

- FIG. 1. *Cicadetta montana*, Scop.
2. *Centrotus cornutus*, Lin.
3. *Gargara genistæ*, Fab.
4. *Tettigometra impressopunctata*, Sign.
5. *Issus coleoptratus*, Geoff.
6. *Oliarus leporinus*, Lin.
6a. „ *Panzeri*, Löw (dorsal aspect of fore parts).
7. *Cixius pilosus*, Ol.
8. „ *cunicularius*, Lin.
9. „ *nervosus*, Lin.
10. „ *stigmaticus*, Germ.
10a. „ *brachycranus*, Fieb (dorsal aspect of fore parts).
11. „ *similis*, Kbm.
11a. „ *Scotti*, Edw. (elytron).
11b. „ *remotus*, Edw. „



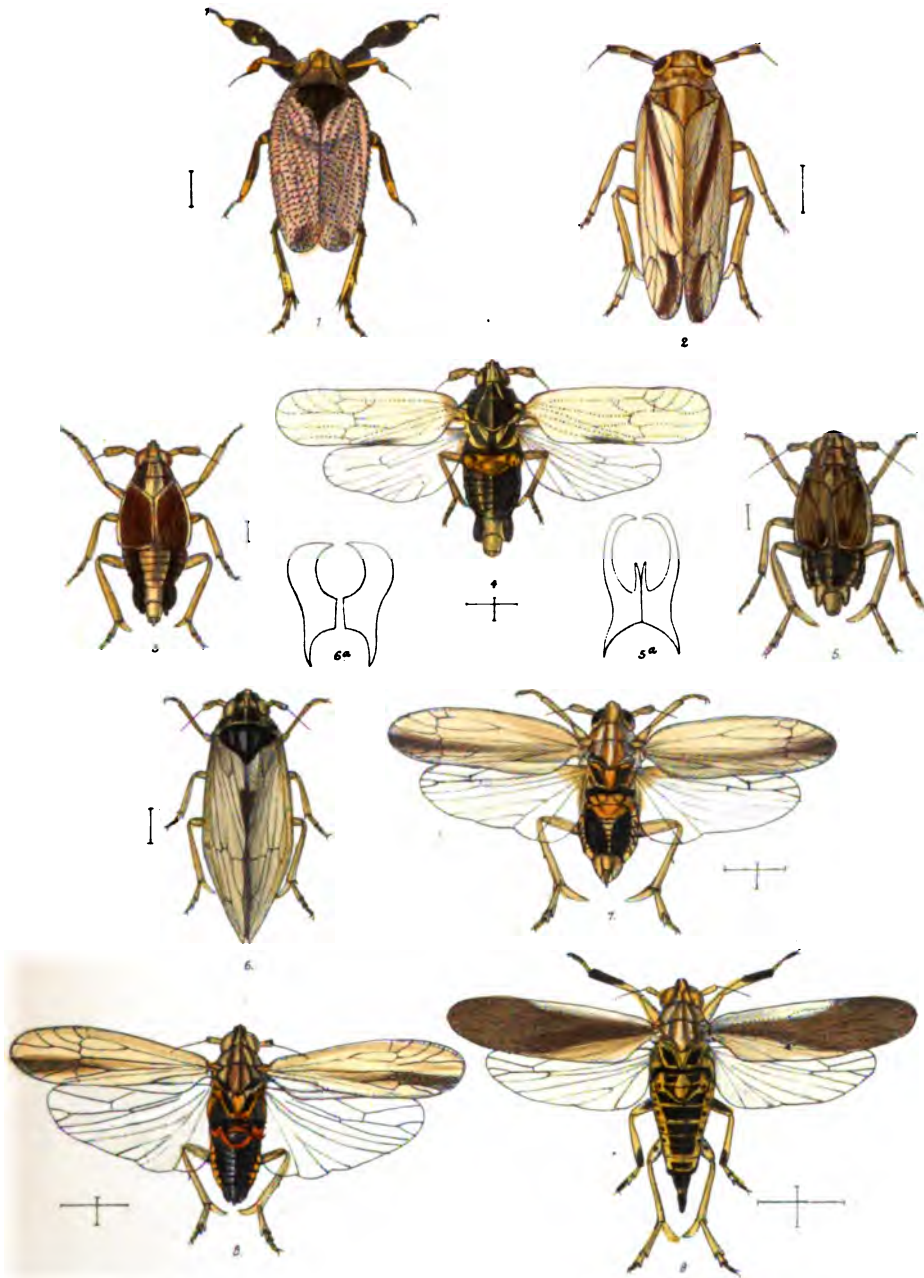
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PLATE IV.

- FIG. 1. *Asiraca clavicornis*, Fab.
2. *Delphax pulchella*, Curt.
3. *Liburnia notula*, Germ.
4. „ „ „ (macropterous form).
5. „ *quadrимaculata*, Sign.
5a. „ „ „ (male genital styles).
6. „ „ „ (macropterous form).
6a. „ *Thoulessi*, Edw. (male genital styles).
7. „ *lineola*, Germ.
8. „ *fuscovittata*, Stål.
9. „ *longipennis*, Curt.



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12. (9) Front pairs of tibiæ gradually widened to the apex. 6. *longipennis*.
13. (8) Frons one and a half to twice as long as its width in the middle. (*KELISIA*.)
14. (25) Scutellum yellow or partly yellow.
15. (20) Cheeks with a large round black spot.
16. (19) Elytra with a black or fuscous marking at the apex.
17. (18) Length, $3\frac{1}{2}$ –4 mm. 7. *vittipennis*.
18. (17) Length, $2\frac{1}{3}$ – $2\frac{1}{2}$ mm. 8. *guttula*.
19. (16) Elytra entirely pale yellow. 9. *perspicillata*.
20. (15) Cheeks with a small punctiform black spot, or unspotted.
21. (24) Crown distinctly narrowed in front; elytra yellow, with a fine black or brown line or lines.
22. (23) Length $2\frac{1}{4}$ –3 mm. Middle vein of elytra brown at the apex, the dark colour rarely reaching beyond the middle. 10. *pallidula*.
23. (22) Length $3\frac{1}{4}$ –4 mm. Middle vein of elytra black to the base, brachial vein, and frequently those of the clavus, black. 11. *punctulum*.
24. (21) Crown parallel-sided; markings of elytra not in the form of fine black lines. 12. *Scotti*.
25. (14) Scutellum black or pitch-black. Species small, shining black or pitch-black. 42. *venosa*.
26. (1) Side-keels of pronotum curving outwards, not reaching hind margin.
27. (52) Crown longer than wide.
28. (31) Species green or greyish green. (*CHLORIONA*.)
29. (30) Frons widest in the middle. Pygofer, seen from behind, almost circular. 13. *smaragdula*.
30. (29) Frons widest in the lower third. Pygofer, seen from behind, transversely oval. 14. *unicolor*.
31. (28) Species not green or greyish green.
32. (41) Facial keels white.

33. (36) A narrow white stripe down the crown, pronotum, and scutellum. Facial keels margined with black in both sexes.
34. (35) The dark margin of the facial keels continued on the crown. Styles yellowish, diverging, their apex hooked outwards. 15. *collina*.
35. (34) The dark margin of the facial keels not extending to those of the crown. Styles subulate, their ciliate inner margin with a strong sharp tooth near the base. 16. *sordidula*.
36. (33) No pale stripe down the crown, pronotum, and scutellum. Face black between the keels, or keels margined with black.
37. (38) Hind margin of pygofer with a wide arcuate notch. 17. *elegantula*.
38. (37) Hind margin of pygofer not notched.
39. (40) Styles diverging, their apex pointed. 18. *distincta*.
40. (39) Styles incurved, their inner apical angle produced into a sharp tooth; outer apical angle produced and bluntly rounded. 19. *Boldi*.
41. (32) Facial keels not white.
42. (45) Crown yellow or clear brownish yellow.
43. (44) Central facial keel obsolete on the forehead. 20. *Signoreti*.
44. (43) Central facial keel distinct on the forehead. 21. *adela*.
45. (42) Crown brown.
46. (47) Scutellum entirely black. 21. *Reyi*.
47. (46) Scutellum various, but never entirely black.
48. (49) Scutellum beyond the side-keels black; face (except the forehead) black (brachypterous male). Veins non-granulate. 23. *melanopachys*.
49. (48) Scutellum generally without dark markings. Veins granulate.
50. (51) Elytra clear brownish yellow; veins strong, with concolorous granules, marginal vein pale. 24. *similis*.

51. (50) Elytra smoky yellow; veins brown with concolorous granules. 25. *capnodes*.
52. (27) Crown not longer than wide.
53. (101) Crown square.
54. (101) Hind tarsi shorter than the tibiæ, basal joint subequal in length to the other two together.
55. (56) Scutellum pale brownish yellow, with a black spot at the base on each side of the middle keel, beyond the side-keels entirely black. 26. *scutellata*.
56. (55) Scutellum not pale with distinct black markings.
57. (60) Elytra pitch-brown, their truncate hind margin with two white spots.
58. (59) Tibiæ brown, with three pale rings. 27. *lepada*.
59. (58) Tibiæ brownish, without pale rings. 28. *Fieberi*.
60. (57) Elytra without white spots on the hind margin.
61. (68) Elytra black, hind margin white or yellow.
62. (65) Scutellum yellow.
63. (64) Hind margin of elytra very narrowly whitish yellow; abdomen yellow. 29. *pullula*.
64. (63) Entire margin of elytra narrowly and base broadly yellowish. 30. *lugubrina*.
65. (62) Scutellum not yellow.
66. (67) Facial keels equally strong, central one distinct on the forehead. 31. *leptosoma*.
67. (66) Central facial keel much more prominent than the side keels, and obsolete on the forehead. 32. *niveimarginata*.
68. (61) Elytra not black with pale hind margin.
69. (92) Abdomen black, or chiefly black, at least in the male.
70. (91) Elytra without a dark streak at the apex of the clavus.
71. (84) Scutellum black.
72. (73) Upper notch of pygofer widely yellow. 33. *Dalei*.
73. (72) Pygofer entirely black.

74. (83) Central facial keel equally strong throughout.
75. (82) Teeth of anal tube long, perpendicularly connate.
76. (81) Apical angles of upper notch of pygofer right angles or nearly so.
77. (78) Pronotum (except a black patch behind each eye) white. Cedeagus a blunt deflexed hook.
34. *pellucida*.
78. (77) Pronotum black or blackish, hind margin very narrowly pale.
79. (80) Elytra brownish-yellow. Cedeagus bifid to the base.
35. *difficilis*.
80. (79) Elytra pitch brown. Cedeagus bifid, but not as far as the middle.
36. *discreta*.
81. (76) Apical angles of upper notch of pygofer very obtuse.
37. *discolor*.
82. (75) Teeth of anal tube very small, tuberculiform.
38. *obscura*.
83. (74) Central facial keel feebler or evanescent on the forehead. Apical angles of upper notch of pygofer acute.
39. *forcipata*.
84. (71) Scutellum yellow or yellowish.
85. (86) Lower margin of pygofer, when viewed from behind, produced into a sharp tooth.
40. *denticauda*.
86. (85) No appearance of a tooth on the lower margin of the pygofer, when viewed from behind.
87. (90) Hind margin of pygofer with a tooth-like projection at its lower extremity.
88. (89) Hind margin of pygofer straight. Abdomen and pygofer entirely black.
41. *exigua*.
89. (88) Hind margin of pygofer angular. Abdomen pitchy black, hind margin of the last segment broadly white. Pygofer shining black.
43. *insignis*.

90. (87) No tooth-like projection from the lower extremity of the hind margin of pygofer. Abdomen with pale longitudinal markings. 44. *Aubei*.
91. (70) Elytra with a dark streak at the apex of the clavus. 45. *striatella*.
92. (69) Abdomen yellow or chiefly yellow, sometimes with a dark lateral stripe.
93. (96) Hind margin of pygofer with a large arcuate notch.
94. (95) Inner margin of styles, when viewed from behind, simple. 46. *Fairmairei*.
95. (94) Inner margin of styles, when viewed from behind, with a feeble obtuse tooth just above the middle, and another similar at the apex. 47. *brevipennis*.
96. (93) Hind margin of pygofer without a notch.
97. (98) Hind margin of pygofer truncate. Styles (viewed from behind) very small and pincer-shaped, occupying little more than one-fourth of the height of the cavity of the pygofer, yellow with the base and tip blackish. Anal tube very large, apparently composed of a pair of pendant lobes, which gradually widen to their truncate apices, where they are generally blackish. 48. *straminea*.
98. (97) Hind margin of pygofer widely rounded.
99. (100) Antennæ entirely pale. 49. *flaveola*.
100. (99) Antennæ with the base of the first joint and apex of the second narrowly black. 50. *paludosa*.
101. (54) Hind tarsi longer than the tibiæ; basal joint one-half longer than the other two together. 51. *speciosa*.
102. (53) Crown not square.
103. (110) Crown transverse.
104. (105) Veins of elytra with large dark granules. 52. *limbata*.

- ♀. Similar to the male, but paler. Length 3-4 mm.

This is the first record of this species (for the name of which I am indebted to M. Lethierry) as a British insect; in appearance it closely resembles *L. notula* from which it may be distinguished in the net by the want of the conspicuous pale stripe on the crown, pronotum, and scutellum. I did not detect it until the year 1890 when it occurred at Ranworth, Flordon, and Booton in Norfolk, at the latter place on *Juncus communis* in company with *L. lepida*.

3. *L. Thoulessi*, *Sp. nov.*—♂. Upper side sordid brownish yellow, the apex of the clavus and the sides of the pronotum and scutellum a little darker. Crown as long as the pronotum, a little longer than wide. Elytra more than half as long as the abdomen, broadly rounded at the apex. Antennæ and legs brownish yellow.

♀. Similar to the male but larger and paler. Length, 2–2½ mm.

I name this species in honour of my friend and colleague, Mr. H. J. Thouless, who took a pair at Ranworth in August, 1886, by searching on the ground beneath growing reeds. The above descriptions may possibly prove to be imperfect as regards coloration, as it is doubtful whether my specimens had acquired their full colouring; but the straight side keels of the pronotum reaching its hind margin and the short simple pincer-shaped styles will always serve to distinguish it.

4. *L. lineola*, *Germ.*—Elongate, pale brownish yellow; crown, pronotum, and scutellum with a fine white stripe. Crown nearly three times as long as its basal width, narrowed in front, its middle keel strongly raised. Pronotum two-thirds as long as the crown. Scutellum somewhat longer than the crown, its middle keel abbreviated. Elytra narrow, one-half longer than the abdomen, yellowish hyaline, finely wrinkled transversely, with a dark brown streak at their narrowly rounded apex, which is sometimes produced inwardly nearly

to the base, and frequently another just below the claval suture; veins pale. Legs pale, thighs with a pair of fine black lines. Abdomen above more or less marked with black. Length, 4-5 mm.

On long grasses, especially in woods. Norwich district; Cotswold district, common; Fairlight, Sussex (Butler); Glanville Wootton, Weymouth, Mount Edgcumbe (Dale).

This species is the same as the *Chloriona farinosa* of Mr. Buckton, who was so good as to lend me an authentic example of his insect of that name.

5. **L. fuscovittata**, *Stal.*—Pale yellowish, with a dark brown or black streak at the apex of the elytra. Greatest length of the crown in advance of the eyes nearly equal to one-half the entire length down the centre. Hind margin of pronotum roundly notched. Elytra nearly twice as long as abdomen, hyaline; veins yellowish, except those of the membrane, which are brown; in the sixth apical area is a brown or black streak, which is sometimes prolonged towards the base. Front pairs of tibiae with a narrow black streak in front, all the tarsi fuscous at the extreme apex. Abdomen black above, side margins yellow. Length, $4\frac{1}{2}$ - $5\frac{1}{2}$ mm.

Not common. Roydon fen, Norfolk; Dallington Forest, Sussex (Butler); Glanville Wootton, Weymouth (Dale).

6. **L. longipennis**, *Curt.*—Male, above dark brown; female, pale yellowish. Greatest length of the crown in advance of the eyes about equal to one-third of the entire length down the centre. Hind margin of pronotum angularly notched. Elytra nearly twice as long as the abdomen, in the male brown, with the clavus and a stripe on the costa yellow; in the female hyaline, with yellowish veins. Front pairs of tibiae in male black, widely pale at the base, all the tarsi black at the apex; in the female all the tibiae are pale, and the tarsi black at the apex. Length, $4\frac{1}{2}$ mm.

Shiere, near Guildford (Capron); Chobham, Wonerah, Surrey (Butler); Glanville Wootton, Freshwater (Dale).

7. **L. vittipennis**, *J. Sahl.*—Crown, pronotum, and scutellum yellowish white, the sides of the two latter widely, a large round spot on the cheeks, and a small round spot on the sides of the prosternum, black. Crown parallel-sided, about one-half longer than its basal width, projecting but very little in advance of the eyes. Pronotum distinctly shorter than crown. Scutellum about twice as long as pronotum. Elytra whitish hyaline, slightly widened towards their rounded apex; on the membrane a black or dark brown streak, continued to the base of the elytron as a wide ill-defined brown stripe, which is sometimes very faint, but always discernible on holding the elytron up to the light. Abdomen above blackish, with a narrow pale dorsal line. Styles oblong, parallel, very distinctly flattened vertically, suddenly acuminate at about the apical third. Insect generally macropterous. Length, 3–4 mm.

In the brachypterous form the elytra are sub lanceolate, but specimens in this state are easily distinguished from *guttula* by their superior size.

Norwich district; Cotswold district; Ewhurst, Dallington Forest, Hurst Green, Sussex (Butler); Glanville Wootton, Tenby (Dale); Woking, Chobham (Saunders).

8. **L. guttula**, *Germ.*—At first sight this species much resembles a very small pale example of the preceding, but upon examination it proves to be abundantly distinct structurally. Crown, pronotum, and scutellum pale yellow; the sides of the two latter, although sometimes slightly darker than the disc, do not appear to develop the dark stripe so conspicuous in *vittipennis*; at least such is not the case in the very numerous examples which I have examined. Elytra not widened towards their sub lanceolate apex, the dark marking on the membrane rarely more than a small subtriangular black spot. Styles curved, subparallel, scarcely perceptibly flattened vertically, gradually acuminate from the base. Length, $2\frac{1}{3}$ – $2\frac{1}{2}$ mm.

This species occurs near the roots of a coarse stiff grass, and is consequently more readily taken by searching than by sweeping; it is locally common in Norfolk, and I have taken it on the Cotswold Hills; it was recorded from Morayshire and Pitlochry by the late George Norman, but it is uncertain whether his specimens belonged to this species or to *vittipennis*, as the two species had not been separated by British collectors at the time he wrote. I have no note of its occurrence in collections sent to me for names, but it is probably overlooked.

9. *L. perspicillata*, Boh.—Pale yellow, a large round spot on the cheeks, and a smaller one on the sides of the prosternum, black. Crown somewhat longer than wide, obtusely rounded in front, impressions obsolete. Frons convex, slightly rounded, dilated at the lower margin of the eyes, middle keel obsolete. Pronotum somewhat shorter than crown. Scutellum one-half longer than pronotum, keels acute. Elytra whitish hyaline, as long as the abdomen, very finely wrinkled transversely, slightly narrowed towards their narrowly rounded apex, outer cubital vein forked behind. Wings very short. Abdomen more or less blackish above. Length, 2 mm.

Colesborne, Gloucestershire, September 1892; by sweeping coarse grass growing near Junipers on a dry hillside. Cheviots, October (Hardy); Pitlochry (Norman).

10. *L. pallidula*, Boh.—Pale sordid yellow, cheeks very rarely with a punctiform black spot. Crown a trifle longer than pronotum, distinctly narrowed in front, projecting for about one-fourth of its length beyond the eyes. Scutellum a little shorter than crown. Elytra lanceolate, about as long as the abdomen, yellowish hyaline, with the middle vein brownish for a short distance from the apex backward. Middle keel of scutellum and inner margin of elytra narrowly white; the saw-case, claws, and the tips of the spines on the hind tarsi, black. Appendages of the anal

tube in the male reaching straight out behind. Length $2\frac{3}{4}$ –3 mm.

Occurs on long grass in damp places on heaths. Norwich district, local. Wimbledon (Scott).

11. *L. punctulum*, *Kirschb.*—At first sight very similar to the preceding species but apparently nearly twice as large. Cheeks nearly always with a punctiform black spot. Elytra one-fourth to one-third or more longer than the abdomen, their middle vein for its whole length, and frequently those of the clavus, black. Appendages of the anal tube in the male distinctly curved upwards.

Macopterous form.—Scutellum twice as long as the pronotum. Elytra one-half longer than abdomen, slightly widened behind, apex obtusely rounded, membrane scarcely half as long as the corium, its middle vein widely fuscous.

Length $3\frac{3}{4}$ –4 mm.

Inhabits reeds near the ground. East Norfolk; Wimbledon (Scott); Fritton, Suffolk (Butler).

This is the insect described by Scott as the developed form of *L. pallidula* (*Ent. Mo. Mag.*, vii. 193).

12. *L. Scotti*, *Fieb.*—Pale brownish yellow, cheeks with a small punctiform black spot. Crown somewhat longer than pronotum, parallel-sided, projecting beyond the eyes for about one-third of its length. Scutellum a little longer than crown. Elytra yellowish hyaline, a trifle longer than the abdomen, parallel-sided, their apex obtusely rounded; in the male with a spot at the apex of the clavus, a spot on the costa at the base of the first apical area, and another at the apex of the middle vein of the membrane, black; in the female with a large irregular patch at the base, another at the apex of the clavus, and an oval patch on the middle vein of the membrane, black. These markings have a strong tendency either to coalesce or to disappear, leaving only a small black spot at the apex of the middle vein of the membrane. Upper

side of the abdomen occasionally with the base of some of the segments narrowly black.

Macropterous form.—Scutellum nearly twice as long as pronotum. Elytra yellowish hyaline, one-third longer than abdomen, apex of the clavus filled up with black. Length, 3–4 mm.

. Occurs on reeds near the ground. East Norfolk, locally common; Leicester (Marshall); Glanville Wootton (Dale); Sallow pit, Lee, and Abbey Wood marshes (Scott).

13. **L. smaragdula**, *Stal.* — ♂. Elongate, pale green. Head strongly keeled, basal keel of crown acute. Scutellum more than twice as long as pronotum. Elytra twice as long as the abdomen, greyish white, opaque, narrowly rounded at the apex, veins with very fine black hairs, second subapical area nearly twice as long as the fifth. Abdomen black, with reddish side margins. Legs with very fine black hairs, claws black.

♀. Scutellum scarcely one-half longer than the pronotum. Elytra greyish white, about one-third as long as abdomen, separately rounded at the apex. Wings wanting. Apex of the saw-case black. Length, $4\frac{1}{2}$ –5 mm.

On reeds, locally common. Norfolk; Yarmouth, Isle of Wight (Dale).

14. **L. unicolor**, *H. S.*—Elongate, greenish or yellowish white; brachypterous female pale green.

♂. Basal keel of crown obtuse. Scutellum twice as long as pronotum. Elytra greyish white, opaque, twice as long as the abdomen, apex narrowly rounded, veins with very fine black hairs, second subapical area somewhat longer than the fifth. Abdomen black, margins of the segments yellowish. Legs as in *smaragdula*. Pygofer sometimes white.

♀. *Macropterous form.*—Scutellum more than twice as long as pronotum. Elytra one-half longer than abdomen, greyish white, sometimes faintly fumose at the apex.

Brachypterous form.—Scutellum scarcely one-half longer than pronotum. Elytra one-third as long as abdomen, greyish white, their apex separately rounded. Length, 4–5 mm.

On reeds. Ranworth, &c., Norfolk; Lulworth, Abbotsbury, (Dale); I. of Wight (Thouless).

15. **L. collina**, Boh.—Pale yellow, with fuscous markings; keels of the head white, with black margins. Crown somewhat longer than wide, basal impressions subtriangular, fulvous, about half as long as the crown. Scutellum one-half longer than pronotum, side keels distinct. Elytra about half as long as abdomen, separately rounded at apex, pale yellow with white margins. Abdomen (male) blackish, with the margins, a dorsal stripe, and a few short lines towards the sides behind, rust-red; female, yellow faintly marked with fuscous, each dorsal segment with a transverse row of dark points interrupted in the middle. Styles hooked outwardly at apex, teeth of anal tube apparently crossing each other. Anal tube and its style entirely pale. Length 2–2½ mm.

Macropterous form.—Scutellum twice as long as pronotum, side keels obsolete, diverging. Elytra more than one-half longer than abdomen, yellowish hyaline; veins smooth, whitish yellow behind. Length, 3–3½ mm.

Found by sweeping grasses. Norfolk; Wotton-under-Edge (Perkins); Glanville Wootton (Dale).

16. **L. sordidula**, Stal.—Pale yellow; facial keels, a stripe along the crown pronotum and scutellum, and the marginal vein of elytra, white. Facial keels narrowly and obsoletely margined with fuscous in the male. Scutellum nearly twice as long as pronotum. Elytra yellowish hyaline, narrowly rounded at the apex, one-third (male) or one-half (female) shorter than abdomen, veins smooth. Abdomen (male) blackish, with the side margins, the dorsal line, and some irregular spots towards the apex, rust-red; female, yellow,

sometimes with a row of dark spots on each side, or otherwise marked with black. Styles subulate, their ciliate inner margin with a strong sharp tooth near the base. Length, 3-3½ mm.

Macropterous form.—Scutellum two and a half times as long as pronotum. Elytra two-thirds (male) or one-half (female) longer than the abdomen, veins darker towards the apex. Length, 4-5 mm.

This is one of the species introduced into our list without remark by Scott in 1870. I have seen no native specimens.

17. *L. elegantula*, Boh.—Elongate, black; keels of the head, pronotum with the exception of a black patch behind each eye, and apex of scutellum, white. Crown distinctly longer than wide, basal impressions yellow, apical impression very narrow, continued on to the forehead. Scutellum one-third longer than pronotum, side keels distinct, diverging. Elytra greyish white, pellucid, about half as long as abdomen, apex truncate, with rounded angles, veins smooth. Abdomen above with a wide brownish yellow central stripe, a narrow whitish dorsal line, and some longitudinal rows of brownish yellow spots on the dark side portions. Legs yellow, femora faintly striped with fuscous. Styles incurved, subequal in width, with a strong triangular tooth at the apex within, and a long process directed backwards at the base. Teeth of anal tube (male) long, acute, diverging, visible from the side.

♀. Pronotum and scutellum pale brownish or greyish yellow; abdomen brownish yellow, darker towards the sides, where there are some rows of pale spots, dorsal line whitish. Length, 2-2½ mm.

Macropterous form.—Scutellum convex, twice as long as pronotum, side keels very feeble. Elytra one-half longer than abdomen, rounded at the apex, veins dirty yellow. Length, 3¾ mm.

Found by sweeping grasses. Norfolk; Wotton-under-

Edge (Perkins); Shiere, near Guildford (Butler); Glanville Wootton, Lulworth (Dale).

18. *L. distincta*, *Flor.*—Head black, with white keels, the two basal impressions of crown yellow. Pronotum and scutellum yellow, sometimes with fuscous markings, margins and keels white. Elytra one-half shorter than abdomen, yellowish, with white margins; hind margin truncate, angles rounded; veins smooth, whitish. Abdomen (male) black, last segment entirely, and pygofer above, broadly pale; in the female black, side margins very narrowly, a fine central line, and the last dorsal segment in the middle, brownish yellow varying to yellow with a row of dark spots down each side, or entirely yellow except the saw-case. Styles elongate-triangular, outer margin straight, inner margin concave in the middle, and cut off obliquely to a sharp point. Length, 2-2½ mm.

Macropterous form.—Scutellum twice as long as pronotum, side keels obsolete, parallel. Elytra more than one-half longer than abdomen, apex rounded. Length, female, 4 mm.

Originally introduced into our list by Scott, without locality in 1870. Three years afterwards he described the male as *L. consanguinea*, from two males taken by Douglas at Bournemouth in September.

19. *L. Boldi*, *Scott.*—Crown yellow, keels white, interstices black. Face yellow, keels white, the middle one on each side and the side ones inwardly margined with black. Pronotum and scutellum yellow, with a greyish shade; keels distinct, somewhat paler than the disc; side keels of the former almost reaching to the hind margin. Elytra yellowish grey, barely covering half the abdomen; hind margin rounded, veins not prominent nor granulate; apex of clavus sometimes with a short narrow dark brown streak. Abdomen (male) above black, with a fine rust-red dorsal line, apex of each segment of the connexium yellow-red; in the female, above

brownish yellow, darker on the sides, side margins orange-yellow, outer margins of the segments black; a fine dorsal line and the hind margins of the segments pale. Styles short and broad, inner margin strongly, outer margin faintly, concave; inner apical angle produced into a pointed tooth; outer apical angle produced and bluntly rounded, thus giving to the style a form very suggestive of a profile view of a bird's head and neck. Length, 2-2½ mm.

Found by sweeping "marram" grass on coast sands in early summer. Yarmouth, Norfolk; Newcastle-on-Tyne (Bold).

20. **L. Signoreti**, *Scott.*—♂. Head, pronotum, scutellum, and elytra dirty brownish yellow, abdomen pitch-black. Sides of metasternum with an oval black spot. Crown nearly square, keels distinct, concolorous. Facial keels concolorous, the central one forked and nearly evanescent on the forehead. Pronotum shorter than crown, keels distinct. Scutellum a little longer than crown. Elytra nearly as long as abdomen, rounded at apex; veins strong, pitch-black, closely and strongly granulate. Legs dirty brownish yellow. Upper notch of pygofer wide, triangular, occupying the entire width of the segment; its margin, viewed from the side, straight, oblique, and forming an obtuse angle with the vertical straight hind margin, which it nearly equals in length. Lower notch bluntly triangular, very large and deep; its margin, when viewed from the side, forming an obtuse angle with the hind margin, the length of which it somewhat exceeds. Styles, when viewed *in situ* under a low magnifying power, scantily pilose, apparently strap-shaped, slightly widened at their subtruncate apex, their lower half parallel with the outline of the lower notch of the pygofer, their upper half upright and slightly curved backward. Anal tube large, exserted; its teeth very short and obtuse.

♀. Pale brownish yellow, claws and apex of the saw-case black. Elytra one-third shorter than abdomen. Length, male, 2¾ mm.; female, 4 mm.

Occurs low down amongst coarse herbage in marshes. Brundall, Norfolk; Abbey Wood, June (Scott.)

21. **L. adela**, *Flor.*—Brownish yellow, abdomen above black, with white hind margins to the segments. Basal impressions of the crown deeper than the apical. Face between the keels sometimes black, its central keel sharp; more feeble, but still distinct, on the forehead. Elytra as long as the abdomen, dirty brown, with a very narrow and indistinct pale margin; veins strong, brown, distinctly granulate. Legs sometimes with indistinct dark stripes. Pygofer (male) black; viewed from behind, oval, widest in the middle. Upper notch deep, triangular, margined with white; viewed from the side, its margin forms a very obtuse angle with the hind margin of the pygofer, which is angularly prominent in the middle. Lower notch deep, narrow, somewhat sinuate. Styles long, strap-shaped, reaching about two-thirds the height of the cavity, oblique at the base, afterwards upright and slightly incurved towards their truncate apex; inner margin sinuate, inner apical angle produced into a blunt tooth. Anal tube whitish, scarcely exerted, its teeth short and blunt. Length, $2\frac{3}{4}$ mm.

Female undescribed.

This species is known to me only from descriptions and a specimen named by Fieber, and sent to me by Scott in 1886. *Flor.*, who described it from two males from Livonia, says that it occurs in meadows in June and July. Scott included it without locality in his table of species in *Entomologist's Monthly Magazine*, vii. p. 26.

22. **L. Reyli**, *Fieb.*—Crown nearly double as long as wide; elytra transparent about two-thirds as long as the abdomen, hind margin narrowly blackish; legs pale, abnormally long, knees (especially the hinder pairs) with a distinct black spot. Male: pronotum white, with a black patch behind each eye, side keels not reaching the hind margin; scutellum black; abdomen black, the base widely and the last segment yellow;

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pygofer yellow above, black beneath. Female: dirty brownish yellow, resembling in contour the same sex of *L. notula*, but somewhat larger; abdomen with pitchy markings. Length $2\frac{1}{2}$ – $3\frac{1}{2}$ mm.

I originally found this fine species in moderate numbers on *Juncus communis* in a coast marsh at Weybourne, Norfolk, in August 1887. I have on several subsequent occasions attempted to procure more specimens from the original locality but without success, although there was no apparent reason why the insect should have disappeared so completely.

23. **L. melanopachys**, *Scott.*—Crown clear brown, the keels acute and prominent. Face (except the forehead) black. Pronotum clear brown, keels acute and prominent, hinder angles broadly black. Scutellum clear brown, keels distinct, sometimes the middle keel and a narrow margin on either side, especially towards the apex; blackish, beyond the side keels black. Elytra about two-thirds as long as abdomen, shining lacquer-yellow, somewhat transparent, hind margin rounded, veins prominent, unpunctured. Breast black. Legs yellow, front pairs of tarsi brown, hind pair yellow. Abdomen above pitchy brown, beneath black. Pygofer (male) black, seen from behind, slightly arched outwardly below the middle, obtusely narrowed towards the base, widely rounded at the top, viewed from the side forming a triangle, of which the longest side is formed by the oblique hind margin, which is continuous with the margin of the upper notch. Anal tube large, semicircular, not exerted, occupying the entire width of the upper part of the pygofer, but not reaching the middle. Styles brownish yellow, shaped like a pruning-knife, narrow at the base, widened towards the top, strongly arched outwardly above the middle, and ending in a slightly incurved point, which reaches the lower side of the anal tube; their points contiguous. Length, 2 mm.

Gosforth woods, September (Bold). Larger than *L. venosa*, to which it is said to bear a great resemblance. Female undescribed.

It is believed that the unique original example of this species is now in the Newcastle-on-Tyne Museum.

24. *L. similis*, *Kirschb.*—Brownish yellow, last tarsal joint, the saw-case, and a row of spots on the sides of the abdomen above darker; face, except the keels, black. Facial keels filiform, the middle one distinct on the forehead. Keels of the crown strong, the impressions deep, the basal ones brownish, about one-third as long as the crown. Pronotum not half so long as the scutellum, keels of the latter distinct. Elytra half as long as abdomen, rounded behind, dirty brownish yellow with white margins, veins strong, with dense concolorous granules. Lateral lobes nearly semi-circular at the base, afterwards strongly sinuate, very wide and rounded behind. Length, $2\frac{1}{2}$ mm.

Male undescribed.

Forres, Morayshire (Norman). An obscure species very likely to be passed over as female *pellucida*; it seems to be only known from two specimens the originals of Kirschbaum's description and those taken by Norman; I have seen one of the latter.

25. *L. capnodes*, *Scott.*—Head, pronotum, and scutellum brownish yellow; keels of the latter, fine, but distinct. Elytra one-third longer than abdomen, pale smoky yellow, almost transparent; veins brown, distinctly and regularly granulate, a blackish streak on the inner margin at the apex of the clavus. Legs pale fuscous yellow, claws and apex of the claw-joint brown. Abdomen above dark brown, paler towards the apex, beneath brownish yellow, hind margin of the segments more or less broadly black, segments themselves with two or three scattered black punctures, pygofer and saw-case brownish yellow, lateral lobes narrowly and very obliquely truncate at the base, their inner angle slightly rounded, somewhat widened behind, obliquely rounded at the apex. Length, 3 mm.

Male undescribed.

This species was described by Scott in 1870 from a single

female, taken somewhere in the neighbourhood of Lee, in October 1863, which had been sent by him to Fieber and returned by the latter with the manuscript name of *capnodes*. Scott says (*Entomologist's Monthly Magazine*, vii. p. 69): "Unlike any other species of the genus it will be at once recognised by the uniform brown nerves and minute but distinct black granules thereon" but after examining the specimen (which for me would have been one of the forms of *pellucida*, female) it seemed to me that the granules were concolorous with the veins on which they stood. With the exception of Mr. Buckton no one seems to have recognised this species since its publication.

26. *L. scutellata*, Scott.—*Macropterous form*.—♂. Crown brownish yellow, slightly widening from the base to the front margin; keels acute, prominent, slightly paler than the disc, apical impression small, the two basal ones large and deep. Face brownish yellow; keels paler than the disc, central one somewhat more feeble on the frons. Pronotum brownish yellow, darker behind each eye, keels somewhat paler. Scutellum brownish yellow, darker on each side of the middle keel, on either side of which at the base is a black spot, beyond the side keels black, side margins brownish yellow. Elytra whitish hyaline, very finely wrinkled transversely, about one-half longer than abdomen; veins yellowish, darker behind, non-granulate, marginal vein round the apex black. Legs fuscous, hind claws and apex of claw-joint black. Abdomen above black; beneath black, hind margin of the two last segments very narrowly yellow. Pygofer and styles black, the latter somewhat billhook-shaped at the apex. Length, $2\frac{1}{2}$ mm.

♀. Similar to the male, but paler and wants the pair of black spots at the base of the scutellum.

Darenth (Marshall); it has also been taken by Mr. A. Piffard, from whom I have a specimen.

This species at first sight bears some resemblance to the

macropterous form of *L. Fairmairei*, but it is at least one-third smaller.

27. **L. lepida**, *Boh.*—Blackish brown, face spotted with white; keels of pronotum and scutellum, three broad rings on the tibiae, and the chief part of the tarsi, pale yellow. Apical impression of crown continued on to the frons. Pronotum distinctly shorter than crown. Middle keel of pronotum and scutellum stout. Scutellum three-fourths longer than pronotum; side keels straight, diverging. Elytra (male) one-third (female) one-half as long as abdomen; apex truncate with rounded angles, dark brown, paler at the base, two large semicircular spots on the hind margin, a small spot at the apex of the clavus, and a streak on the inner margin, white; veins with large brown granules. Abdomen above black, generally with three lines of small white spots. Pygofer (male), seen from behind, wide, oval; upper notch widely triangular, its margin, seen from the side forming an obtuse angle with the hind margin, which is straight and directed obliquely inwards, lower margin produced into a blunt lobe. Styles erect, approximating at the base and apex, widened above, outer apical angle widely rounded, inner drawn out into a fine sharp point. Length, $2\frac{1}{2}$ –3 mm.

Macropterous form.—Scutellum two and a half times as long as pronotum; side keels diverging, slightly curved. Elytra nearly twice as long as abdomen, whitish hyaline; veins strong, with large brown granules, an oblique band before the middle, a band on the angular veins, a streak at the apex of the clavus, and some small spots at the apex of the veins of the membrane, brown. Length, $3\frac{1}{2}$ mm.

Locally common in Norfolk on *Juncus communis*; Lulworth (Dale).

28. **L. Fieberi**, *Scott.*—Blackish brown above, yellow-brown beneath, hind margin of elytra with two white spots separated by a black one. Keels of crown sharp, frons at the apex narrowly pale. Pronotum and scutellum sub-

equal in length, their keels sharp. Elytra (male) one-half, (female) one-third, as long as abdomen, suffused with pale at the base of the suture, apex truncate with rounded angles; veins strong, smooth. Abdomen above, male blackish brown, sometimes with three lines of pale spots; female yellow-brown, widely darker on the sides, with three more or less distinct lines of pale spots. Pygofer (male) sparingly set with fine pale hairs, upper notch wide, triangular, reaching the preceding segment, its margin, seen from the side, forming an obtuse angle with the hind margin, which is vertical, and has its lower angle rounded off. Styles long, narrow, incurved, quite reaching the lower margin of the anal tube, their inner apical angle produced inwardly and hooked. Length, 2-2½ mm.

Occurs amongst low plants in wet places; I once found it in quantity by sweeping *Myosotis palustris* at Colesborne, Gloucestershire; Norfolk, Bonchurch, The Lizard (Dale).

29. *L. pullula*, Boh.—♂. Dirty yellow, elytra and abdomen black, hind margin of the former narrowly white. Crown rounded in front, apical impressions very narrow and obsolete. Frons strongly roundly dilated below the middle, slightly narrowed before the apex, its middle keel evanescent above. Pronotum somewhat shorter than crown. Scutellum one-half longer than pronotum. Elytra coriaceous, half as long as abdomen, widely rounded at the apex; veins strong, sparingly granulate. Legs slender, pale yellow. Pygofer black, seen from behind elongate-oval, upper notch acutangular, its margin, seen from the side, short, and forming an obtuse angle with the hind margin, which is straight, somewhat oblique, and has its lower angle widely rounded off. Styles yellow, very small, about one fourth as long as the opening of the pygofer, seen from the side with a large triangular tooth behind at the base, apex truncate, outer apical angle produced into a wide triangular tooth. Anal tube black, somewhat prominent,

its teeth long, vertically connate, curved forwards at the apex, and nearly reaching to the middle of the opening of the pygofer.

♀. Entirely dirty yellow, except some obsolete spots at base of the abdomen and the saw-case and claws, which are brown. Length, $1\frac{1}{2}$ –2 mm.

Macropterous form (female).—Scutellum twice as long as pronotum, side keels distinct and curved outwards. Elytra two-thirds longer than abdomen, yellowish hyaline; veins pale yellow, sparingly granulate with brown, marginal vein of membrane brown. Length, $3\frac{1}{2}$ mm.

Introduced into our list by Scott, but without locality. In Scandinavia it is found rarely on *Carices* by river-banks in June and July. It also occurs in France and Germany.

30. *L. lugubrina*, Boh.—♂. Pale yellow, elytra black, costal and hind margins narrowly yellowish white, inner margin near the apex of the scutellum broadly yellow; abdomen above yellow with black margins, or with the basal segments entirely dark. Central facial keel sharp, forked, and becoming indistinct on the forehead. Scutellum three-fourths longer than pronotum, its side keels straight, strongly diverging, sometimes with a black spot on each side at the base, or black with the apex yellow. Elytra scarcely two-thirds so long as abdomen, hind margin broadly rounded, veins finely granulate. Legs slender, spur of hind tibiæ large and wide. Pygofer, seen from behind, distinctly wider than high, and having three blunt angles, namely, one just below the middle of each side, and one in the middle of the lower margin. Viewed from the side the nearly horizontal margin of the upper notch forms an obtuse angle with the hind margin, which is oblique and nearly straight; the rounded right angle in which the hind joins the lower margin, coincides with the point of the greatest width of the pygofer, when seen from behind. Styles straight, strongly diverging, narrow-triangular, pointed, reaching half

the height of the cavity of the pygofer. Teeth of anal tube distant, slightly curved outwards at the apex. Length, $2\frac{3}{4}$ –4 mm.

♀. Entirely pale brownish yellow.

Macropterous form (female).—Scutellum nearly three times as long as pronotum, side keels distinct, slightly curved outward. Elytra yellowish, subpellucid, one-half longer than abdomen, rounded at the apex, veins non-granulate. Length, 5 mm.

Also introduced into our list by Scott, without locality. In Livonia Flor found it abundantly in damp meadows, and on the borders of woods in June and July; according to J. Sahlberg it occurs on river-banks in Sweden and Finland on *Phragmites* and *Carices*; it also occurs in France and Germany.

31. *L. leptosoma*, Flor. — ♂. Face pitch-black, keels sometimes pale. Crown dirty brownish yellow, remainder of upper side shining black, with the pronotum, and occasionally the base of the elytra, dirty white, hind margin of the latter pure white. Elytra half as long as abdomen, hind margin truncate with rounded angles; veins strong, not perceptibly granulate. Pygofer black margined with white, the upper notch very wide and deep, its sides feebly concave, and its base concealed beneath the preceding segment. Styles diverging, straight, pointed, shining black, reaching about half the height of the cavity.

♀. Lighter or darker brownish yellow, hind margin of elytra white. Length, $2-2\frac{3}{8}$ mm.

Occurs on grasses in damp places. Norwich district, common; Chingford, Shalford (Butler); Woking, Chobham (Saunders); Glanville Wootton, Bournemouth (Dale).

32. *L. niveimarginata*, Scott. —. Face and crown pale brownish yellow. Pronotum and scutellum white. Elytra about half as long as abdomen, apex truncate with rounded angles, hind margin broadly white; veins strong,

but not perceptibly granulate. Abdomen black, last segment in the middle above and margin of pygofer broadly white. Upper notch of pygofer sharply triangular. Teeth of anal tube long, pointed, vertically contiguous. Styles pale, diverging, somewhat lanceolate, reaching the level of the teeth of anal tube.

♀. Similar to that of the last species, but distinguishable by the difference in the central keel of the face. Length, $2\frac{1}{2}$ –3 mm.

Occurs on long herbage in swampy places. Booton Common, Swardston Common, Norfolk; Wimbleton Common (Marshall).

33. **L. Dalei**, *Scott.* — . Crown yellow, the two basal impressions distinct, the front one appearing as a deep puncture. Central facial keel distinct, but not prominent. Pronotum yellow. Scutellum deep black, shining, sides and apex narrowly yellow. Elytra yellow, not half so long as abdomen, hind margin rounded, veins non-granulate. Abdomen black, shining, side margins and a very narrow dorsal line yellow, last two segments clear yellow. Pygofer above whitish yellow, sides and beneath black; seen from behind its outline is inversely oval, the sides narrowed below, rounded above. Upper notch triangular, its margin, seen from the side, forming an obtuse angle with the nearly vertical hind margin, lower angle somewhat less obtuse. Lower notch deep, rounded, with sinuate edges. Styles upright, slightly diverging, nearly reaching the teeth of the anal tube, narrow, cuneiform, obliquely truncate on their inner side near the base. Anal tube large, sunken, its teeth short, distant. Length, $1\frac{3}{4}$ mm.

♀. Sordid whitish yellow. Crown subquadrate, the basal foveæ large, the apical one punctiform. Middle facial keel obsolete on the forehead. Pronotum a little shorter, scutellum a little longer, than the crown. Elytra hyaline about half as long as the abdomen, truncate with rounded angles, veins pale non-granulate. Length 2 mm.

Lulworth, 25 Aug. 1884 (J. C. Dale, *vide* C. W. Dale 1893); Glanville Wootton, one female, 17th September, 1888 (C. W. Dale); Esher Common (Saunders). It has also occurred in France, and the above description of the female is from an example given to me by Dr. Puton.

34. **L. pellucida**, *Fab.*—*Macropterous form.*—♂. Black; facial keels, pronotum (except a patch behind each eye), tegulæ, and apex of scutellum, white. Scutellum more than three times as long as pronotum, apex reflexed; side keels fine, parallel, obsolete behind. Elytra whitish hyaline, twice as long as abdomen; veins, pale at the base, darker behind, distinctly and moderately closely granulate throughout, marginal vein of membrane black. Abdomen black, sides narrowly yellowish. Pygofer large, prominent, black. Viewed from above the upper notch is wide and deep, scarcely angular at the base, its edges forming a right angle, or nearly a right angle with the hind margin. Styles spreading almost horizontally, their apex reflexed. Cedeagus a simple blunt, deflexed hook. Teeth of anal tube long, vertically connate.

♀. Pale brownish yellow; face between the keels, some markings on the breast and abdomen beneath, and the saw-case, black. Elytra yellowish hyaline. Length, 4–4½ mm.

Brachypterous form.—♂, ♀. Varying in colour from pale brownish yellow to pitch-black, but sometimes the coloration of the fore parts mentioned above is developed in the male. Scutellum more than twice as long as pronotum; keels distinct, diverging behind. Elytra about as long as abdomen, apex narrowly rounded, veins strong, closely set with conspicuous black granules. Length, 3 mm.

This species and the two following are closely allied, the form of the pygofer being similar in each, but they may always be separated with certainty by the form of the cedeagus.

Very common amongst grasses. Norwich district; Cots-

wold district; Hastings, Chobham, Ewhurst, Lowestoft, Shiere (Butler); Wotton-under-Edge (Perkins); Glanville Wootton, Land's End (Dale); Morayshire, Pitlochry, (Norman); Dublin (Halbert)

35. *L. difficilis*, *Edw.*—This species may usually be distinguished from the preceding by the colour of the pronotum which is blackish with the hind margin narrowly pale, but its diagnostic character lies in the form of the cedeagus which is divided nearly to the base into two lobes of which the upper one is broad and sharply pointed and the lower one is narrow and rounded at the apex. I have specimens of the brachypterous male which exactly resemble *pellucida* in colour and which are consequently only separable by the different form of the cedeagus.

Length, 2 mm. (brachypterous), $3\frac{1}{2}$ mm. (macropterous).

In Norfolk this species is equally common with *pellucida* and is probably overlooked elsewhere. Wotton-under-Edge (Perkins); Glanville Wootton (Dale).

36. *L. discreta*, *Edw.*—The male of this species may always be separated from that of the two preceding by its small size and entirely pitch-black colour. The form of its cedeagus, which is divided for about one-third of its length into two sub-equal pointed lobes, is absolutely diagnostic. Its habitat, too, is an aid to its identification, as it occurs on the edges of ponds, &c., on the floating leaves of a grass, and in Norfolk I have found it commonly in summer by sweeping grasses growing on the site of pools which have been dried up. The females of this species and the two preceding can only be identified with certainty when taken in company with the opposite sex. Length, $1\frac{3}{4}$ –2 mm. (brachypterous); 3– $3\frac{1}{2}$ mm. (macropterous).

Glanville Wootton (Dale).

In dealing with such difficult species as *pellucida*, *difficilis*, and *discreta* it will be better for the student not to be satisfied

with his identifications until he has seen the œdeagus of some at least of his specimens in each gathering. The examination of this organ is best accomplished after dissection and this is a business demanding care and patience but the certainty of identification which follows, is (to the mind of the writer) ample compensation for the pains bestowed. The "mutilation" of specimens is objected to by some, but it is not easy to conceive what may be the value of a specimen whilst it is impossible either to identify it with certainty or to define its distinctive characters.

37. **L. discolor**, *Boh.*—Black; keels of head and pronotum yellow, hind margin of the latter generally narrowly white in the male; elytra pellucid, pale brown, marginal vein paler. Scutellum about twice as long as pronotum; side keels strong, divergent. Elytra about one-half as long as abdomen, widely rounded behind; veins strong, their granulation indistinct. Pygofer (male) large, prominent, black, the upper notch, viewed from above, large, deep, round at the base, its edges forming at their junction with the hind margin an obtuse angle. Styles and anal tube almost as in *pellucida*. Length, $2\frac{1}{2}$ –3 mm.

Macropterous form.—Scutellum two and a half times as long as pronotum; side keels distinct, somewhat diverging. Elytra yellowish hyaline, nearly twice as long as abdomen; veins yellow at the base, afterwards dark, with small setigerous granules towards the apex, costal margin white, that of the membrane and the suture dark. Length, $3\frac{1}{4}$ – $3\frac{1}{2}$ mm.

Woods in early summer. Norwich district; Cotswold district; Wotton-under-Edge (Perkins); Glanville Wootton, Charmouth (Dale); Woking, Chobham (Saunders); Pitlochry (Norman); Hastings, Battle (Sussex); Emhurst (Butler).

38. **L. obscurella**, *Boh.*—Crown brown, fork of the middle keel evanescent in front. Frontal channels blackish,

paler down the middle, keels whitish. Pronotum brownish yellow, somewhat shorter than the crown. Scutellum twice as long as pronotum, brownish yellow, with a large blackish spot on each side and another at the apex, keels sharp, pale. Elytra as long as the abdomen, brownish grey, rounded behind, costal margin and suture yellow-brown, hind margin and clavus brownish; veins strong, yellow-brown, closely set with setigerous granules. Abdomen above, male black, last segment paler; female yellow, more or less widely brown at the base, dorsal line whitish, each segment narrowly black at the base, apical segments frequently entirely pale. Upper notch of pygofer (male), seen from the side, almost vertical, and forming a very obtuse angle with the straight hind margin, which is directed obliquely forwards, lower notch very wide. Styles very short, sub-lanceolate, arched forwards. Length, 2-2½ mm.

Macropteros form.—Scutellum three times as long as pronotum, transversely impressed at the apex; side keels obsolete, sub-parallel. Elytra twice as long as abdomen, fusco-hyaline; veins yellow, with black setigerous granules, which are stronger on the corium than on the membrane, margins brown. Length, 3-3½ mm.

Introduced into our list by Scott without note of its locality.

39. *L. forcipata*, Boh.—Pitch-black, shining; facial keels, crown, hind margin of pronotum, and base of elytra widely, yellowish, marginal vein of the latter pale. Scutellum one-half longer than pronotum; side keels distinct, diverging. Elytra coriaceous, about one-half as long as abdomen, widely rounded behind; veins strong, their granulation indistinct. Pygofer (male) large, prominent, black, the upper notch deep, reaching to the preceding segment, viewed from above elliptic, at least one-half wider across the middle than at its opening on the hind margin, its edges forming at their junction with the latter an acute angle. Length, 2-2½ mm.

Macropterous form.—Scutellum two and a half times as long as pronotum, flattened towards the apex; side keels obsolete, slightly curved outwards. Elytra about twice as long as the abdomen, fuscous, somewhat pellucid (male), aqueo-hyaline (female), base yellowish, veins with small setigerous granules. Length, $2\frac{3}{4}$ –4 mm.

Occurs in woods in spring. Norwich District; Cotswold District; Bonchurch (Dale); Morayshire (Norman).

40. **L. denticanda**, Boh. — ♂. Pale brownish yellow, breast and abdomen black, the latter with the hind margin of the last dorsal segment white. Pronotum distinctly shorter than crown, side keels curved outwards. Scutellum scarcely one-half longer than pronotum; side keels acute, strongly diverging. Elytra about half as long as abdomen, pale yellow, pellucid, very finely wrinkled transversely, hind margin truncate with rounded angles; veins strong, non-granulate. Margin of upper notch of pygofer, seen from the side, oblique and forming with the sinuate hind margin, which is directed obliquely forwards, a wide triangular tooth. Middle of the lower margin of pygofer with a long sharp tooth. Teeth of anal tube short, obtuse, vertically connate.

♀. Entirely pale brownish yellow, elytra about one-third as long as abdomen. Length, 2 – $2\frac{1}{2}$ mm.

Macropterous form.—Scutellum two and a half times as long as pronotum; apex reflexed, white; side keels very indistinct nearly parallel. Elytra, male two-thirds, female one-half, longer than abdomen, yellowish hyaline; veins dirty yellow dusky towards the apex. Length, 3 – $3\frac{1}{4}$ mm.

This species is also partial to woods in spring. Norwich District; Glanville Wootton (Dale).

41. **L. exigua**, Boh. — ♂. Greyish yellow, abdomen black with the apical segments sometimes narrowly margined with yellow. Facial keels strong, evanescent on the forehead.

Scutellum scarcely one-half longer than pronotum; side keels distinct strongly diverging. Elytra about half as long as abdomen, pale greyish yellow, pellucid, margins paler, apex truncate with rounded angles; veins strong, non-granulate. Pygofer black, retracted, upper notch wide, rounded, margined with yellow, lower notch feeble, hind margin straight. Styles narrow, somewhat lanceolate, with a long narrow tooth at base projecting backward. Anal tube nearly circular, its teeth represented by a long narrow straight process from the middle of its lower margin.

♀. Pale greyish yellow, head, pronotum, scutellum, and elytra whitish, sides of abdomen above with some blackish markings. Length, $1\frac{1}{2}$ –2 mm.

Macropterous form.—♂. Scutellum nearly three times as long as pronotum, transversely impressed before the apex, sides fuscous; side keels fine sub-parallel. Elytra nearly twice as long as abdomen, whitish hyaline; veins non-granulate, pale brown, darker towards the apex. Length, $2\frac{1}{2}$ mm.

Occurs on grasses in dry places. Norfolk; Wotton-under-Edge (Perkins); Lulworth (Dale); Woking, Chobham, Hayling Island (Saunders).

42. *L. venosa*, *Germ.*.—Fore parts lighter or darker pitch-brown, abdomen black. Elytra and legs yellow-brown; veins of the former strongly raised, black. Crown rectangular, a little longer than wide, its keels strong. Pronotum a trifle shorter than the crown, its side keels straight, strongly diverging, but reaching the hind margin. Scutellum very little longer than the pronotum. Elytra about two-thirds as long as the abdomen, widely rounded at the apex, entire marginal vein black.

Macropterous form.—Scutellum one and a half times as long as pronotum. Elytra dirty whitish hyaline, finely wrinkled transversely, nearly twice as long as abdomen; veins dark brown, strongly raised. Length, $1\frac{1}{2}$ –2 mm.

At roots of coarse grass and rushes. Easily distinguished

from our other black species by its small size, and the side keels of the pronotum reaching the hind margin.

Norwich District ; London District (Douglas).

43. *L. insignis*, *Scott.* — ♂. Pale yellowish, abdomen pitch-black, shining, with a large yellow or brownish yellow transverse patch on the upper side at the base, hind margin of the last four segments very narrowly brown, down the centre of each a short narrow streak not reaching the front margin, hind margin of the last segment broadly white. Side keels of pronotum somewhat indistinct, disc on each side of the centre somewhat depressed. Keels of scutellum distinct, somewhat acute. Elytra about half as long as abdomen, their apex flatly rounded ; veins fine, non-granulate. Legs yellow, thighs fuscous at the base. Pygofer black, shining ; viewed from the side the hind margin is produced into a flat isosceles-angular form, and has a short curved acute tooth at the lower extremity ; viewed from behind the pygofer appears almost circular, margins of the upper half folding down inwardly and forming two triangular flaps, leaving a small space between their edges down the centre. Styles black, forming a wide V-shaped character, apex of the arms white, produced into a point. Length, 3 mm.

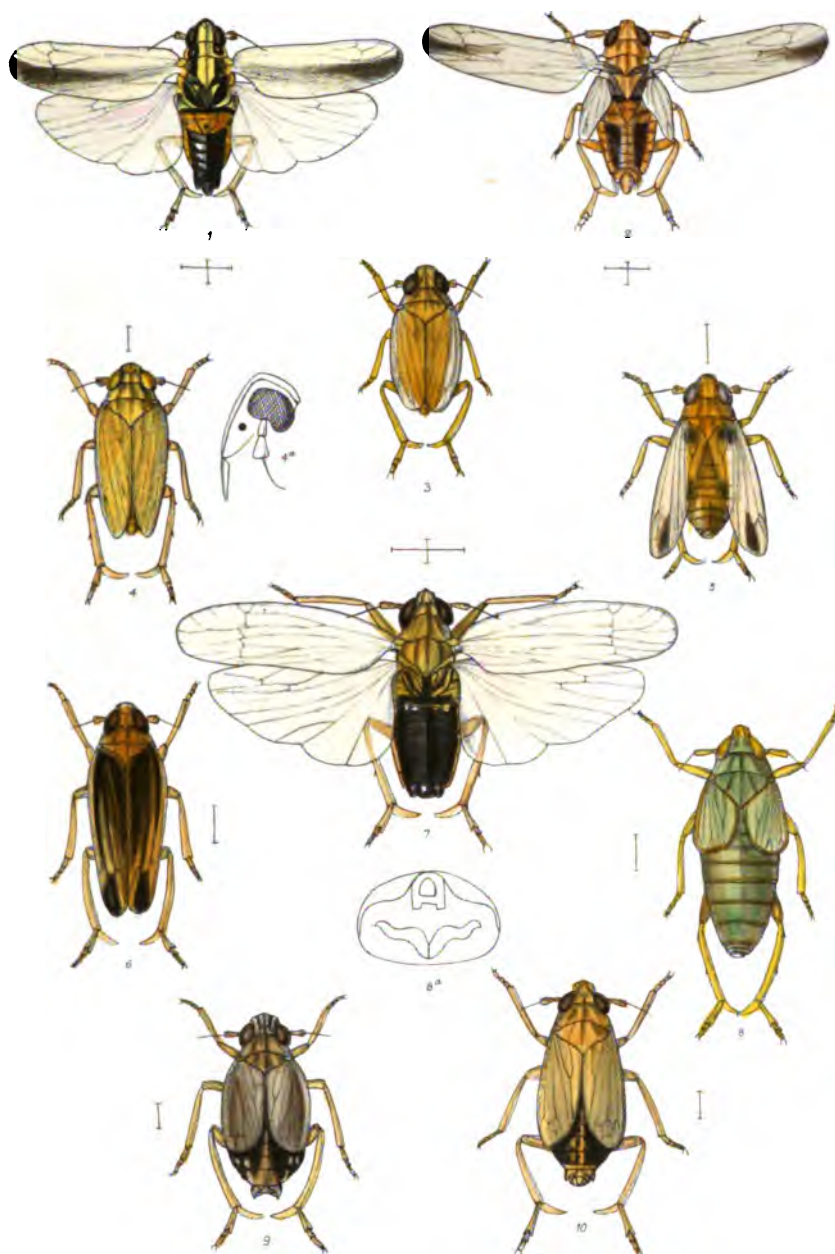
♀. Unknown.

Pitlochry, Perthshire (Norman).

44. *L. aubei*, *Perris.* — ♂. Greyish yellow, abdomen black with a whitish dorsal line, each segment with a transverse row of about three short narrow reddish yellow stripes near each side. Middle keel of pronotum and scutellum and marginal nerve of elytra whitish. Elytra pellucid, half as long as abdomen, apex widely rounded ; veins moderately strong, non-granulate. Pygofer black, moderately prominent the margin of its deep angular upper notch and a large subquadrate spot adjoining its obsolete lower notch yellowish, hind margin straight. Styles pale, sinuate, blunt, nearly reaching the very feeble obtuse teeth of the anal tube.

PLATE V.

- FIG. 1. *Liburnia vittipennis*, J. Sahl.
2. „ *guttula*, Germ.
3. „ *perspicillata*, Boh.
4. „ *pallidula*, Boh.
4a. „ *punctulum*, Kbm. (lateral aspect of head).
5. „ *Scotti*, Fieb.
6. „ „ „
7. „ *smaragdula*, Stäl. ♂.
8. „ „ „ ♀
8a. „ *unicolor*, H. S. (male genitalia seen from behind).
9. „ *collina*, Boh. ♂
10. „ *sordidula*, Stäl. ♂.



R. Morgan del., et lith.

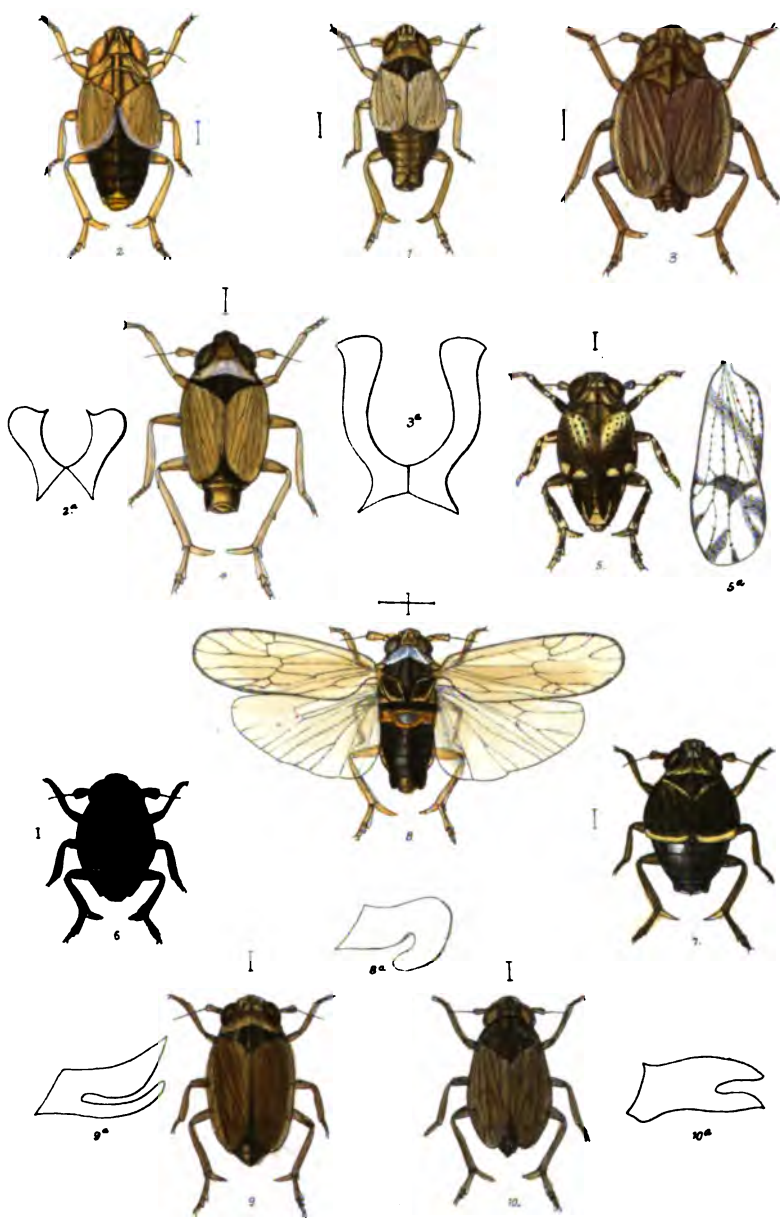
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PLATE VI.

- FIG. 1. *Liburnia elegantula*, Boh. ♂
 2. „ *distincta*, Flor.
 2a. „ *Boldi*, Scott. (male genital styles).
 3. „ *Signoreti*, Scott.
 3a. „ „ „ (male genital styles).
 4. „ *Reyi*, Fieb.
 5. „ *lepida*, Boh.
 5a. „ „ „ (macropterous elytron).
 6. „ *pullula*, Boh.
 7. „ *leptosoma*, Flor.
 8. „ *pellucida*, Fab.
 8a. „ „ „ (lateral aspect of œdeagus).
 9. „ *difficilis*, Edw.
 9a. „ „ „ (lateral aspect of œdeagus).
 10. „ *discreta*, Edw.
 10a. „ „ „ (lateral aspect of œdeagus).

PLATE 6.



R. Morgan del et lith.

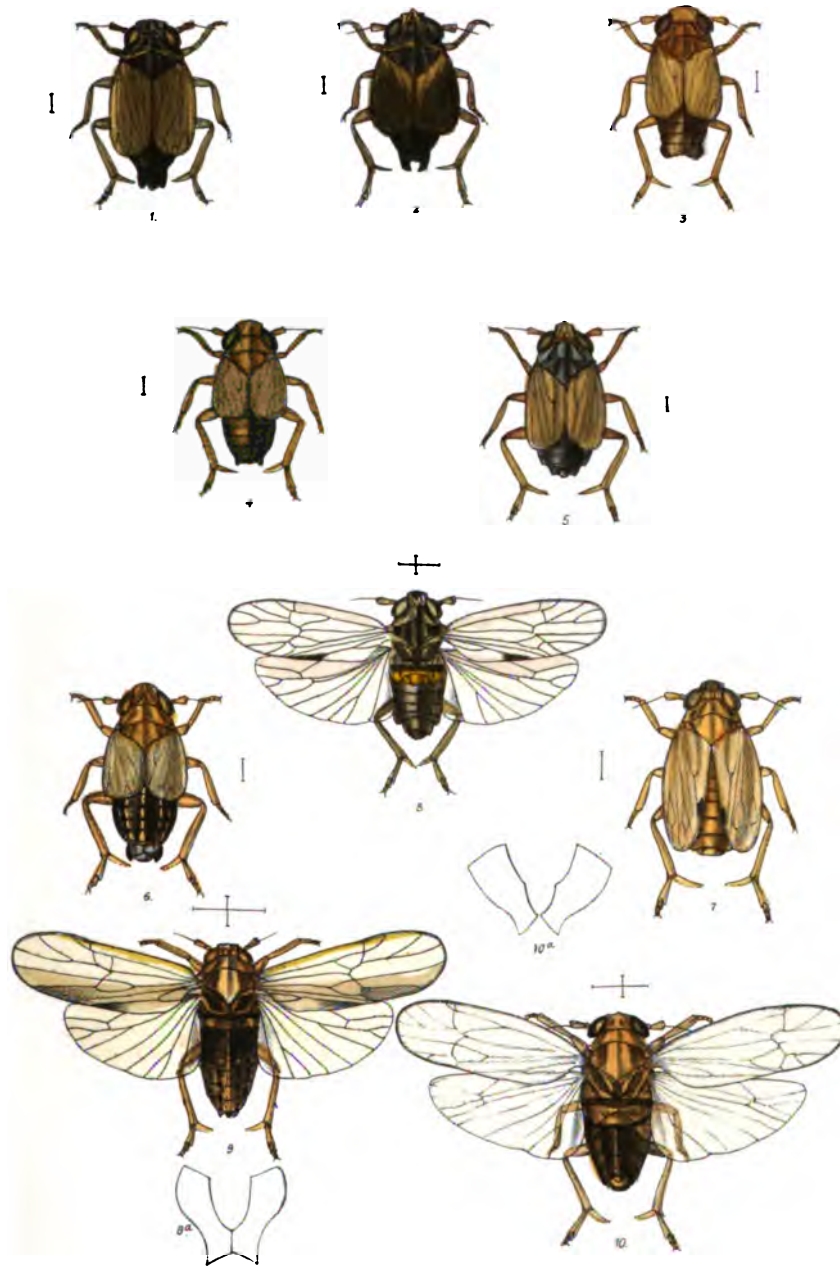
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PLATE VII.

- FIG. 1. *Liburnia discolor*, Boh.
 2. „ *forcipata*, Boh.
 3. „ *denticauda*, Boh.
 4. „ *exigua*, Boh.
 5. „ *venosa*, Germ.
 6. „ *Anbei*, Perris.
 7. „ *striatella*, Fall.
 8. „ „ „ (macropterous form).
 9. „ *Fairmairei*, Perris („ „).
 9a. „ „ „ (male genital styles).
 10. „ *brevipennis*, Boh. (macropterous form).
 10a. „ „ „ (male genital styles).

PLATE 7



R. Morgan del. lith.

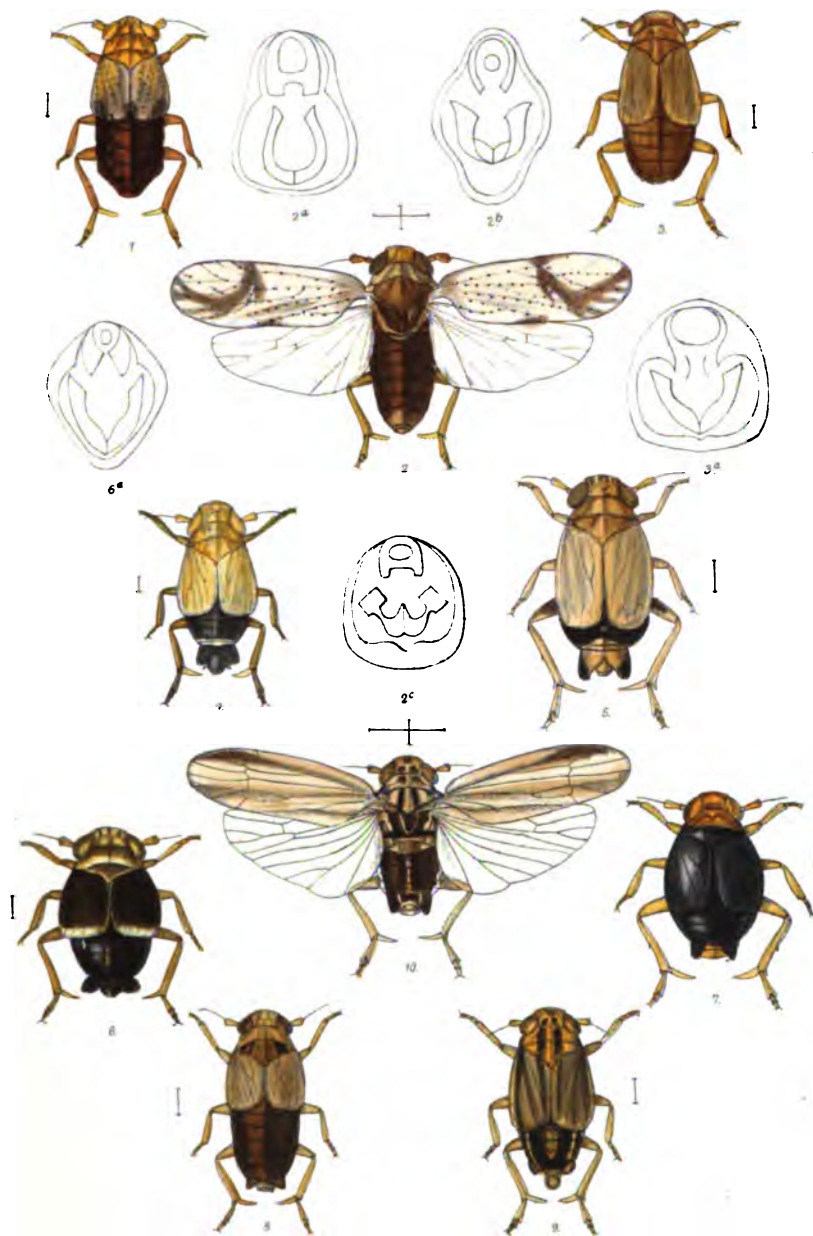
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PLATE VIII.

- FIG.**
- | | | | | | |
|-----|--------------------------------------|------------------------------|------------------------------------|----------------------|---|
| 1. | <i>Liburnia limbata</i> , Fab. | | | | |
| 2. | " | " | " | (macropterous form). | |
| 2a. | " | <i>flaveola</i> , Flor. | (male genitalia seen from behind). | | |
| 2b. | " | <i>paludosa</i> , Flor. | " | " | " |
| 2c. | " | <i>speciosa</i> , Boh. | " | " | " |
| 3. | " | <i>lineata</i> , Perris. | | | |
| 3a. | " | <i>uncinata</i> , Fieb. | (male genitalia seen from behind). | | |
| 4. | " | <i>mesomela</i> , Boh. | | | |
| 5. | <i>Dicranotropis hamata</i> , Boh. | | | | |
| 6. | <i>Stiroma albomarginata</i> , Curt. | | | | |
| 6a. | " | <i>borealis</i> , J. Sahl. | (male genitalia seen from behind). | | |
| 7. | " | <i>pteridis</i> , Boh. | | | |
| 8. | " | <i>affinis</i> , Fieb. | | | |
| 9. | " | <i>nigrolineata</i> , Scott. | | | |
| 10. | " | " | " | (macropterous form). | |

PLATE 8.



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1894.

♀. Abdomen greyish yellow with a whitish dorsal line, each segment with a transverse row of about three short black stripes near each side. Coloration otherwise as in the male. Length, $2\frac{1}{2}$ –3 mm.

Common by sweeping grasses on coast sands in Norfolk. Glanvilles Wootton, Portland (Dale); Morayshire (Norman).

45. *L. striatella*, *Fall.*.—♂. Black; facial keels, pronotum (except a large spot behind each eye), and apex of scutellum, whitish, crown pale. Elytra but little longer than abdomen, pale brownish, rounded at the apex, veins sparingly granulate. Legs yellow. Aperture of pygofer constricted, its outline sinuate, upper notch semicircular, its margin, seen from the side, oblique; hind margin nearly vertical, sinuate just before it joins the margin of the upper notch. Styles very short, broad at the base, rapidly narrowing towards their somewhat rhomboidal apex. Teeth of anal tube long, vertically subcontiguous. Length, $1\frac{3}{4}$ – $2\frac{3}{4}$ mm.

♀. Pronotum and scutellum widely pale down the middle, their sides and the abdomen above blackish, the latter sometimes with pale spots towards the apex. Length, $2\frac{1}{2}$ –3 mm.

Macropterous form.—Elytra hyaline, nearly twice as long as abdomen; veins fine pale brown, darker towards the apex, sparingly granulate, apical third of costal vein black, sixth apical area fuscous, at least in the female. Length, $3\frac{1}{2}$ – $4\frac{1}{2}$ mm.

Found on grasses in early summer. Norwich, very local; Glanvilles Wootton, Land's End, Holyhead (Dale).

46. *L. Fairmairei*, *Perris.*—Pale brownish yellow, sides of pronotum and scutellum and frequently also sides of abdomen widely brown. Elytra in the brachypterous form about two-thirds as long as abdomen, broadly rounded at the apex, inner marginal vein white; veins strong, sparingly and indistinctly granulate; in the macropterous form nearly twice as long as abdomen, whitish hyaline; veins fine, pale, darker

E

towards the apex, very finely and sparingly granulate, marginal vein of membrane black. Towards the apex of the abdomen each segment has a transverse row of about three black punctures on each side, and a fine pale dorsal line runs down the middle. Upper notch of pygofer (male) rounded at the base, very wide and deep; hind margin, viewed from the side, with a wide and deep arcuate notch in the middle, produced above into a strong triangular tooth, lower angle of the notch rectangular or nearly so; styles visible, cleaver-shaped, reaching across the mouth of the notch. Styles viewed from behind, wide, flat, black, parallel-sided, straight and connivent for a short distance from the base, then suddenly bent outwards and afterwards curved upwards, their apex truncate. Length, $2\frac{3}{4}$ – $4\frac{1}{2}$ mm.

Very common on grasses by roadsides, &c. Norfolk, Cotswold District; Wotton-under-Edge (Perkins); Charmouth, Falmouth, Lulworth (Dale); Woking, Chobham (Saunders); Morayshire (Norman.)

47. *L. brevipennis*, Boh.—Similar in size and appearance to the last named, but the pale ground colour of the upper side is dirty white, inclining to bluish grey, and the dark stripe on the sides of the pronotum and scutellum is rarely so decided as in that species. Styles viewed from behind, somewhat cleaver-shaped, wide, flat, black, truncate at the apex, their inner margin faintly concave on its lower half, with a feeble obtuse tooth just above the middle, and another, similar, at the apex, outer margin simple.

At roots of coarse grass, September and October. Norwich district; Shiere (Butler); Woking, Chobham (Saunders).

48. *L. straminea*, Stal.—♂. Pale yellow, claws fuscous. Scutellum two-thirds longer than pronotum, its side keels distinct, diverging. Elytra yellowish hyaline, about one-half as long as abdomen, separately rounded at the apex; veins raised,

concolorous. Upper notch of pygofer angular with sinuate sides, its margin, when viewed from the side, forming an obtuse but distinct angle with the vertical hind margin. The styles are really placed horizontally, so that only their ends are visible when viewed *in situ* from behind.

Macropterous form.—Scutellum two and a half times as long as pronotum, its side keels scarcely perceptible, slightly diverging. Elytra hyaline, nearly twice as long as abdomen, narrowly rounded at the apex, yellowish white.

♀. Similar in colour to the male. Elytra in the macropterous form about two-thirds longer than the abdomen. Length, 2–3½ mm.

The male of this species may be easily recognised by the structure of the genitalia, but the female is hardly to be distinguished from that of the next.

Occurs on grasses. Norfolk, local. The late Mr. Scott had a single male example (the type of his *L. V-flava*) but without locality.

49. *L. flaveola*, *Flor*.—Yellow or somewhat ferruginous. Central facial keel acute, obsolete on the forehead. Elytra pale yellow, transparent, about one-half as long as abdomen, their apex broadly rounded. Legs yellow, sometimes with a reddish tinge, claws dark brown. Abdomen sometimes brown above. Upper notch of pygofer (male) angular with sinuate sides, its margin, when viewed from the side, passing gradually into the convex hind margin. Styles narrow-lanceolate, obliquely truncate at the apex. Teeth of anal tube large, blunt. Length, 2 mm.

Macropterous form.—Elytra nearly twice as long as abdomen, pale, transparent; veins pale, finely granulate, marginal vein of membrane brownish. Length, 3 mm.

London district, Barnes Common, July 1876 (Power).

Flor gives this species as abundant in meadows in May, June and July.

50. *L. paludosa*, *Flor*.—Pale yellowish or brownish

yellow, apex of the first and base of the second joint of antennæ narrowly black, tarsi darker towards the apex. Elytra ovate-lanceolate, as long as the abdomen, slightly narrowed towards the apex, veins somewhat thickly and finely granulate. Pygofer (male) brown, its outline, when viewed from behind, lozenge-shaped with rounded angles, upper notch large, semicircular, margined with yellow; viewed from the side the margins of both the upper and lower notches pass gradually into the hind margin, thereby giving the latter the appearance of being roundly produced at the middle of its height. Styles wide, nearly reaching the teeth of the anal tube, obliquely truncate at the apex, their inner margin with a large notch near the base. Teeth of anal tube short, pointed, divergent. Length, $2\frac{1}{2}$ –3 mm.

Merton, Wimbledon (Power). Occurs in bogs according to Flor.

51. *L. speciosa*, Boh.—♂. Dirty yellow, pronotum and scutellum with a whitish central stripe. Elytra yellowish hyaline, twice as long as abdomen, with a large wedge-shaped basal spot, a broad curved band at the inner margin of the membrane, and a streak on the suture near the apex of the clavus, black, veins very finely granulate. Scutellum more than twice as long as pronotum. Abdomen blackish brown, dorsal segments narrowly margined with whitish. Upper notch of pygofer widely arcuate, its margin, seen from the side, forming an obtuse angle with the nearly vertical hind margin; lower notch wide, shallow, obtus-angular, and having in the middle a short triangular tooth. Styles short; viewed from behind their apex is apparently expanded into a large rhomboidal plate. Teeth of anal tube long, distant, curved forward at the apex.

♀. Scutellum scarcely twice as long as pronotum. Elytra about one-half as long as abdomen, yellowish hyaline, without black markings, apex obtusely rounded. Abdomen brown or

yellow-brown with a darker lateral stripe, sometimes with a pale dorsal line. Length, $3\frac{1}{2}$ –5 mm.

Occurs on *Phragmites communis*. Weston-on-Green, Oxon, June, 1832 (J. C. Dale).

52. **L. limbata**, *Fab.*—Fore parts above yellow, elytra whitish hyaline with a faint lilac tinge, hind margin brown, veins with large remote black granules. Abdomen blackish brown with some transverse rows of pale spots. Crown, pronotum, and scutellum subequal in length. Elytra less than half as long as abdomen, their apex truncate. Length, $2\frac{1}{2}$ –3 mm.

Macropterous form.—Crown and pronotum yellow, scutellum yellow-brown, elytra whitish hyaline with a faint lilac tinge; a short line near the apex of the clavus, a broad curved band on the membrane (its convexity to the inner margin), the veins of the latter, and the conspicuous granulation of all the veins black. Scutellum more than twice as long as pronotum, side keels obsolete. Elytra nearly twice as long as abdomen. Length, $3\frac{1}{2}$ –4 mm.

Very abundant amongst rushes; the macropterous form scarce. Hurst Green, Dallington Forest, Barnet, Ewhurst, Leith Hill (Butler); Pitlochry, Morayshire (Norman); Solway district (Robinson-Douglas), Glanvilles Wootton, Fresh-water (Dale).

53. **L. Douglasi**, *Scott.*—♂. Crown, forehead, and pronotum yellow. Face blackish, spotted with white between the keels, middle keel acute, obsolete on the forehead. Scutellum pale brown, beyond the side keels dark brown. Elytra brown, more than half as long as abdomen, hind margin truncate with rounded angles; veins fine, non-granulate. Abdomen black. Pygofer above brownish yellow, sides black, its outline seen from behind oval. Upper notch semicircular, with incurved angles not occupying the entire width of the segment, its margin, seen from the side, very oblique and forming a very

obtuse angle with the vertical hind margin. Lower notch angular with arcuate sides. Styles large, yellowish, reaching the anal tube, upright, somewhat divergent in their lower two-thirds, suddenly narrowed into a short neck, and afterwards expanded into a square plate directed towards the interior of the cavity. Length, 2 mm.

♀. Undescribed.

At roots of rushes, Folkestone Warren, September, 1862 (Douglas).

54. *L. lineata*, *Perris*.—♂. Crown yellow. Face black with two transverse white patches on each side of the middle keel, the latter obtuse, obsolete above. Pronotum and scutellum grey, outer angles of both and a streak on each side of the middle keel of the latter brown. Elytra pale, more than half as long as abdomen, apex widely rounded, veins non-granulate. Abdomen black, the two last dorsal segments more or less widely yellow. Pygofer, seen from the side, obtusely angular in the middle at the junction of the shallow arcuate upper notch with the hind margin; lower notch deep, angular. Styles incurved, their inner apical angle produced into a pointed tooth, outer apical angle produced, obliquely truncate, and bearing a few fine hairs, the whole strongly resembling a profile view of a bird's head and neck. Teeth of anal tube, seen from behind, long, pointed, strongly divergent.

♀. Face brown with white patches, abdomen generally pale with blackish stripes.

Macropteros form (male).—Crown brown. Pronotum dark brown, side keels and hind margin more or less grey. Scutellum black, middle keel generally brown. Elytra pale, nearly twice as long as abdomen, with a more or less broad smoky streak along the inner margin, veins brown, non-granulate. Length, $2\frac{1}{2}$ –4 mm.

On grasses in dry places. Arminghall, Weybourne, Norfolk; Shiere (Capron); Glanvilles Wootton (Dale).

55. **L. uncinata**, *Fieb.*—♂. Face and crown black, keels yellowish. Pronotum and scutellum yellowish grey, with white keels. Elytra dusky, in the macropterous form much longer than the abdomen; veins with brown granules; costa and inner margin pale; membrane slightly darker, its marginal and other veins brownish yellow. Abdomen orange at the base, the other dorsal segments black, with white margins. Outline of pygofer, viewed from behind, roundish; upper notch wide-oval, apical angles acute, strongly incurved; its oblique margin, viewed from the side, forming with the hind margin, which is somewhat sinuate and directed obliquely downwards and forwards, a large angular incurved black-pointed tooth; lower notch semicircular, bordered with white. Teeth of anal tube not apparent. Styles brown, nearly reaching the tooth on the hind margin of the pygofer, wide, lanceolate, their outer margin convex, inner margin sinuate, pilose. Length, 3 mm.

♀. This sex was apparently unknown to Fieber, but it is thus characterised by Scott: "The space between the keels on the crown, face, and clypeus smutty or black, keels of the two latter yellowish white. Elytra sordid yellow, distinctly granulated. Abdomen sordid yellow, the margins of the segments more or less broadly black."

On grass in woods. Pitlochry, Perthshire (Norman); Lulworth (Dale).

56. **L. mesomela**, *Boh.*—♂. Crown, pronotum, scutellum, and elytra white; abdomen deep black, the last two segments margined with white; legs black, knees pale. Scutellum one-half longer than pronotum. Elytra about half as long as abdomen, truncate with rounded angles, nerves non-granulate.

♀. Whitish yellow, claws black.

Macropterous form.—Elytra pellucid, longer than the abdomen, slightly widened behind, their apex narrowly rounded; veins pale yellow, somewhat infuscated towards the apex;

marginal nerve of membrane narrowly blackish. In the male the white margin to the last two abdominal segments is wanting. Length, $2\frac{1}{4}$ – $3\frac{1}{2}$ mm.

Found on grasses. Norfolk; Glanvilles Wootton, Clovelly, Langport (Dale); Woking, Chobham (Saunders); Pitlochry (Norman).

Dicranotropis, Fieb. (Pl. 1, fig. 20.)

Easily separated from the last genus by the greater length of the bifurcation of the central facial keel, which is equal to or exceeds one-half of its entire length. Of the four described European species one only has hitherto been recorded from Britain.

1. **D. hamata, Boh.**—♂. Pale testaceous, facial keels white, more or less strongly margined with black, pronotum and scutellum with a narrow white central stripe. Elytra more than half as long as abdomen, pellucid greyish white, hind margin white, truncate with rounded angles, inner apical angle with a short black line. Abdomen black with a fine pale dorsal line, and occasionally some rows of pale spots on each side. Pygofer black, down the middle of the upper side broadly white, upper notch deep, angular, hind margin strongly sinuate and directed obliquely downwards and forwards. Legs pale, thighs dusky, hind pair black.

♀. Paler than the male, abdomen pale testaceous, with the sides widely, the hind margin of each segment, and a fine line on each side of the pale dorsal line black, on the dark side portions a few rows of pale spots. Elytra less than half as long as abdomen. Legs entirely pale. In some examples the dark markings, including the short line at the apex of the clavus, are entirely wanting. Length, $2\frac{1}{4}$ – $3\frac{1}{2}$ mm.

Macropterous form.—Scutellum nearly three times as long as the pronotum, its keels obsolete. Elytra about twice as long as abdomen, whitish hyaline, inner margin at the apex of the clavus with a short black line; veins pale brown,

darker behind, closely set with fine setigerous granules. Length, 4-4½ mm.

Brachyterous form widely distributed and common; the macropterous form rather scarce. Norfolk; Cotswold district; Wotton-under-Edge (Perkins); Paisley (Young); Pitlochry (Norman); Birch Wood, Esher (Marshall); Glanvilles Wootton, Weymouth (Dale); Hastings, Bexhill, Hurst Green, Ewhurst, Shiere, Albury, Lowestoft (Butler).

Stiroma, Fieb. (Pl. 1, fig. 21.)

A small genus with the facies of *Liburnia*, but distinguished by the shorter and broader crown and the different carination of the frons. Frons smooth with two keels on the disc, which, although sometimes obsolete above, are always observable near the clypeus. This genus is well represented in Britain; there are seven species included in the Palearctic fauna, and of these we have five. *Nigrolineata* is the type of Scott's genus *Eurybregma*, but there is really no valid character by which it may be separated from *Stiroma*.

TABLE OF SPECIES.

1. (4) Facial keels filiform throughout.
2. (3) Facial keels strong, separate at the clypeus, mouth of pygofer (male) triangular.
 1. *albomarginata*.
3. (2) Facial keels feeble, confluent at the clypeus, mouth of pygofer (male) wide-oval, widest above the middle
 2. *borealis*.
4. (1) Facial keels obsolete above.
5. (10) Pronotum and scutellum not striped with black.
6. (7) Frons narrow-oblong, entirely yellow. 3. *pteridis*.
7. (6) Frons wide, narrowed and marked with black just above the clypeus.
8. (9) Styles obliquely truncate at the apex, each angle produced into a small pointed tooth. 4. *affinis*.
9. (8) Styles acuminate at the apex. 5. *bicarinata*.

10. (5) Pronotum and scutellum yellow, each with two black stripes 6. *nigrolineata*.

1. **S. albomarginata**, Curt — ♂. Crown and face brownish yellow, keels white, pronotum white, scutellum dirty yellow, elytra pitch-black, hind margin broadly white, abdomen pitch-black with a fine pale dorsal line. Crown, pronotum, and scutellum subequal in length. Elytra about one-half as long as abdomen, subtruncate at the apex. Styles spreading horizontally, triangular, acuminate.

♀. Similar to the male, but with shorter elytra and the black coloration replaced by yellow-brown. Length, 2–2½ mm.

Macropterous form.—Scutellum somewhat convex, more than twice as long as pronotum, transversely impressed behind, side keels wanting. Elytra nearly twice as long as abdomen, fusco-hyaline, veins yellow, the marginal vein of the membrane brown. Length, 3½–4 mm.

On grasses. Norwich district, common; Wotton-under-Edge (Perkins); Shiere, near Guilford (Capron); Morayshire (Norman); Chingford, Bexhill (Butler); Glanvilles Wootton, Freshwater (Dale).

2. **S. borealis**, J. Sahl. (*mæsta*, Fieb., Scott).—♂. Very similar to the last species in size and colour. Styles diverging, moderately curved, pointed, their inner margin strongly bisinuate, outer margin simple.

♀. Pale brownish yellow, facial keels and hind margin of elytra white.

Macropterous form (female).—Scutellum pitch-black, its keels obsolete. Elytra much longer than abdomen, hyaline with a faint brownish tinge, veins brownish. Abdomen black or pitch-black.

Introduced to our list by Scott without locality. A male specimen labelled *mæsta* in the British Museum, and formerly in his collection, is certainly *albomarginata*; but in that part of his collection now belonging to Mr. P. B. Mason of Burton-on-Trent there is a male of true *borealis*, but without locality.

3. **S. pteridis**, Boh.—♂. Shining black, head, pronotum,

and legs yellow. Elytra rather more than half as long as abdomen. Mouth of pygofer rhomboidal, upper notch angular. Styles black, spreading, acuminate. Anal tube white.

♀. Generally somewhat paler than the male, sometimes entirely brownish yellow. Elytra one-third as long as abdomen. Length, $2\frac{1}{2}$ –3 mm.

Macropterous form (female).—Elytra livid, brownish at the base, nerves yellowish. Length, $4\frac{1}{2}$ mm.

On *Pteris*; locally common. The macropterous form rare. Norfolk, Shiere (Capron); Epping Forest (Marshall); Chingford, Battle, Pevensey, Fritton (Butler).

4. *S. affinis*, *Fieb.*—♂. Fore parts dirty greyish yellow, abdomen yellow-brown, darker on the sides, a black patch on each side of the frons adjoining the clypeus (occasionally confluent), and another on each side of the scutellum beyond the side keels, and the claw-joints black. Crown a little longer than pronotum, which is about one-third shorter than the scutellum. Elytra about one-third as long as abdomen, subtruncate behind. Mouth of pygofer pyriform-oval.

♀. Yellowish white, with the usual black markings on the frons and scutellum, and generally a dark stripe down each side of the abdomen.

Macropterous form (female).—Crown and face yellow-brown, the dark marking at the apex of the frons faint and ill-defined, remainder of the body dark piceous. Scutellum at least twice as long as pronotum; its side keels obsolete, subparallel. Elytra one-third longer than abdomen, fusco-hyaline; veins, fine, brown. Length, $3\frac{1}{4}$ –4 mm.

On long grass in woods. Norwich district; Cotswold district, common; Wotton-under-Edge (Perkins); Shiere (Capron).

5. *S. bicarinata*, *H. Scff.* (*nasalis*, *Scott*).—This species so nearly resembles the preceding that it can only be separated from it with certainty by the characters derived from the male genitalia. Mouth of pygofer pyriform-oval.

Rare. Booton Common, Norfolk; Shiere (Capron); Glanvilles Wooton (Dale); Pitlochry (Norman).

6. *S. nigrolineata*, Scott.—♂. Crown almost twice as broad as long, brown, impressions black, keel between the two basal ones yellow. Face yellow-brown, its lower half, outside the middle keels, black; keels rudimentary, approximating and uniting at the apex. Pronotum and scutellum yellow, their side margins and a wide stripe down each side of the centre black. Elytra much longer than the abdomen, whitish hyaline; a brown stripe (becoming darker behind) near the costa, another near the claval suture, and a third down the middle of the clavus, round the apex broadly black. Abdomen black, dorsal line and side margins narrowly yellow. Pygofer black, with a somewhat triangular yellow patch on each side near the upper margin, hind margin almost vertical, mouth transverse-ovate. Styles long, aculeate, diverging, almost touching the margin at the height of the anal tube. Legs pale fuscotestaceous, thighs with a black stripe on the inside. Length, nearly 5 mm.

♀. Similar to the male.

In the brachypterous form the elytra are about half as long as the abdomen, truncate with rounded angles, and the veins are non-granulate.

Morston, Norfolk, on a fine-leaved long grass growing on a bare salt-marsh; Fawley, Hants (Scott).

VII. CERCOPIDÆ.

In this well-marked family the hind tibiae are subterete and furnished with a ring of spines at the apex and two spines on the outer side, one near the base and the other beyond the middle. Frons tumid. The crown bears on the hind part of its disc two ocelli, and adjoining the middle of its front margin there is a space, generally subquadrate, distinctly marked off from the remainder by an impressed line. The pronotum is obliquely narrowed behind from the point of insertion of the elytra, and its apex is occupied by an angular notch, so that the scutellum, instead of being

triangular as usual, is irregularly rhomboidal in shape. The elytra are corneous, punctured, and more or less closely covered with fine pubescence. The two basal joints of the tarsi are denticulate at the apex, and the pulvilli between the claws are distinct. This family contains the well-known "cuckoo-spit frog-hoppers," and the frothy excretion in which the insects reside during their pre-imaginal stages has often been described. We have in Britain three out of the five genera of *Cercopidæ* found in the Palearctic region.

TABLE OF GENERA.

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|---|-------------------------|
| 1. (2) Front of pronotum straight. | i. <i>Triecphora</i> . |
| 2. (1) Front of pronotum produced between the eyes. | |
| 3. (4) Crown and pronotum with a middle keel. | ii. <i>Aphrophora</i> . |
| 4. (3) Crown and pronotum not keeled. | iii. <i>Philænus</i> . |

i. *Triecphora*, *Am. et Serv.* (Pl. 1, fig. 22.)

Ocelli much nearer to each other than to the eyes. Rostrum 2-jointed, not reaching beyond the middle coxæ. The free side margins of the pronotum as long as the scutellum. Of the eight described Palearctic species we possess but one.

1. *T. vulnerata*, *Illig.*—Black, the basal third of the clavus, an abbreviated band across the middle of the corium, and an outwardly curved band just before the apex of each elytron, blood-red. Pubescence pale and very fine. Punctuation very close and fine. Side keels of the face indistinct, the central one wanting. Length, 10–11 mm.

On alder and willow, also on grasses and *Pteris*. New Forest, Darenth Wood (Curtis); Swanscombe Wood; Shropshire (Marshall); Cotswold district; Lincolnshire, Derbyshire (Fowler); Glanvilles Wootton (Dale); Hastings,

Eastbourne (E. A. Butler); Paisley, (Young); Bagley Wood, near Oxford (Shipp); Haslemere (Buckton); Edlingham Wood, near Doncaster; Huddersfield.

ii. **Aphrophora**, *Germ.* (Pl. 1, fig. 23.)

Ocelli as in the last genus. Rostrum 3-jointed, reaching, or nearly reaching, the hind coxæ. The free side margins of the pronotum much shorter than the scutellum.

We possess two species of this genus, which may be thus distinguished:

Costa with an oblique band-like spot near the middle and another (triangular) behind. 1. *alni*.

Costa without distinct white markings. 2. *salicis*.

A third species, *A. corticea*, *Germ.*, should be looked for in Britain. In appearance it resembles *alni* rather than *salicis*, and is distinguished from either by the distinctly raised pale sides of the scutellum. It has an European distribution, and has occurred in Finland on willow bushes in August.

1. **A. alni**, *Fall.*—Pale greyish brown with very short yellow pubescence, closely and deeply punctured with black, except on the white portion of the elytra, where the punctuation is pale. Markings on elytra as above. Abdomen black. Legs pale, dark at the extreme apex. Length, $8\frac{1}{2}$ – $9\frac{1}{2}$ mm.

Occurs on alders, &c.; generally distributed and common throughout Europe.

2. **A. salicis**, *De. G.*—Greyish yellow with short yellow pubescence, closely and finely punctured with black. Elytra occasionally with faint traces of a triangular whitish spot on the costa near the base. Length 10–10½ mm.

Occurs on *Salices*. Widely distributed, but not generally common. Norwich district; Cotswold district; Hurst Green, Chobham, Barnet, Chilworth (Surrey), (Butler); Christchurch, Shipwick, Whittlesea Mere (Dale); Woking, common on willows (Saunders).

iii. *Philæenus*, *Stal.* (Pl. 1, fig. 24.)

Ocelli nearer to the eyes than to each other. Rostrum 2-jointed, not reaching beyond the middle coxæ. The free side margins of the pronotum much shorter than the scutellum.

In the matter of colour and pattern *P. spumarius* is quite Protean, but there is in our other species no variation calling for remark, with the exception of a tendency for the black stripe on the elytra of *P. lineatus* to spread out and in extreme cases to cover the whole elytron.

TABLE OF SPECIES.

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| 1. (2) Sides of elytra distinctly rounded. | 1. <i>spumarius</i> . |
| 2. (1) Sides of elytra parallel. | |
| 3. (6) Costa with one or more large white spots. | |
| 4. (5) Costa with two white spots. | 2. <i>campestris</i> . |
| 5. (4) Costa with one white spot and a white streak | |
| | 3. <i>exclamationis</i> . |
| 6. (3) Costa with a white streak, without spots, or elytra entirely black. | 4. <i>lineatus</i> . |

1. *P. spumarius*, *Linn.*—This abundant species may at all times be readily distinguished from its congeners by the distinctly curved side margins of its elytra. It occurs in numerous varieties, which are for the most part well-marked and do not appear to be in any way correlated with sex or habitat. The following is a list of some of the more distinct varieties, but other combinations of colour and pattern occur; although none of these varieties are rare, it is probable that the greater number of specimens belong to the first.

- Var. 1. Yellowish brown, costa with two large transverse white spots. *spumaria*, *Auct.*
 „ 2. Head and pronotum yellow, elytra black with two large transverse white spots on the costa. *fasciata*, *Fab.*

- Var. 3. Crown and front half of the pronotum yellow; hind part of the latter, scutellum, and elytra black, the latter with a large white transverse spot before the middle. *gibba*, Zett.
- „ 4. Black mottled with yellow, elytra with a small round white spot behind. *biguttata*, Fab.
- „ 5. Entirely black. *leucophthalma*, Linn.
- „ 6. Black with the crown and front of pronotum yellow. *leucocephala*, Linn.
- „ 7. Black; sides of elytra widely yellow. *lateralis*, Linn.
- „ 8. Black; crown, front of pronotum, and sides of elytra yellow. *marginella*, Fab.
- „ 9. Yellowish; hind part of pronotum, scutellum, and a wide sutural stripe brown. *vittata*, Fab.
- „ 10. Yellowish; crown, pronotum, and margin of elytra at the base and apex black. *ustulata*, Fall.
- „ 11. Yellowish; hind part of pronotum, scutellum, and apex of elytra brown. *præusta*, Fab.
- „ 12. Yellowish; middle of the hind part of pronotum, scutellum, a stripe on the elytra, and the suture blackish brown. *lineata*, Fab.
- „ 13. Unicolorous yellow. *populi*, Fab.
- Length, 5–6 mm.
- Very abundant.

2. *P. Campestris*, Fall.—Upper side pale yellowish brown or fawn-colour, costa at the base narrowly and two large triangular spots upon it behind white. Very closely and finely punctured. Pubescence dense, pale. Crown, pronotum, and scutellum sometimes with a blackish brown central stripe. Length, 4–5 mm.

Locally abundant on low plants in dry places. Norwich district; Brandon (on Scotch firs); Cotswold district; Hastings, Camber (near Rye), Hurst Green, Ewhurst, Shiere, Maiden-

head (E. A. Butler); Bournemouth, The Lizard, Craig Caillach (Dale); Woking (Saunders).

3. **P. exclamationis**, *Thumb.*—Lighter or darker yellowish brown with a faint bronzy tinge, costa widely and a large triangular spot upon it just before the apex white. Apex of the clavus sometimes widely pale. Very closely and somewhat strongly punctured, densely clothed with short pale hairs. Length, $3\frac{1}{2}$ –4 mm.

Locally abundant on low plants in dry places. Very abundant on the heaths of West Norfolk; Cotswold district; Chobham, Eridge, Lowestoft, Leith Hill, Shiere (E. A. Butler), Glanvilles Wootton, Freshwater, Dover, Holyhead, Lulworth (Dale); Perth district (McGregor); Swithland Slate Quarries; Wimbledon Common (Marshall).

4. **P. lineatus**, *Linn.*—Pale yellow, costa with a white stripe, just within which is a black one, which becomes indistinct on the hinder half of the elytron. Densely clothed with very short pale pubescence, punctuation very close and fine. Length, $4\frac{1}{2}$ –6 $\frac{1}{2}$ mm.

Entirely black examples of this species have been taken not uncommonly at Chobham.

Very common on almost all kinds of herbage. Norwich district; Cotswold district; Hastings, Dallington Forest, Chobham (black var.), Ewhurst, Lowestoft, Ascot (black var.), Camber (E. A. Butler); Glanvilles Wootton, Freshwater, Bude (Dale); Solway district (Robinson-Douglas); Dublin (Halbert); Paisley (Young); Perth district (McGregor); Ardara (Johnson).

VIII. LEDRIDÆ.

This family contains but one genus and species, the characters of which are given below.

R

Ledra, Fab. (Pl. 1, fig. 25.)

Body oblong, convex above, flat beneath. Crown lamellar, a little declivous, its front margin bluntly angular in the middle, and forming a distinct obtuse angle near each eye. Eyes small, globose. Ocelli near the base of the crown, nearly twice as far from the eyes as from each other. Pronotum raised on each side into a larger rounded longitudinal wing or crest. Elytra corneous with an irregular network of veins in their apical half. Outer edge of hind tibiae flattened and produced in a knife-like form, ciliate on the distal half, which bears three or four strong saw-like teeth.

1. **L. aurita, Linn.**—Lighter or darker brown with a greenish tinge, elytra paler towards the apex, with a broad indistinct pale band before the middle, and traces of a pale subtriangular spot on the costa just before the apex. Abdomen above black (male) or brownish yellow (female). Upper side roughly punctured with brown. Crown tricarinate, the side keels abbreviated. Pronotum in front and between the processes and the scutellum behind transversely wrinkled. Veins of elytra brown, strongly raised. Length, 13–18 mm.

Widely distributed, but not common; lives upon oak. Norfolk; Cotswold district; London and Midland districts, near Cheltenham, Purfleet (Marshall); Glanvilles Wootton, Purley, New Forest (Dale); Woking (Saunders).

IX. ULOPIDÆ.

This is another family which comprises only a single genus.

Ulopa, Fall. (Pl. 1, fig. 26.)

Our representatives of this genus are small insects, very broad in front, with convex corneous strongly veined and coarsely punctured elytra. The frons is swollen and the front margin of the crown is acute. The tibiae are all trigo-

nate and unarmed ; and the hind tibiæ are only a little longer and not any stouter than the front pairs.

Of the five described European species only two have been detected in Britain, and they may be distinguished as follows :

Front margin of crown forming an obtuse but distinct angle near each eye, straight or faintly concave in the middle.

1. *reticulata*.

Curve of front margin of crown continuous.

2. *trivia*.

1. *U. reticulata*, *Fab.*—Brown with a reddish tinge, elytra with two oblique white bands running from the suture to nearly the same point on the costa. Fore parts strongly punctured. Crown with a large depression near each eye. Pronotum with a horseshoe-shaped impression on each side. Elytra convex, parallel-sided, narrowed and deflexed behind, ocellate-punctate ; veins strongly raised, claval suture not apparent.

Macropterous form.—Pronotum wider and more convex behind. Elytra pellucid, not deflexed behind, claval suture distinct, the white bands obsolete. Length, 3–3½ mm.

Common under *Erica* and *Calluna*. Darenth Wood, Esher, Weybridge, Epping Forest, Bardon Hill and Bradgate Park, Leicestershire, Rannoch (Marshall) ; Haslemere (Buckton) ; Norfolk ; Bournemouth, Land's End (Dale) ; Battle, Netherfield (Sussex), Guestling, Shalford, Ewhurst (E. A. Butler) ; Armagh, Ardara, Donegal, Newtown Hamilton (Johnson) ; Dublin (Halbert) ; Solway district (Robinson-Douglas) ; Paisley (Young).

2. *U. trivia*, *Germ.*—Similar in form to the preceding, but somewhat smaller. Male yellowish white ; a broad stripe on the crown near each eye, the front and hind margins of pronotum, and three stripes on each elytron, dark brown or black. Female entirely yellowish white. Length, 2½–3½ mm.

Occurs at the roots of low plants, and has been but rarely

taken in Britain. Winfrith, near Lulworth, 6 August, 1836, by sweeping long coarse grass near furze bushes (J. C. Dale); Riddlesdown, at roots of low plants (Douglas); Shiere, near Guildford (Capron).

X. PAROPIDÆ.

This family is represented in Britain by the single genus *Megophthalmus*, erected by Curtis for the *Cicada scanica* of Fallen. The latter is a small inconspicuous insect of which the sexes are dissimilar, but which may always be recognised by the form of the keel separating the crown from the face, which somewhat resembles a letter X laid on its side.

Megophthalmus, Curt. (Pl. 1, fig. 27.)

Each end of the keel dividing the crown from the face split into a fork, in the angle of which is placed an ocellus. Frons excavated above. Legs feeble; tibiæ unarmed, with the exception of a few bristles on the outer angles of the hinder pairs, front pairs trigonate, hinder pair four-angled.

1. *M. scanicus*, Fall.—Dirty brownish yellow, roughly punctured, veins of elytra strongly raised. Male; crown with three spots, pronotum with a fine central line and two blotches on each side confluent in front, and the scutellum entirely, except a short pale line at each end of the transverse impression, black; female generally entirely pale, but examples are frequently met with in which the dark markings of the male are strongly indicated, the elytra have the veins and two short lines on the suture fuscous or black, and the areas, especially towards the apex, are sparingly speckled with fuscous. Length, 3–4 mm.

Widely distributed and common at the roots of low plants. Norfolk; Cotswold district; Leicestershire, Esher, Rannoch (Marshall); Isle of Portland (Curtis); Berwickshire, Edinburgh (Hardy); Paisley, Renfrewshire (Young); Dublin district (Halbert).

XI. BYTHOSCOPIDÆ.

A well-marked family, rather numerous in species, and characterised by the position of the ocelli, the multispinose tibiæ, and the extreme shortness of the crown in proportion to its width.

Forehead obtuse. Crown short and very wide, rarely longer in the middle than at the sides. Ocelli on the upper part of the frons much below its upper margin. Face dilated, frons and clypeus somewhat convex. Cubital veins forked, the inner one joined to the brachial by a transverse vein. Front tibiæ without spines on the outer side.

All the genera found in Europe are represented in Britain.

TABLE OF GENERA.

1. (6) Antennæ inserted in a deep cavity beneath a ledge.
2. (5) Striation of pronotum transverse.
3. (4) Side margins of pronotum sharply keeled, of moderate length. i. *Macropsis*.
4. (3) Side margins of pronotum not sharply keeled, very short. ii. *Bythoscopus*.
5. (2) Striation of pronotum running obliquely from the middle of its front margin towards its hinder angles. iii. *Pediopsis*.
6. (1) Antennæ inserted in a feeble cavity, their base free.
7. (8) Head with the eyes wider than the elytra at the base. Membrane with an appendix. iv. *Idiocerus*.
8. (7) Head with the eyes as wide as the elytra at the base. No appendix to the membrane. v. *Agallia*.

i. *Macropsis*, *Lewis*. (Pl. 1, fig. 28.)

Crown with the eyes not wider than the pronotum. Frontal suture not reaching the base of the antennæ. Pro-

notum finely transversely striate. Elytra subcoriaceous, deeply punctured.

We have two species which may be distinguished as follows:

- | | |
|-------------------------------------|--------------------------|
| Elytra finely punctured with black. | 1. <i>microcephala</i> . |
| Punctuation of elytra concolorous. | 2. <i>lanio</i> . |

Besides the two species characterised above, there are two others which are found over the greater part of Europe, and which may possibly be found to occur in this country. The first of these, *M. scutellaris*, Fieber, occurs on elms, and is distinguished from *M. lanio*, amongst other things, by the horseshoe-shaped impression on the scutellum. The second, *M. prasina*, Fab., is said by Fieber to resemble *M. microcephala* in the shortness of the ledge above the base of the antennæ, but it is not punctured with black, and the abdomen is reddish above in both sexes. So far as I am aware, its food-plant has not been recorded.

1. ***M. microcephala*, H.-S.**—Very pale green, elytra with a fine black punctuation, which occasionally extends to the crown and pronotum. Crown distinctly longer in the middle than at the sides, at least in the male. Length, 4–5 mm.

On *Helianthem vulgare*. Mickleham, July (Scott); Shiere, Chilworth (E. A. Butler); Wotton-under-Edge (Perkins); Cotswold district.

2. ***M. lanio*, Linn.**—Crown, pronotum, and scutellum pale brown, more or less closely speckled with red-brown or black; elytra pale reddish brown (male), or green (female), with a shallow rugose punctuation and strongly raised veins. Crown not longer in the middle than at the sides. Length, 7–8 mm.

Common on oaks; generally distributed. Norfolk; Cotswold district; Glanvilles Wooton (Dale); Hastings, Dallington Forest, Highgate, Barnet, Ewhurst, Lowestoft, Wymondley, Llanwrtyd, S. Wales (E. A. Butler); Wotton-under-Edge

(Perkins); Solway district (Robinson-Douglas); Dublin (Halbert); Paisley (Young).

ii. **Bythoscopus**, *Germ.* (Pl. 1, fig. 29.)

Distinguished from the preceding genus by its impunctate elytra and the much greater obliquity of the ledge which covers the base of the antennæ, and from the following by the less angular hind margin of the crown and the transverse sculpture of the pronotum. Two transverse veins standing on the brachial vein.

TABLE OF SPECIES.

1. (4) Face (seen in profile) somewhat flattened.
2. (3) Length $5\frac{1}{2}$ –6 mm. Face with a deep narrow curved impression on each side, which is distinct in the female. Inhabits alder.

1. *alni*.

3. (2) Length 4–5 mm. Face with a wide shallow impunctate impression on each side, which is only faintly indicated in the female. Inhabits willow and birch.

2. *rufusculus*.

4. (1) Face strongly convex, consequently the facial impressions appear much deeper than in the other species.

3. *flavicollis*.

1. **B. alni**, *Schr.*—♂. Crown and face greenish yellow, the former more or less suffused with blackish, but having a pale central line and a black puncture on each side, the latter with a pale central line in its upper half, a black puncture on each side near the eye, the upper part of the curved impression filled up with black and generally a pair of small black points towards the apex. Pronotum greenish yellow, with a large irregular dark patch on each side of the front margin and one or two black punctures behind each eye, the disk having a blackish appearance owing to the channels of the sculpture being mostly black. Scutellum reddish yellow;

a large triangle on each side of the base, a linear central stripe, the transverse channel and a pair of small round spots just above it, brown or black. Elytra transparent, brownish yellow, the apical two-thirds of the costal and subapical areas, the disc of the subcostal area and that below it, and a broad band at the base of the clavus, whitish hyaline; claval suture and the veins dark brown or black; cubital vein as far as the fork, brachial vein as far as the first transverse vein, the basal three-fourths of the anal and axillary veins, the vein of the inner margin, with the exception of a short piece at the apex of the clavus and the part between the apices of the anal and axillary veins, white. Abdomen above black, hind margin of the segments narrowly reddish. Legs pale, hind tibiae with a black stripe both on the inner and outer sides.

♀. Similar in coloration to the male, but with all the dark marking less pronounced, and the abdomen above entirely reddish yellow-brown. Length, $5\frac{1}{2}$ –6 mm.

Common on alder. There is a variety of *B. flavicollis* which closely resembles the present species in size and colour, but apart from the difference in habitat it is distinguishable by its more convex face.

Norfolk; Cotswold district; Guestling, Ewhurst (E. A. Butler); Glanvilles Wootton (Dale); Wotton-under-edge (Perkins); Ardara (Johnson).

2. *B. rufusculus*, *Fieb.*—♂. Crown dark brown or black, narrowly greenish yellow in front with a black puncture on each side. Face greenish yellow, generally with a narrow black band above not reaching the ocelli at either end. Pronotum greenish yellow, the channels of the sculpture mostly blackish. Scutellum reddish yellow; a large triangle on each side at the base, a narrow central stripe reaching as far as the transverse channel, and occasionally a pair of minute round spots just above the latter, reddish brown or black. Elytra whitish hyaline, clavus with a faint yellow-

brown tinge; the apical areas, an ill-defined spot on the base of the second and third subapical areas, the apex of the clavus, and the space between the apices of the anal and axillary veins, dark brown, claval suture and the veins blackish brown, the basal half of the axillary vein white. Abdomen above black, hind margins of the segments very narrowly yellow. Hind tibiæ with a black stripe on the outer edge only.

♀. Crown, face, pronotum, scutellum, and upper side of the abdomen reddish yellow-brown, generally without darker markings. Elytra brown, the discs of the subcostal area and the one below it and the apical three-fourths of the subapical areas whitish hyaline. Length 4–5 mm.

On sallow and birch, local. Norwich district; Heathfield (Sussex), Ewhurst (E. A. Butler); West Ross-shire (Robinson-Douglas); Coney Island, Ardara (Johnson).

3. *B. flavicollis*, Linn.—An exceedingly variable species, but always easy to recognise when once the decided convexity of the face has been appreciated. The following are some of the more usual colour varieties:

1. Elytra whitish hyaline, veins blackish brown.
2. Upper side entirely pale brown.
3. Upper side greenish yellow.
4. Crown, pronotum, scutellum, and base of the clavus widely greenish yellow. Elytra pale yellow-brown, a large ill-defined blotch in the middle and another before the apex white.
5. Closely resembling female *alni* in the coloration of the elytra.

Length, 5–6 mm.

Very common on birch. With the exception of No. 3, which is comparatively rare, all the varieties occur in nearly equal numbers, frequently all on the same tree. It appears that the specimens of No. 1 are for the most part males. Norfolk; Cotswold district; Glanvilles Wootton, Bonchurch

(Dale); Hastings, Hurst Green, Frant, Loughton, Shiere (E. A. Butler); Armagh, Clonmacate, Loughgall, Ardara (Johnson); Wotton-under-Edge (Perkins); Solway district West Ross-shire (Robinson-Douglas); Paisley, Renfrewshire (Young); Dublin (Halbert); Perth district (McGregor); Rannoch (Marshall).

iii. **Pediopsis**, *Burm.* (Pl. 1, fig. 30.)

Distinguished from its allies by the direction of the sculpture of the pronotum. The species of this genus fall naturally into two groups, the one consisting of wide species with the crown less angular and the face convex, with its upper margin, widely rounded, as in *tilia scutellatus*, &c., and the other comprising our remaining species, which are narrower and more pointed in front, and have the face flat and rhomboidal in shape. The full complement of black markings on the face of those species which have spotted faces is nine, placed as follows: a pair of moderate size near the upper margin, with a dissimilar one between them, a small round one at each ocellus, a large subtriangular or comma-shaped pair just above the clypeus, and between the bases of these a minute punctiform pair. These markings occur in various combinations in different species, but notwithstanding their liability to vary within certain limits, they afford useful aids to identification. Two transverse veins standing on the brachial vein. We possess eleven species of the twenty-two given by Puton as Palearctic.

TABLE OF SPECIES.

- | | |
|--|-------------------|
| 1 (2) Crown linear, scarcely visible from above. | 1. <i>tilia</i> . |
| 2. (1) Crown distinctly visible from above. | |
| 3. (8) Front margin of crown rounded or scarcely angular in front. Face distinctly convex. | |
| 4. (5) Elytra lacteo-hyaline. | 2. <i>nanus</i> . |

- 5. (4) Elytra hyaline with a brownish yellow tinge,
nerves dark brown or black.
- 6. (7) Inner side of hind tibiæ pale throughout. 3. *scutellatus*.
- 7. (6) Inner side of hind tibiæ with two short black
streaks, one near the base, the other just before
the apex. 4. *tibialis*.
- 8. (3) Front margin of crown nearly rectangular. Face
flat.
- 9. (20) Species not pale green.
- 10. (17) Face spotted with black.
- 11. (14) Nerves darker than the elytra.
- 12. (13) Nerves not suffused with fuscous. 5. *nassatus*.
- 13. (12) Nerves at the base of the subapical areas con-
spicuously suffused with fuscous. 6. *fuscinervis*.
- 14. (11) Nerves concolorous.
- 15. (16) Wider and less pointed in front; elytra without
fuscous bands. 7. *impurus*.
- 16. (15) Narrower and more pointed in front; elytra
with two wide ill-defined fuscous bands 8. *distinctus*.
- 17. (10) Face unspotted.
- 18. (19) Costa narrowly brown. Inhabits elm. 9. *ulmi*.
- 19. (18) Costa concolorous. Inhabits willow. 10. *cereus*.
- 20. (9) Species pale green. 11. *virescens*.

1. *P. tilia*, Germ.—Head and pronotum greenish yellow. Scutellum and elytra yellow-brown, the latter generally irrorated with darker brown, especially towards the apex; on the inner margin beyond the apex of the clavus a whitish spot followed by a dark brown one. Abdomen above black, hind margin of the segments narrowly pale, beneath yellow. Legs yellow-brown. Length, 5–5½ mm.

Rare. Its food-plant is *Tilia parvifolia*, but I am not aware that its connection with that tree has been observed in this country, and in fact a specimen kindly given to me by

Mr. V. R. Perkins almost certainly did not come off *Tilia*. Esher, June (Scott); Wotton-under-Edge (Perkins).

2. **P. nanus**, *H.-S.*—♂. Body black, face generally with a stripe on its lower half and the free side margins narrowly yellow. Hind margin of the crown narrowly, sides and hind margin of the pronotum, and the hind margin of the scutellum irregularly whitish. Elytra lacteo-hyaline; veins, brown, paler on the disc. Legs pale, hind pairs of thighs black except at the apex, all the tibiae with a black spot at the outside at the base.

♀. Face above and the crown more or less yellow. Otherwise as in the male. Length, 2–2½ mm.

Not generally common; occurs on short grass in dry places. Boxhill, end of July (Scott); Shiere (E. A. Butler).

3. **P. scutellatus**, *Boh.*—Head and pronotum pale greyish yellow, the former with from four to nine black spots, of which the uppermost pair are round, and the dissimilar one when present takes the form of a short double stripe, the latter more or less blotched with brown or black, so as to leave the sides and front margin irregularly pale. Scutellum yellow, with a black triangle on each side at the base, and frequently a pair of black points before the transverse channel. Elytra hyaline with a faint brownish yellow tinge; claval suture and the veins, brown or black. Abdomen black, hind margins of the segments more or less widely yellow. Legs greyish yellow, hind tibiae with a black spot on the outside at the base. Length, 4½–5¼ mm.

Common on sallocs. Norwich district; Cotswold district; Highgate, Barnet, Ewhurst, Shiere (E. A. Butler); Glanvilles Wootton (Dale); Wotton-under-Edge (Perkins); Wimbledon Common, Leicester (Marshall).

4. **P. tibialis**, *Scott.*—Very similar in appearance to the preceding, but the two uppermost facial spots have a tendency

to become comma-shaped, and have the included space suffused with blackish; the spot at each ocellus, which is seldom developed in *scutellatus*, is almost invariably well-marked, while the pair of punctiform spots between the base of the lower comma-shaped pair are wanting; the hind tibiæ, too, in addition to the spot on the outside at the base, have two short black streaks on the inner side, which latter markings are occasionally present on the inner side of the two front pairs. Length, $3\frac{1}{2}$ – $4\frac{1}{2}$ mm.

Occurs on brambles, and on that account may be distinguished from *scutellatus*, Boh., even in those specimens in which the dark markings on the inner side of the hind tibiæ and the upper part of the face are wholly or partially wanting. Dartford Heath, Headley Lane, Bexley Road (Scott); Norwich district; Cotswold district; Portland (Dale); Battle, Barnet, Shiere, Maidenhead (E. A. Butler); Wotton-under-Edge (Perkins); Dublin district (Halbert).

Pediopsis rubi, Boh, which occurs on *Rubus idæus*, should be found in Britain. It would be distinguishable from *tibialis* by its food-plant and the absence of the dark markings on the inner side of the hind tibiæ.

5. **P. nassatus**, Germ.—♂. Face yellow, the uppermost pair of black spots small and round, with the space between them frequently dusky but no dissimilar spot, the lower comma-shaped pair very large, the pair of points between the bases of the latter distinct, and the spot at each ocellus occasionally present. Pronotum yellow with an ovate black spot behind each eye, its disc more or less suffused with brown or black. Scutellum yellow with a large black triangle on each side at the base. Elytra hyaline with a brown tinge, claval suture and the veins pale brown. Abdomen above black, hind margins of the segments very narrowly paler. Thighs generally piceous, tibiæ with a black stripe on the inner side, hind pair with a black spot on the outer side, at the base.

♀. Similar to the male, but with a strong green tinge in the only example which I possess. Length, 4½–5 mm.

I have never seen a British example of this species, but as it was introduced to our list by Scott in 1874, and is recorded from Glanvilles Wootton by Dale, I give it a place here. A specimen lent to me as this species by Scott was certainly *scutellatus*, and the same may be said of specimens ex. coll. Douglas. The known distribution of the species, however, renders its occurrence in this country extremely probable.

6. *P. fuscinervis*, Boh.—♂. Face greyish yellow with from three to five black spots, of which the subtriangular dissimilar spot is the largest and most constant, the uppermost pair are frequently reduced to mere points, and the lower comma-shaped pair are either represented by a pair of black points or absent altogether. Pronotum greyish yellow, its disc more or less suffused with brown, the smooth ovate space behind each eye sometimes filled up with black. Scutellum greyish yellow with a black triangle on each side at the base and a pair of black points just above the transverse channel. Elytra whitish hyaline with a strong brown cloud on the base of the subapical areas, and the apical areas and the clavus below the anal vein tinged with brown; veins strong, rust-brown. Abdomen above black, hind margins of the segments narrowly yellow. Legs pale, hind tibiae with a small black spot on the outer side at the base.

♀. General coloration with a bright rust-brown tinge. Length, 4½–5 mm.

This species occurs, sparingly, on *Aspen* at Stoke Holy Cross, Norfolk, and Mr. E. Saunders has taken it at Surbiton.

Scott's single female example, on the strength of which he introduced the species to our list (*Entomologist's Monthly Magazine*, vol. x. p. 192), and which he was good enough to lend to me, was really *scutellatus*.

7. *P. impurus*, Boh.—Face greyish yellow, its disc

frequently suffused with dusky, the three uppermost spots subequal in size, the lower comma-shaped ones large and well-marked. Pronotum pale brownish grey, the smooth space behind each eye filled up with black. Scutellum greyish yellow, with a black triangle on each side at the base and occasionally a pair of black points just above the transverse channel. Elytra subopaque, pale brownish grey, veins concolorous. Abdomen above black with the hind margins of the segments more or less widely yellow. Legs as in *fuscinervis*. Length, $3\frac{1}{4}$ –4 mm.

Not uncommon on *Salix repens*. Norwich district; Chingford (E. A. Butler); Shiere (Dale); Wotton-under-Edge (Perkins); Woking, Chobham (Saunders).

Blackish grey varieties are not uncommon, and in these the veins are paler than the elytra.

8. **P. distinctus**, *Scott*.—Similar in appearance to the last, but the body is narrower and the angle of the crown more pointed. Elytra pale brownish grey, subopaque, a stripe along the costa, a wide band across the middle, and another across the base of the membrane, fuscous; apical half of the clavus mottled with fuscous; veins concolorous. Length (male), 4 mm.

Darenth, July (Douglas). Examples in which the markings of the elytra are wanting might be mistaken for *P. impurus*, but on comparison of the two the narrower and more pointed form of *distinctus* is very apparent.

The above description is drawn from one of the original examples lent to me by Scott, and the species is, in my opinion, perfectly distinct from its immediate allies.

9. **P. ulmi**, *Scott*.—Fore parts brownish yellow. Scutellum with a brown triangle on each side at the base. Elytra and legs yellow-brown, the former subopaque with the costa narrowly dark brown and the veins concolorous. Hind tibiae with a black spot on the outer side at the base. Abdomen

above (male) black, hind margins of the segments narrowly pale; female brownish yellow. Length, 4-5 mm.

On elm; usually not common. Lee (Douglas and Scott); Norwich district; Woking (Saunders); Shalford (E. A. Butler). Dr. Puton, in his catalogue, puts *ulmi*, Scott, as a synonym of *glandacea*, Fieber; but as Scott's description notices the dark costal stripe, a character by which the species is most readily separated from its immediate allies, and Fieber's description would apply equally well to many specimens of *P. cercus*, I have given the preference to Scott's name.

10. *P. cercus*, Germ.—Face greyish yellow. Upper side reddish yellow-brown. Scutellum sometimes with a red-brown triangle on each side at the base. Elytra subopaque, just behind the middle a broad red-brown band, which seldom reaches the inner margin and never the costa; veins concolourous. Legs concolourous, hind tibiae as in the last species. Abdomen above (male) black, hind margins of the segments narrowly pale; (female) brownish yellow. Length, 4-5 mm.

Common on sallows. Lee, Dunoon (Douglas and Scott); Norwich district; Cotswold district; Glanvilles Wootton (Dale); Battle, Ewhurst, Shiere, Chingford (E. A. Butler); Woking, Chobham (Saunders). Very frequently the dark brown band on the elytra is only indicated on the inner margin, though it is rarely entirely wanting, and in the latter case the species is best distinguished from *ulmi* by its habitat and the want of the brown line next the costa.

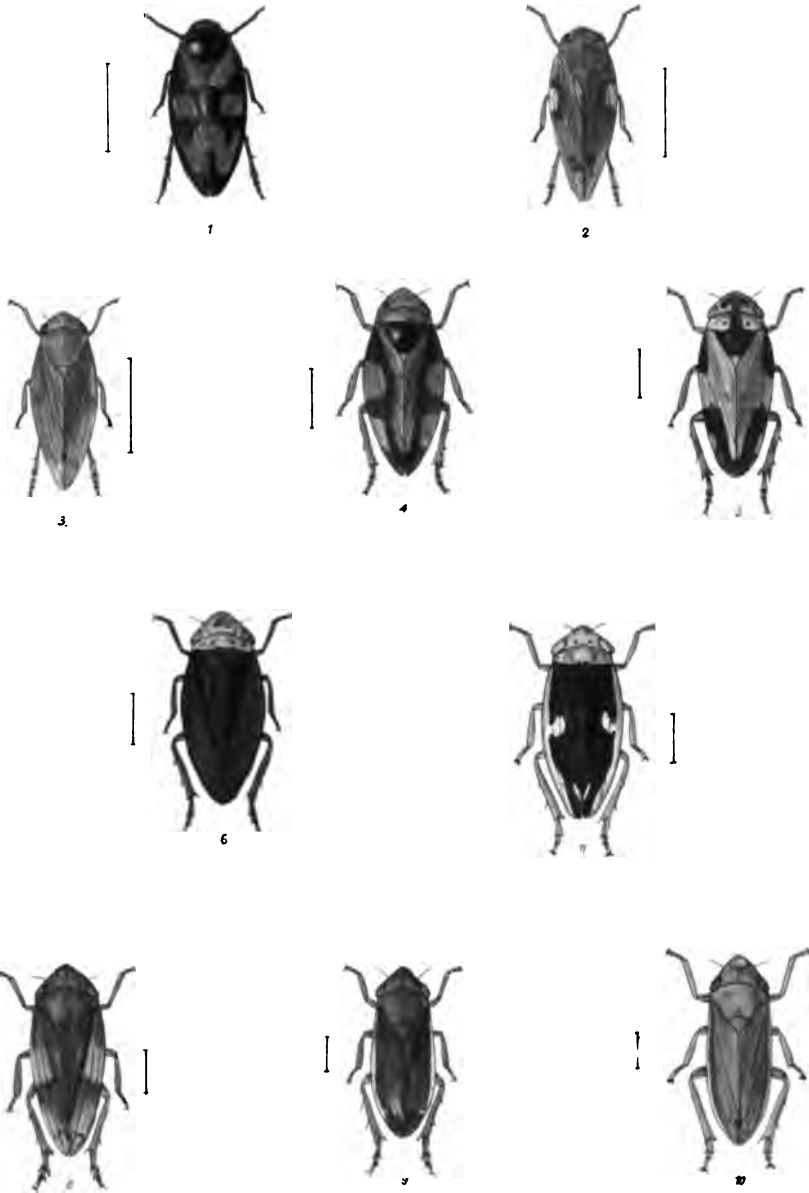
11. *P. virescens*, Fab.—Pale yellowish green, abdomen above in the male black, the hind margins of the segments very narrowly pale. Elytra whitish hyaline, veins yellowish green. Length, 4-5 mm.

Common on *Osiers*, &c. Norwich District; Cotswold District; Battle, Bexhill, Shalford, Ewhurst (E. A. Butler); Glanvilles Wootton (Dale); Wimbledon Common (Marshall).

PLATE IX.

- FIG. 1. *Triecphora vulnerata*, Illig.
2. *Aphrophora alni*, Fall.
3. „ *salicis*, De G.
4. *Philænus spumarius*, Lin. var.
5. „ „ „
6. „ „ „
7. „ „ „
8. „ *campestris*, Fall.
9. „ *exclamationis*, Thumb.
10. „ *lineatus*, Lin.

PLATE 9.



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PLATE X.

FIG. 1. *Ledra aurita*, Lin.

1a. „ „ (lateral aspect).

2. *Ulopa reticulata*, Fab.

3. „ *trivia*, Germ.

4. *Megophthalmus scanicus*, Fall.

4a. „ „ (front view of head).

5. *Macropsis microcephala*, H.-S.

6. „ *lanio*, Lin.

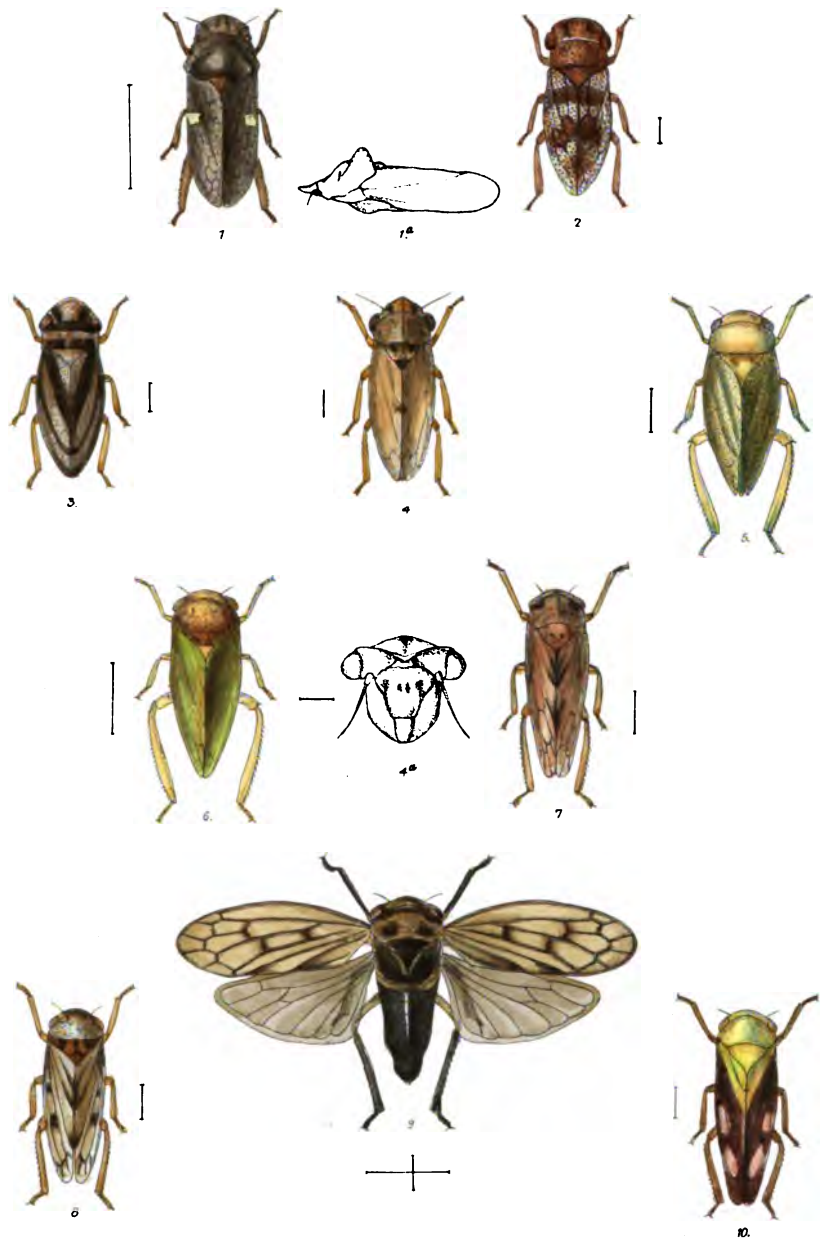
7. *Bythoscopus alni*, Schr.

8. „ *rufusculus*, Fieb.

9. „ *flavicollis*, Lin.

10. „ „

PLATE 10.



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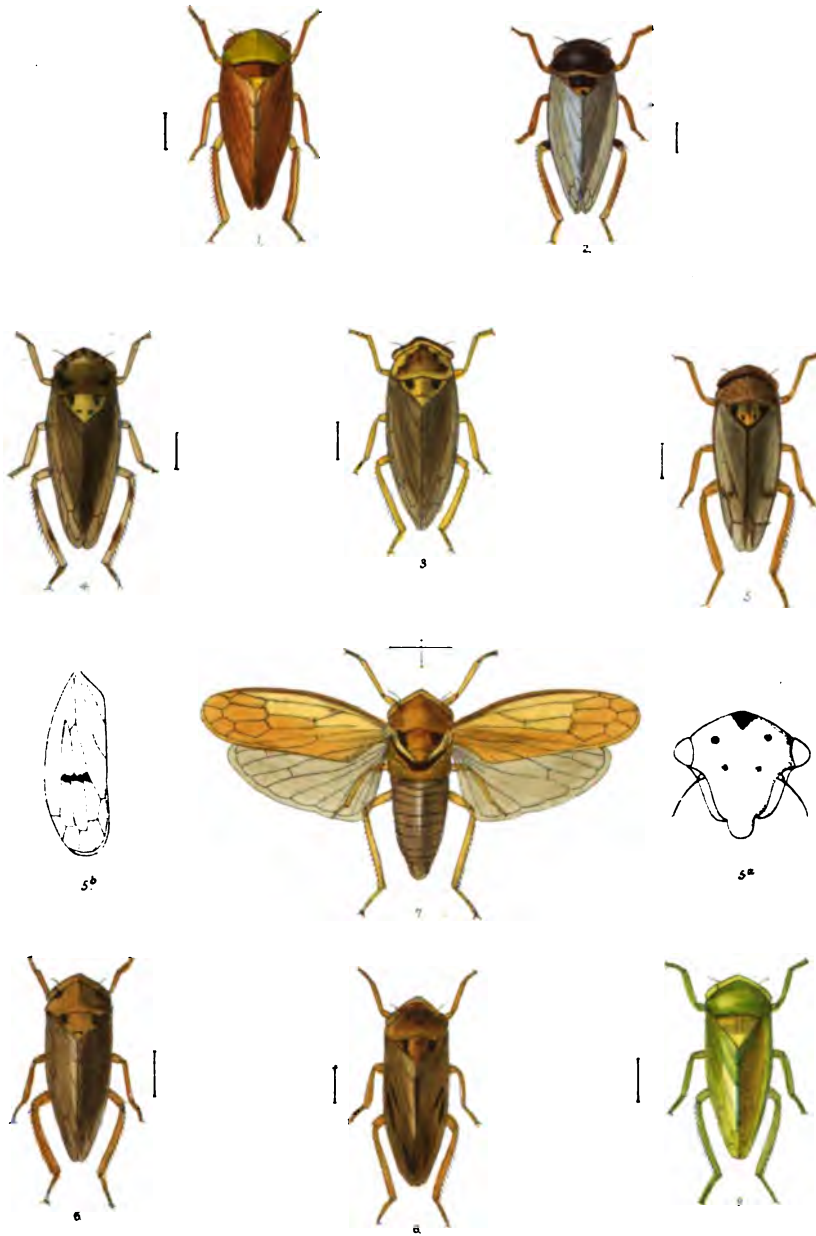
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PLATE XI.

FIG. 1. *Pediopsis tiliæ*, Germ.

- 2. „ *nanus*, H.-S.
- 3. „ *scutellatus*, Boh.
- 4. „ *tibialis*, Scott.
- 5. „ *fuscinervis*, Boh.
- 5a. „ „ (front view of head).
- 5b. „ „ (elytron).
- 6. „ *impurus*, Boh.
- 7. „ *ulmi*, Scott.
- 8. „ *cereus*, Germ.
- 9. „ *viresceus*, Fab.

PLATE II.



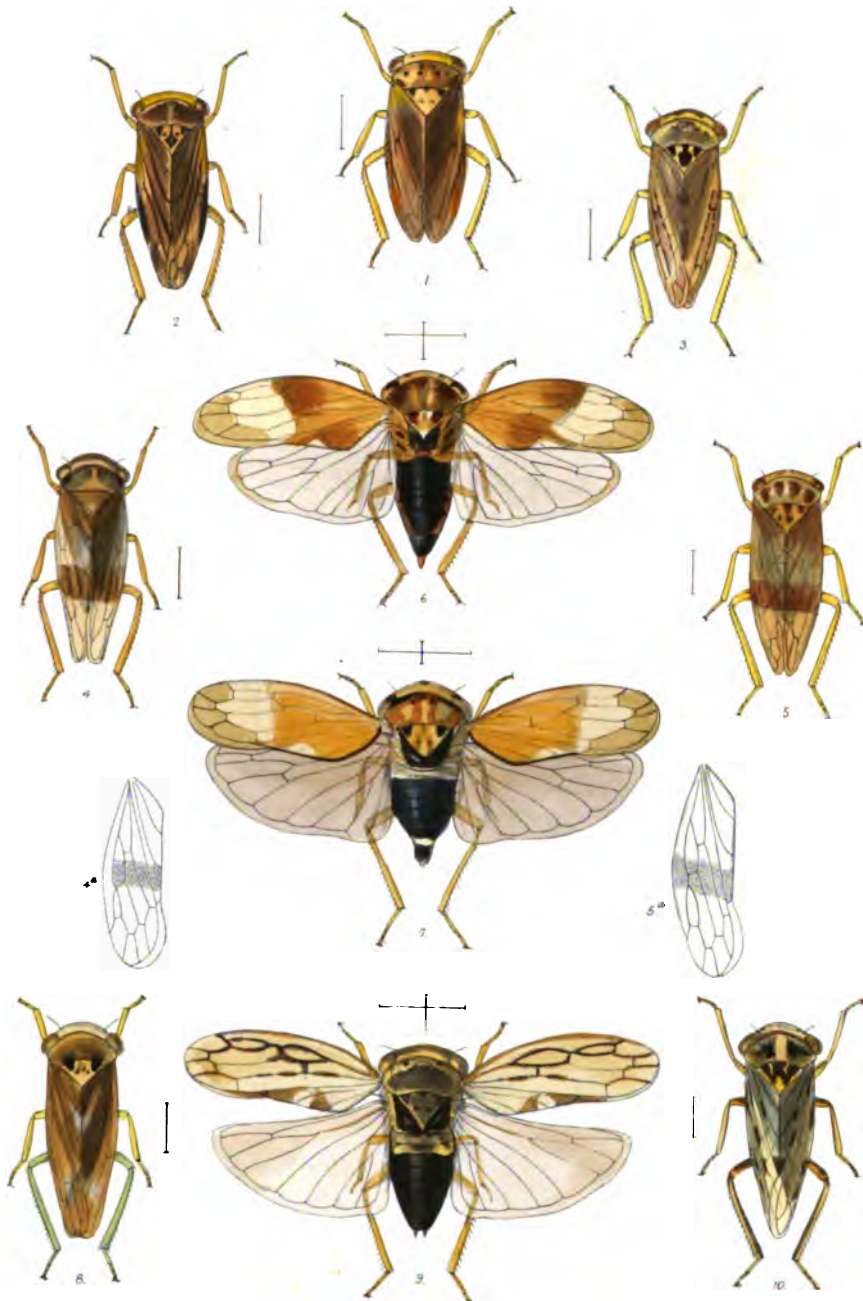
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PLATE XII.

- FIG. 1. *Idiocerus adustus*, H.-S.
- | | | |
|-----|---|--------------------------------|
| 2. | „ | <i>varius</i> , Fab. |
| 3. | „ | <i>Herrichii</i> , Kbm. |
| 4. | „ | <i>distinguendus</i> , Kbm. |
| 4a. | „ | „ „ (elytron). |
| 5. | „ | <i>tremulæ</i> , Estl. |
| 5a. | „ | „ „ (elytron). |
| 6. | „ | <i>viduatus</i> , Edw. (type). |
| 7. | „ | <i>elegans</i> , Flor. |
| 8. | „ | <i>laminatus</i> , Flor. |
| 9. | „ | <i>lituratus</i> , Fall. |
| 10. | „ | <i>pœcilus</i> , H.-S. |



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Of the variety with a small black spot in the middle of the upper margin of the face (*graminea*, Fab.) I have seen but one example, a female taken by myself near Norwich in Sept. 1888, in company with many normal examples of the same sex.

iv. *Idiocerus*, *Lewis*. (Pl. I., fig. 31.)

A well-marked genus of considerable extent, of which all our species except *tibialis*, which according to Herr Paul Löw lives on the common maple, are to be found on various species of *Salix* and *Populus*.

Crown widely rounded in front. Frontal suture reaching the ocellus. Antennal seta in the male with an oval black plate immediately before the apex, except in *distinguendus*, *tremulæ*, *vitreus*, and *aurulentus*; only one transverse vein standing on the brachial vein.

There are about thirty-two well-ascertained species included in the European Fauna, and of these we have seventeen.

TABLE OF SPECIES.

- | | |
|--|---------------------------|
| 1. (2) First and second apical areas of elytra sub-equal in length, <i>i.e.</i> , their bases level or nearly so | 1. <i>adustus</i> . |
| 2. (1) First apical area much longer than second | |
| 3. (4) First subapical area triangular or 5-sided, reaching the costa | 2. <i>varius</i> . |
| 4. (3) First subapical area parallel-sided, not reaching the costa | |
| 5. (6) Cheeks pubescent, more conspicuously so in the male | 3. <i>Herrichii</i> . |
| 6. (5) Cheeks bare | |
| 7. (16) Elytra brownish, with a pale transverse band or bands | |
| 8. (11) Elytra with two pale bands | |
| 9. (10) Costa widely pale | 4. <i>distinguendus</i> . |
| 10. (9) Costa not widely pale | 5. <i>tremulæ</i> . |

G

11. (8) Elytra with one pale band
12. (15) First subapical area reaching much more than half as far backward as the second
13. (14) Inner edge of the wide pale band on the elytra commencing in the middle of the inner margin
6. *viduatus*.
14. (13) Inner edge of the narrow pale band on the elytra commencing at the apex of the clavus
7. *elegans*.
15. (12) First subapical area reaching about half as far backward as second
8. *laminatus*.
16. (7) Elytra without pale transverse bands
17. (22) Apex of anal vein standing in an oval white patch
18. (19) Cubital vein only marked with white in the lower boundary of the second subapical area
9. *lituratus*.
19. (18) Cubital vein chequered with black or rust-colour and white
20. (21) Frontal suture sharply bent inwards at the base of the antennæ, the frons therefore subtrapezoidal
10. *pæcilus*.
21. (20) Frontal suture evenly curved outwards throughout, the frons therefore suborbicular
11. *tibialis*.
22. (17) Apex of anal vein white, but not standing in an oval white patch, or veins entirely white
23. (26) Brachial vein with a white streak near the apex.
Face in the male with a small sharp tooth on each side of the apex of the clypeus
24. (25) First transverse vein white
12. *vitreus*.
25. (24) First transverse vein not white
13. *aurulentus*.
26. (23) Brachial vein not marked with white. Apex of face simple in both sexes
27. (32) Elytra green or greenish grey, more or less tinged with reddish brown towards the suture

28. (29) Side margins of face angularly indented below the eyes. Inhabits poplars 14. *fulgidus*.
 29. (28) Side margins of face at most slightly sinuate
 30. (31) Male with the face and legs generally much suffused with orange-yellow. Female with about one-sixth of visible length of saw-case projecting. Inhabits aspen 15 *populi*.
 31. (30) Male without orange coloration. Female with about one-third of visible length of saw-case projecting. Inhabits sallow 16. *confusus*.
 32. (27) Elytra greenish white or almost milk-white, veins entirely white. Inhabits white poplar 17. *albicans*.

1. *I. adustus*, H.—S.—♂. Face greyish yellow, cheeks with a dense short silvery pubescence. Crown greyish yellow, more or less suffused with fuscous in the middle, near each eye a dark puncture. Pronotum greyish yellow clouded with fuscous, front margin irregularly spotted with black. Scutellum greyish yellow, along the base three black triangles and in the middle a pair of somewhat comma-shaped black spots. Elytra hyaline with a yellow-brown tinge inclining to orange on the costa, from the inner margin at the apex of the anal vein to the first apical area a very oblique pale band; veins punctured, thick and black except in the pale band; first subapical area apparently incomplete but really reaching the costa, the latter vertically flattened in its basal two-thirds, yellow at the base, the middle third black and bearing a row of four or five large blunt tubercles. Abdomen above blackish, hind margins of the segments narrowly yellow. Legs pale, inner side of hind tibiae narrowly black.

♀. Face with a black triangle near each eye. Pubescence of the cheeks excessively fine, scarcely perceptible. Elytra hyaline with a yellow-brown tinge, the pale band only faintly indicated; costa but slightly flattened vertically without tubercles, veins pale brown. Length, $6\frac{1}{2}$ –7 mm.

On willows, particularly *Salix alba*, common. Norwich district; Cotswold district. Glanvilles Wootton, Bonchurch (Dale); Gomshall, Chingford, (E. A. Butler); Wotton-under-Edge (Perkins); London District, Midland district (Marshall); Woking (Saunders).

2. **I. varius**, *Fab.*—♂. Crown and face as in *adustus*, but the pubescence of the cheeks is less apparent. Pronotum greyish yellow clouded with dark fuscous, front margin irregularly spotted with black. Scutellum as in *adustus*, but the black triangle in the middle of the base is replaced by a linear stripe, and the pair of spots on the disc generally coalesce. Elytra hyaline with a dark brown tinge, which becomes almost black on the costa, from the inner margin at apex of the axillary vein to the first apical area a very oblique pale band; first subapical area subtriangular, reaching the costa; veins punctured, thick and black except in the pale band; costa slightly flattened vertically, the tubercles scarcely perceptible. Abdomen above black, hind margins of the segments narrowly yellow. Legs pale, hind tibiae narrowly black on both the outer and inner sides, thighs frequently with a black stripe.

♀. Face between the eyes much clouded and speckled with dark brown or black, cheeks bare. Elytra hyaline with a faint yellow-brown tinge, and only faint traces of the pale band; veins dark brown or black except in the pale band; costa scarcely flattened vertically, without tubercles. Legs pale, all the tibiae generally narrowly black on both the outer and inner sides. Length, $5\frac{1}{4}$ –6mm.

On *Salix trianda*, local; I have taken it in one locality only, near Norwich. The species was introduced to our list by Scott in 1874 under the name of *I. venustus*, but he does not say where his specimens were taken. The males are distinctly smaller and darker than those of *adustus* and the costal tubercles are obsolete.

3. **I. Herrichii**, *Kbm.*—♂. Face greyish yellow, disc

above between the eyes with a dark fuscous cloud, near each eye a black triangle and a few small black spots, edges of the frons below the eyes with a black line, clypeus black, cheeks with a dense long silvery pubescence. Pronotum pale greenish grey mottled with fuscous, a wide central line pale. Scutellum pale greenish grey, marked as in *adustus*. Elytra hyaline with a greenish grey tinge; veins stout, chequered with black and white, punctured, and having a row of fine short hairs on each side; costa slightly flattened vertically, but without tubercles. Abdomen above black, hind margins of the segments narrowly pale. Legs pale, femora and tibiæ striped with black, intermediate tibiæ with a short black line on the outer side of the base.

♀. Differs from the male in having the cheeks scarcely perceptibly pubescent, a row of black points down each side of the frons below the eyes, the clypeus generally pale, and the costa not flattened vertically. Length, 6-6½ mm.

On *Salix alba*, Stratton Strawless, Caister by Norwich, Norfolk.

4. *I. distinguendus*, *Kbm.*—Face greenish yellow, more or less suffused with fuscous above, sometimes with pale spots. Pronotum greenish yellow (male) or bluish white (female), more or less suffused with fuscous so as to leave the margins narrowly, a narrow central stripe, and a roundish spot on each side of the disc of the pale ground colour. Scutellum pale with a triangle on each side of the base and a pair of small roundish spots on the disc fuscous. Elytra lacteo-hyaline, with three wide brown bands which do not reach the costa and are placed one at the base, one just behind the middle, and one at the apex; veins punctured, white except in the brown bands, where they are dark brown, base and apex of the anal vein white, first subapical area reaching about three-fourths as far as the fourth. Abdomen above black, hind margins of the segments narrowly greenish. Legs pale, apex of the tarsi more or less fuscous.

♀. When fresh, with the face and legs rather strongly tinged with pink. Length, $4\frac{1}{2}$ –5 mm.

On *Populus alba* and *canescens*, locally common. Cotswold district. Lewisham (Douglas); Woking' (Saunders); Kidbrook (Beaumont); Bray (E. A. Butler).

5. *I. tremulæ*, *Estl.*—Very similar in appearance to the preceding species, and best distinguished therefrom by the brown bands of the elytra reaching the costa. Length, $4\frac{3}{4}$ –5 mm.

On *Populus tremula*; not common. Stoke Holy Cross, Norfolk. Esher (Saunders); Glanvilles Wootton (Dale).

6. *I. viduatus*, *Edw.*—♀. Crown and face yellow, variously spotted with rust-red and bluish white, a black puncture near each eye. Pronotum red-brown, a central stripe and a spot on each side of the disc bluish-white, hind margin narrowly pale. Scutellum yellow, with a blackish triangle on each side at the base and a rust-red marking on the disc in shape like a musical tuning-fork. Elytra red-brown, darker behind, from the middle of the inner margin to the costa a broad oblique white band interrupted at the claval suture by a streak of the red-brown ground colour, membrane and appendix smoky hyaline; veins punctured, dark red-brown, in the pale band white, those of the membrane dark brown, brachial vein with one or two white spots. Abdomen above black, beneath rust-red. Legs yellow-red, a dark stripe on the outer side of the middle tibiae. Length, $5\frac{1}{2}$ mm.

My single female example of this species, which was beaten from fallow in Foxley Wood, Norfolk, on the 10th September, 1885, still remains unique. Of our British species this comes nearest to *I. elegans*, Flor., from which it differs in the darker colour of the brown part of the elytra and the greater obliquity of the inner edge of the pale band; I believe, however, that it is a distinct species, because *I. elegans*, with which I am well acquainted, has the inner edge of the pale

band on the elytra nearly at right angles to the inner margin, and does not appear to vary in this respect; moreover, I am not aware that *I. elegans* has ever been taken in Norfolk.

7. *I. elegans*, *Flor.*—♂. Face lemon yellow, the disk of the upper half dusky, down the middle from the level of the ocelli to the base of the clypeus a straight red double line. Crown yellow, with a subquadrate black spot in the middle and a dusky puncture on each side. Pronotum mottled with grey, yellow, and rust-red, its front margin with a black triangle behind each eye, and about three punctiform black spots in the middle. Scutellum greyish yellow, a black triangle on each side at the base, the disc clouded with rust-red. Elytra very shiny pale reddish brown, a spot at the apex of the anal vein, two or three spots on the brachial vein, and a narrow transverse band at the apex of the clavus, white; veins punctured, dark brown, on the pale parts white. Abdomen above black, hind margins of the segments narrowly yellow. Legs pale yellow.

♀. Face greyish yellow speckled with red-brown, with a large fuscous spot in the middle above and a black puncture near each eye. Pronotum generally with a pale central stripe. Scutellum yellowish, its markings red-brown. Legs brownish yellow. Length, 5–5½ mm.

On sallows, local and not common. Cotswold district. Shiere (Capron); Chobham (Saunders).

8. *I. laminatus*, *Flor.*—♂. Crown and face greyish yellow. Pronotum dirty greyish yellow, more or less suffused with fuscous. Scutellum greyish yellow, a black triangle on each side at the base and generally a pair of black points on the disc. Elytra pale brown, a spot at the apex of the anal vein, the costal, first subapical, and the greater part of the first apical area and a wide band across the apex of the corium, white; veins punctured, dark brown except in the white parts, where they are concolorous, first subapical area

narrow-triangular, very small and indistinct. Abdomen above black, hind margins of the segments narrowly pale. Legs pale, claws black.

♀. Similar to the male, but larger and paler, with some fuscous markings on the middle of the crown. Length, $5\frac{1}{4}$ –6 mm.

Locally common on *Populus alba* and *canescens*. The pale band on the elytra is not very conspicuous even in fresh specimens, when those organs are closed, and the species might easily be passed over as *I. fulgidus*.

Norwich district, Cotswold district. Battle (Butler); Croxton, Norfolk, Whittlesea Mere (Dale); Esher (Saunders); Renfrewshire (Young).

9. *I. lituratus*, Fall.—♂. Crown greyish yellow, more or less clouded with rust-yellow, with a pair of black punctures (frequently united by a brown line) placed one near each eye. Face greyish yellow, in its upper half a large blackish grey triangle which frequently bears a black central stripe, frons and clypeus reddish-yellow. In life the face is dull white with a wide greenish yellow central stripe. Pronotum greyish yellow clouded with fuscous and spotted with bluish white, the front margin irregularly spotted with black. Scutellum greyish yellow; a triangle on each side of the base, a tuning-fork-shaped marking and a pair of points on the disc, black. Elytra whitish hyaline with a fuscous tinge, which takes the form of a wide central band reaching from the inner margin about half-way across the disc; veins punctured, black, in the fuscous band much thickened; a small piece at the apex of the anal vein, sundry pieces of the brachial and lower cubital veins, and occasionally the first transverse vein white; costa yellow, vertically flattened but without tubercles. Abdomen above black, hind margins of the segments very narrowly pale. Legs pale, tibiae generally with a black line on both the outer and inner sides, thighs with a short black line at the apex.

♀. Face greyish yellow mottled with rust red, the upper half of the disc occupied by a large subquadrate fuscous patch, in the lower half of which are some pale spots. Elytra hyaline with a yellow-brown tinge, a fine black line next the costa; veins punctured, rust-brown on the corium, on the membrane black, their white markings not so conspicuous as in the male, but similar in position. Length, $6\frac{1}{2}$ – $6\frac{3}{4}$ mm.

On sallows, common. Norwich district, very common; in the Cotswold district it appears to be replaced by *I. elegans*. Glanvilles Wootton, Charmouth (Dale); Deal, Dallington Forest, Hurst Green, Frant (Butler); Moulsey, Thames Ditton (Marshall); Woking, Chobham (Saunders).

10. *I. poecilus*, *H. S.*—♂. Face greyish yellow, its lower half generally with four wide equidistant black stripes, its upper part variously clouded with fuscous; in strongly marked examples there is a short black stripe spotted with white next the inner margin of each eye. Crown with a black puncture on each side. Pronotum greyish yellow clouded with fuscous, speckled with black in front, down the centre a wide bluish white stripe. Scutellum greyish yellow; its base with a short linear stripe between two triangles, and a pair of spots on the disc frequently followed by a pair of stripes, black. Elytra greyish hyaline; veins dark brown or black, those of the corium chequered with white. Abdomen above varying from pale brown to black. Legs pale, thighs generally striped with black, tibiae with a short black stripe on the outer side at the base, the hind pair with a black stripe down the inner side.

♀. Face greyish yellow, variously clouded and speckled with fuscous or black; the black stripes of the male represented by a pair of narrow ones on the lower part of the frons. Length, $5\frac{1}{2}$ –6 mm.

On Lombardy poplar in two localities, Cossey and Wacton in Norfolk.

11. *I. tibialis*, *Fieb.*—♂. Face greyish yellow, variously clouded and marked with rust-red black and brown, a black puncture near each eye. Pronotum clouded with fuscous, a narrow central stripe and a roundish spot on each side of the disc bluish white. Scutellum greyish yellow, with a black triangle on each side at the base. Elytra greyish hyaline; veins brown, those of the corium chequered with white. Abdomen above generally brownish yellow, with a brown band across each segment. Legs pale, tibiae with a fine black stripe or stripes, hind thighs with a fine black stripe along the front and hind margins.

♀. Face greyish yellow, variously clouded and speckled with red-brown and black. Crown clouded with fuscous, with a pale central line and a black puncture near each eye. Length, $5\frac{1}{2}$ –6 mm.

Darenth, October, 1866 (*Douglas*). This species is well distinguished by the shape of the frons; *rotundifrons*, one of Kirschbaum's names for it, being particularly apt.

In Austria it occurs on *Acer campestre*.

12. *I. vitreus*, *Fab.*—♂. Crown and face dirty whitish yellow, on the former near each eye a dark puncture. Pronotum pale brown, a central stripe and a small spot on each side in front whitish, near the front margin a few black points. Scutellum whitish yellow, a triangle on each side at the base and a pair of points on the disc black. Elytra pale yellow-brown; veins punctured, dark brown, the transverse vein and a short piece of the inner cubital and brachial veins adjoining it, the apical third of the anal vein, the extreme apex of the clavus, the apex of the brachial vein, and a piece of the outer half of the lower boundary of the second subapical area, white. Abdomen above yellow, base of each segment more or less widely black. Legs pale, inner side of hind tibiae with a narrow black streak.

♀. Crown and face greyish yellow, the former with a black puncture on each side and between them a large brown patch

divided down the middle by a pale stripe, some markings across the middle of the face and a line on each side of the frons rust-red. The veins of the elytra are paler than in the male, and consequently the white parts are less conspicuous. Length, 5 mm.

On black and Lombardy poplars; locally common in Norfolk. Bray (Butler). A shining brown species easily distinguished by the white H on the disc of the elytra.

13. *I. aurulentus*, *Kbm.*—♂. Crown and face yellow or greyish-yellow, on the former near each eye a dark puncture. Pronotum yellow-brown, with a more or less distinct central stripe and a suboval spot on each side of the disc pale. Scutellum yellow, with a black or red-brown triangle on each side at the base, and a pair of dark points on the disc. Elytra shiny reddish-brown; veins punctured, dark brown; apex of the anal vein, the extreme apex of the clavus, a short piece at the apex of the brachial vein, and the middle of the lower boundary of the second subapical area, white. Abdomen greenish yellow, dorsal segments widely black at the base. Legs pale, claws black.

♀. Crown yellow, with a dark puncture near each eye. Face yellow, an ill-defined subquadrate blackish spot in its upper half; temples spotted with rust-red. Pronotum and scutellum as in the male, but the ground colour more decidedly yellow and the markings obsolete. Elytra pale yellow-brown; veins punctured, almost concolorous; the white portions much less sharply defined than in the male. Length, 5 mm.

A single specimen obtained by me off Lombardy poplar at Cossey, Norfolk, was named for me by Dr. Paul Löw. It closely resembles *I. vitreus* in general appearance, but wants the white H on the disc of the elytra.

14. *I. fulgidus*, *Fab.*—♂. Deep yellow. Antennal plate oblong-oval. Apex of the face frequently tinged with red, its upper part generally with a wide dusky central stripe.

Scutellum with a black triangle on each side at the base, and occasionally a pair of black spots on the disc. Elytra yellowish hyaline, light yellow-brown towards the inner margin; membrane smoky hyaline; veins dark yellow; those of the membrane blackish; apex of the anal vein white. Abdomen above and the claws black.

♀. Similar to the male, but larger and paler; the colour of the body pale green in fresh, yellowish grey in dried, examples; the triangles at the base of the scutellum rust-red or wanting; the upper side of the abdomen black only down the middle. Length, $5\frac{1}{2}$ – $6\frac{1}{2}$ mm.

Abundant on poplars. Readily separated from its allies by the outline of the sides of the face. Norwich district; Cotswold district. Glanvilles Wootton, Bonchurch (Dale); Wootton-under-Edge (Perkins). It seems probable that the distinctions between this species and the next are not always appreciated by collectors, and consequently that some of the localities given for *I. populi* really belong to *I. fulgidus*.

15. *I. populi*, Lin.—♂. Crown yellowish white. Face yellow; frons and clypeus red. Pronotum fuscous, a large pale space on each side in front; a short black transverse line near each anterior angle sometimes joined to a short oblique line on each side of the disc. Scutellum greyish-yellow; a triangle on each side at the base and a pair of points on the disc black. Elytra subopaque, pale brown, darker towards the inner margin; veins punctured, concolorous or paler than the disc; those of the membrane blackish. Inner marginal vein black; its middle third and the apex of the anal vein white. Abdomen above black, beneath yellow. Legs red-yellow; claws black.

♀. Legs and under side yellowish-grey. Pronotum and scutellum as in the male. Nerves of corium hyaline. Abdomen above widely black down the middle. Length, 5 – $5\frac{1}{2}$ mm.

Not uncommon, but apparently confined to *Populus tremula*. The female, when mature and fresh, generally has

the face and legs tinged with a fine pink colour. Norwich district; Cotswold district. Hastings, Battle, Chobham, Highgate, Chingford, Albury, Wymondley (Butler); Surbiton (Saunders); Renfrewshire (Young).

16. **I. confusus**, *Flor.*—♂. Crown, face, and legs yellow; frons sometimes dusky. Pronotum and scutellum greenish-yellow. Elytra hyaline, with a faint fuscous tinge, which becomes brownish-yellow on the inner margin; veins punctured, concolorous or paler than the disc; costa pale green. Abdomen above black; beneath greenish-yellow. Claws black.

♀. Larger and paler. Abdomen above widely black down the middle. Length, $5\frac{1}{2}$ – $6\frac{1}{2}$ mm.

On sallows; common. Easily recognised when fresh by its pale greenish-grey colour. Norwich district; Cotswold district. Bexhill, Hurst Green, Shalford, Albury, Chobham, Dallington Forest, Ewhurst, Wymondley (Butler); Glanvilles Wootton, Bonchurch (Dale); Woking, Chobham (Saunders).

I have a note that a specimen of *Idiocerus nubilus*, Buckton, kindly sent to me by that author, was a male of *I. confusus*.

17. **I. albicans**, *Kbm.*—Head, pronotum and scutellum greenish-white; face sometimes with a yellow tinge in the male, in which sex also there is sometimes a black puncture near each eye, and a black triangle on each side of the base of the scutellum. Elytra whitish hyaline, sometimes with a faint reddish-brown tinge near the inner margin in the male; veins white, the apices of those on the membrane and the marginal vein of the latter blackish. Dorsal segments of the abdomen narrowly black at the base (male), or entirely pale (female). Length, $5\frac{1}{2}$ – $6\frac{1}{2}$ mm.

Locally abundant on white poplar. Norwich district. Glanvilles Wootton, Holyhead (Dale); Chobham, Surbiton (Saunders); Bray (Butler).

v. *Agallia*, Curt. (Pl. I., fig. 32).

Crown widely rounded in front. Clypeus, cheeks, loræ, and frons separated by distinct sutures. Frontal suture not reaching the ocelli. Antennal seta never clavate in the male. Species small, dirty yellowish-white, with black or brown markings.

Twelve species are enumerated as European by Dr. Puton in his Catalogue, and of these we possess three.

TABLE OF SPECIES.

- | | |
|---|-------------------------|
| 1. (4) Pronotum twice or nearly twice as long as crown. | |
| Insect macropterous. | |
| 2. (3) Pronotum faintly punctured | 1. <i>puncticeps</i> . |
| 3. (2) Pronotum transversely striate | 2. <i>venosa</i> . |
| 4. (1) Pronotum only slightly longer than crown. Insect | |
| brachypterous | 3. <i>brachyptera</i> . |

1. *A. puncticeps*, Germ.—♂. Dirty greyish white. Crown with a round black spot on each side, and in the middle a pair of fine brown parallel lines, which are continued over the forehead beyond the ocelli. Face with a minute black point at each ocellus, from which a brown line runs obliquely outwards and downwards; frons black or dark brown, with a whitish central stripe; clypeus with a fine dark central stripe. Pronotum with a transverse line behind each eye, a pair of points in the middle of the front margin, a central stripe divided longitudinally by a fine pale line, and a large triangle on each side at the base, its base resting on the hind margin, dark brown or black. Scutellum with a triangle on each side at the base, and generally a pair of points on the disc, dark brown or black. Elytra with a fine line just below the claval suture, the veins of the clavus, the transverse vein, and the cubital vein as far as the fork, white; the remaining veins, and the inner margin narrowly, dark brown, the veins of the disc much widened. Abdomen above

black, widely pale at the sides, beneath pale. Legs more or less striped and banded with black.

♀. Similar to the male, but the dark markings are generally paler. The central stripe on the pronotum is apparently never divided by a pale line, the frons is pale, with a row of closely placed very short black transverse lines down each side, the sides of the abdomen above are more widely pale, and there is a black spot on each side of the ventral segments. Length, $2\frac{1}{2}$ – $3\frac{1}{2}$ mm.

Found commonly by sweeping low plants.

Norwich district, Cotswold district. Glanvilles Wootton, Land's End, Freshwater (Dale); Shalford, Ewhurst, Barnet, Wymondley, Maidenhead (Butler); Paisley (Young); Plumstead (Beaumont).

2. *A. venosa*, Fall.—♂. Dirty greyish white. Crown with a round spot on each side, a fine central line, which is continued over the forehead as far as the ocelli, where it suddenly divides and proceeds in an arcuate form to the base of each antenna, a point at each ocellus, a sub-triangular spot, of which one point reaches the ocellus on each temple, and the lower half of the face almost entirely, black. Pronotum with a curved line from each front angle to the front margin behind the spot on the crown, a linear central stripe, and a large roundish spot on each side at the base, black. Scutellum as in *puncticeps*. Veins of the membrane and corium dark brown, brachial vein as far as the transverse vein and a small piece at the base of the upper cubital vein pale; claval suture and inner margin narrowly, a stripe just above the anal vein, and extending for half its length, a piece of the anal vein just before its apex, a stripe just above the axillary vein and extending for two-thirds of its length, dark brown or black; a linear marking following the course of the anal vein for about half its length, and then passing to the suture in the form of a blotch, the apex of the anal vein, and the entire axillary vein, white. Abdomen black. Legs variously striped and banded with black.

♀. Similar to the male, but larger and with most of the black markings replaced by rust-red. The central line on the crown divides almost immediately on leaving the base. Lower half of the face pale, with sundry dark markings; frons with a rust-red linear central stripe on its lower half, and a row of small black spots down each side. Abdomen above black, narrowly pale at the sides, beneath pale. Legs variously striped and banded with rust-red. Length, $2\frac{1}{2}$ –3 mm.

Very common at the roots of grass, &c. Norwich district, Cotswold district. Chobham, Camber (Butler); Glanvilles Wootton, Land's End, Freshwater (Dale); Solway district (Robinson-Douglas); Paisley (Young); Pembrokeshire coast, Deal (Marshall); Dublin district (Halbert).

3. **A. brachyptera**, *Boh.*—Dirty yellowish white; two large roundish spots and sometimes a central stripe on the crown, four spots and a central stripe on the pronotum, three stripes on each elytron, and the hind margins of the abdominal segments narrowly, black. Elytra about half as long as the abdomen, truncate, with rounded angles. Length, $2\frac{1}{2}$ –3 mm.

North Cliff, Scarborough, amongst newly-cut grass, end of June. (Wilkinson).

This species occurs throughout Europe from Austria to Finland, and has been taken by Löw on *Mentha*.

TETTIGONIDÆ.

Body oblong. Eyes prominent, their outer edge not lying in a continuous curve with the free sides of the crown, but projecting somewhat beyond. Ocelli on the disc of the crown; frons and clypeus very convex, the passage from the former to the crown widely rounded; hind tibiæ multi-spinose.

Our three representatives of this family are comparatively

large and showy insects, the male of *Tettigonia viridis* when alive being particularly handsome. Eight genera, comprising sixteen species, are included in the Palearctic fauna, but it is scarcely likely that any addition will be made to our list in this family.

Our two genera may be thus distinguished—

Frons longitudinally carinate	1. <i>Evacanthus</i> .
Frons non-carinate	2. <i>Tettigonia</i> .

I. *Evacanthus*, *Lep. et Serv.* (Pl. I., fig. 33.)

Upper side pubescent. Ocelli just beyond the eyes, three or four times as far from each other as from the sides of the crown. The latter with an anchor-shaped keel, crossed about its apical third by a more or less distinct straight ridge, which runs from one ocellus to the other; on each side at the base a callus or a short outwardly oblique keel. Scutellum with a transverse impressed line before the apex, and two punctures near the base. Submarginal wing-vein reaching the costa.

The two species of this genus are distinguished as follows:—

Clavus deep black, its inner margin widely yellow

1. *interruptus*.

Clavus brown, with thick whitish nerves

2. *acuminatus*.

1. *E. interruptus*, *Lin.*—♂. Face yellow; frons with a series of fine curved brown transverse lines, interrupted down the middle by a wide stripe of the pale ground colour. Crown yellow, with some irregular symmetrical black markings, which have a strong tendency to spread over the entire surface. Pronotum transversely striate, black, with a large triangle in the middle of the hind margin, and the latter narrowly, yellow; or entirely black. Scutellum yellow, more or less widely black on the sides. Elytra yellow, a large spot occupying the apex and continued in an elongate triangular form as far as the middle, and an elongate

H

triangular stripe occupying all but the inner margin of the clavus, deep black. Abdomen above black, sides widely and hind margins of the segments narrowly yellow. Legs yellow; hind tibiae with black points at the roots of the larger spines.

♀. Similar to the male, but a trifle larger, and having the black markings somewhat reduced. Abdomen yellow, its sides widely black. Dimorphous. Length, 5-6½ mm.

Common and generally distributed.

Norwich district, Cotswold district. Glanvilles Wootton (Dale); Hastings, Ewhurst, Lowestoft, Llanwrtyd, Maidenhead (Butler); Solway district, Aberdeenshire, West Ross-shire (Robinson-Douglas); Dublin (Halbert); Paisley (Young); Armagh, Ardara (Johnson); Ailsa Craig on fern (Marshall).

2. *E. acuminatus*, *Fab.*—♂. Frons dark brown or black, with a series of fine pale transverse lines; upper margin pale, at least in the middle; cheeks pale, more or less marked with dark brown or black. Crown black, sides irregularly pale. Pronotum and scutellum black, the hind margin of the former very narrowly pale. Elytra dirty yellowish, with the inner two-thirds of the clavus, an abbreviated band across the middle of the corium, and a large spot at the apex dark brown, the thick veins and a large triangular spot on the apex of the costa whitish. Abdomen above blackish, pale in the middle behind. Legs dirty yellow, claws black. The dark markings on the elytra have a strong tendency either to coalesce or be reduced.

♀. Face as in the last species. Crown dark brown, its sides widely pale. Pronotum dirty yellow, the sides widely and a broad central stripe black; behind each eye there is frequently a short black line or a few black points. Scutellum black, sometimes indistinctly pale at the base. Otherwise coloured as in the male, but generally paler. Dimorphous. Length, 5-6 mm.

Common on various bushes and low plants.

Norwich district, Cotswold district. Dublin (Halbert); Hastings, Bexhill, Netherfield, Ewhurst, Shalford, Barnet Wymondley (Butler); Glanvilles Wootton (Dale).

II. *Tettigonia*, *Geoffr.* (Pl. II., fig 1.)

Upper side bare. Ocelli near the hind margin of the crown, the distance between each ocellus and the inner margin of the eye about twice as great as the distance between the ocellus and the hind margin of the crown. The frons encroaches on the horizontal upper surface of the head in the form of two wide arcuate lobes, separated from the crown proper by an impressed line, which is more distinct in the male than in the female. Submarginal wing-vein running into the first vein.

1. *T. viridis*, *Liv.*—♂. Frons pale brown, the side margins, a stripe down the middle, and a series of fine curved transverse lines down each side, yellow; cheeks with a fine black line next the frons and clypeus. Crown greenish yellow, with a biarcuate line across the middle, and a pair of irregular pentagonal spots near the hind margin, black. Pronotum and scutellum yellowish green, the former sometimes irregularly marked with black in front, the latter with an abbreviated impressed transverse line near the base. Elytra subopaque, blackish blue, glaucous during life, membrane fumose. Abdomen above blue-black. Legs yellow, the claws and a fine stripe on the inside of the hind tibiæ black, the spines of the latter springing from black points. Elytra sometimes green with the veins narrowly bordered with blackish.

♀. Elytra green, the costa narrowly whitish, nerves narrowly bordered with blackish. Length, $5\frac{1}{2}$ –9 mm.

This exceedingly handsome insect is very abundant in damp grassy places. The var. *arundinis*, Germ., has the elytra pale, with the veins widely margined with blackish.

Norwich district, Cotswold district. Glanvilles Wootton,

Dartmoor (Dale); Watford, Bury St. Edmunds, Chingford, Ewhurst, Shiere, Barnet, Wymondley, Llanwrtyd, Battle, Maidenhead (Butler); Armagh, Coolmore, Donegal (Johnson); Solway district (Robinson-Douglas); Dublin (Halbert); Paisley (Young); Rannoch (Marshall).

ACOCEPHALIDÆ.

Crown always distinctly separated from the face, generally by a well-defined ridge, its disc more or less excavated or bearing impressions, frequently transversely striate in front, at least distinctly sculptured. Ocelli on or adjoining the ridge which separates the crown from the face, or, if that is absent, on the forehead. Elytra generally coriaceous, with strongly-raised veins; appendix wanting or very narrow. Hind tibiæ multispinose.

The foregoing definition of the family Acocephalidæ is adopted because it seemed desirable that the systematic arrangement of this work should accord with that adopted by the author in Mr. Saunders' catalogue of British Hemiptera; but, apart from the question of convenience, it is probable that a better arrangement would be to treat *Eupelix* as forming a separate family, to restrict the Acocephalidæ to the genera *Acocephalus* and *Strongylocephalus*, and to place *Platymetopius*, *Graphocrærus*, *Doratura*, *Paramesus*, and *Glyptocephalus* at the head of the next family. Acocephalidæ would then be distinguished by the imperfection of the submarginal wing-vein, which is not continued beyond the third wing-vein; Eupelidæ by the facies of its members, and particularly by the laminar forehead, and the complete submarginal wing-vein, which is continued quite round the apex of the wing; and Jassidæ, whilst possessing the same venation of the wings as Eupelidæ, would be distinguished by the want of the produced crown and laminar forehead which form the most striking feature of the members of the family last named.

TABLE OF GENERA.

1. (6) Ocelli on the crown close to its front margin.
2. (5) Eyes normal.
3. (4) Crown transversely striate in front
 1. *Strongylocephalus*.
4. (3) Crown not transversely striate in front
 2. *Acocephalus*.
5. (2) Eyes nearly enclosed by the foliaceous edge of the crown
 3. *Eupelix*.
6. (1) Ocelli on the forehead.
7. (12) Crown not transversely striate in front.
8. (9) Crown angular in front
 4. *Platymetopius*.
9. (8) Crown not angular in front.
10. (11) Pronotum separated from prosternum by a distinct ridge
 5. *Graphocrævus*.
11. (10) Pronotum not separated from prosternum by a ridge
 6. *Doratura*.
12. (7) Crown transversely striate in front.
13. (14) Crown with a linear black band adjoining and running parallel with its front margin
 7. *Paramesus*.
14. (13) Crown entirely pale
 8. *Glyptocephalus*.

1. **STRONGYLOCEPHALUS**, *Flor.* (Pl. II., fig. 2).

Crown obtusangularly produced and transversely striate in front; frons transversely impressed above; forehead thin and knife-like. Ocelli close to the front margin of the crown, about equidistant from the front margin and from the eyes. Elytra coriaceous, narrowly rounded at the apex, scantily pubescent along the veins; two transverse veins; appendix wanting.

We possess both the described European species of this genus, which may be distinguished by the following characters :—

Length of pygofer (σ) down the middle of the upper side equal to or longer than the preceding dorsal segment.

No black line on the crown in front. 1. *agrestis*.

Length of pygofer (σ) down the middle of the upper side distinctly shorter than the preceding dorsal segment. Front of crown with a black line just beyond the ocelli. 2. *Megerlei*.

1. **S. *agrestis*, Fall.**— σ . Frons black, finely and closely spotted with yellow-brown; remainder of the face and the upper side yellow brown, finely and more or less closely speckled with dark brown or black. Crown transversely impressed, smooth at the base, transversely striate in front. Pronotum transversely striate, front margin widely smooth. Elytra a trifle longer than the abdomen, inner margin narrowly and some irregular spots along the costa and round the hind margin dark brown or black. Abdomen above black, beneath black irregularly spotted with yellow-brown towards the apex. Legs brownish yellow, the front pairs spotted and banded with black, the hind pair striped with dark brown or black.

♀. Greyish yellow, with the dark markings very much reduced or entirely wanting; the narrow dark line on the inner margin of the elytra is the last to disappear. Hind margin of last ventral segment more or less concave, sometimes with an indication of a small notch in the middle. Length, 6–7 mm.

Inhabits damp grassy places, not common. Norwich district. Chobham (Saunders, Butler); Perth (MacGregor); Glanvilles Wootton, Land's End, Portland (Dale).

2. **S. *Megerlei*, Scott.**— σ . Frons black, its lower half speckled with yellow-brown; crown brownish yellow, with a black line along the front margin; otherwise similar to *agrestis*.

♀. Frons yellow-brown, with a black line along its upper

margin. Crown yellow-brown, with a black line along its front margin. This sex has a strong general resemblance to the male of *agrestis*, but it is much duller than that insect. Hind margin of the last ventral segment feebly concave, with a distinct notch in the middle. Length, 5-6 mm.

Habitat similar to that of the preceding species, than which it is much less frequent. Newcastle-on-Tyne (Bold); Ranworth, Surlingham, Booton, Norfolk.

II. *Acocephalus*, Germ. (Pl. II., fig. 3.)

Crown obtusangularly produced in front, more or less broadly excavated (in the subgenus *Anoscopus*, Kbm., slightly convex); in the male sometimes, and in the female generally, tricarinate. Ocelli on the front margin of the crown a little nearer to the eyes than to the apex. Submarginal wing-vein incomplete. Sexes very dissimilar.

TABLE OF SPECIES.

1. (6) Crown more or less broadly excavated.
2. (5) Excavation of crown very strong.
3. (4) Elytra not banded with white. 1. *nervosus*.
4. (3) Elytra with white bands. Crown one-third or more than one-third longer than pronotum. 2. *bifasciatus*.
5. (2) Excavation of crown very feeble. Crown not or very little longer than pronotum 3. *albifrons*
6. (1) Crown slightly convex, not excavated.
7. (8) Elytra dark brown, with broad white bands. 4. *brunneo-bifasciatus*.
8. (7) Markings of elytra longitudinal.
9. (10) Elytra whitish hyaline, with the nerves and a band near the apex black. 5. *histrionicus*.
10. (9) Nerves of elytra pale, interstices black. 6. *flavostriatus*.

The foregoing table applies only to the males; the determination of female specimens not found in company with the opposite sex is generally attended with some uncertainty owing to the absence of the distinctive coloration found in the males.

1. **A. nervosus**, *Schrk.*—♂. Upper side lighter or darker brown, a band across the crown, a band across the pronotum, and a narrow stripe near the claval suture, whitish; occasionally all the veins are pale. Frons punctato-rugulose, distinctly impressed across the top. Crown about as long as the pronotum, longitudinally striate, reflexed at the apex, its middle keel exceedingly fine. Pronotum rugulose in front, transversely striate behind. Elytra coriaceous, a little longer than the abdomen, transversely rugulose, veins raised. Breast and abdomen black. Legs pale. Length, 5–6 mm.

♀. Upper side dirty greyish or greenish yellow, more or less closely speckled with black, and frequently having a few pale spots arranged in an irregular band-like manner across the elytra, the veins sometimes chequered with black and pale. Crown about one-fourth longer than pronotum. Elytra as long as the abdomen, the apical areas sometimes filled up with fuscous, so as to give that part a chequered appearance. Length, 6–8 mm.

Very common.

Var. *a.* Upper side reddish yellow (♀).

Var. *b.* Upper side varying in colour from red-brown to almost black (♀).

In August 1883 I found under *Obione portulacoides* in salt marshes at Wells, Norfolk, a remarkable race of this very variable species; the males are distinguished by having the upper side very pale yellow-brown with a greenish tinge, and exceedingly finely irrorated with fuscous, and the shape of the crown in extreme examples is decidedly sublunate; the range of variation in the females, however, extends to the ordinary speckled form. Both sexes appear distinctly

narrower than typical *nervosus*, but I have not been able to discover any structural differences on an examination of the male genitalia.

A. carinatus, *Stal* (= *variegatus*, *Fieb.*) has been recorded as British, but a specimen lent to me by Mr. Douglas, and labelled by Dr. Signoret, is a dark example of the speckled form of *nervosus* ♀. The true *carinatus*, which is said to resemble *nervosus* ♀, should have the crown tricarinate in both sexes.

2. ***A. bifasciatus*, *Lin.***—♂. Upper side dark red-brown, varying to blackish brown; a band across the pronotum and two wide bands across the elytra white. Crown tricarinate, at least one-third longer than pronotum, strongly reflexed at the apex, the sculpture of its disc spreading obliquely on each side of the middle keel; that beyond the side keels also oblique. Pronotum uneven, with a scattered shallow punctuation in front, even and finely transversely striate behind. Elytra very finely reticulato-punctate, with a scattered shallow punctuation, about as long as the abdomen, rather narrowly rounded at the apex; one or both of the white bands are not unfrequently interrupted, and the apex is often more or less broadly white. Frons yellowish white, punctured like the elytra, with a large impression in each upper angle. Breast yellowish white, metasternum with a blackish spot on each side. Abdomen black. Legs pale, front pairs, blackish at the apex; hind tibiae and tarsi black. Length, $3\frac{1}{2}$ –4 mm.

♀. Upper side pale brownish grey speckled with brown; elytra with two more or less interrupted pale bands, the veins brown. Crown tricarinate, nearly twice as long as the pronotum. The whole upper side very finely reticulato-punctate, with a scattered shallow punctuation. Length, $4\frac{2}{3}$ –5 mm.

At roots of low plants, not very common.

Norwich district, Cotswold district. Whittlesea Mere

(Dale); Arthur's Seat, Edinburgh (Butler); West Ross-shire (Robinson-Douglas); Paisley (Young); Albury Heath (Capron); West Kilbride (Douglas); Leicester, Rannoch, in profusion (Marshall); Newcastle-on-Tyne (Bold); Weston-on-the-Green, Oxon (Curtis); Perth district (MacGregor).

3. **A. albifrons**, *Lin.*—♂. Upper side reddish yellow, becoming darker (in some examples almost black) towards the apex of the elytra, the latter with two wide more or less interrupted bands, and the apex broadly white. Face not impressed above. Crown feebly impressed just behind the apex, about equal in length to the pronotum, its middle keel very fine. Elytra a trifle longer than the abdomen; that portion of the dark ground colour which precedes the white space at the apex frequently assumes the appearance of a black or blackish band. Under side and legs pale; hind tibiæ generally blackish. Length, 3–3½ mm.

♀. Upper side pale grey, more or less closely speckled with fuscous or black. Face very feebly impressed above. Crown tricarinate, about as long as the pronotum, more distinctly impressed than in the male. Elytra as long as the abdomen, their apex generally having a chequered appearance, owing to the apical areas being filled up with fuscous; not unfrequently two bands are indicated by a few pale spots, and generally the axillary and anal veins are white at the apex; sometimes all the veins of the corium are chequered with black and pale. Face pale, breast and abdomen blackish. Length, 3½–4½ mm.

Common at roots of low plants, occasionally taken by sweeping.

Norwich district, Cotswold district. Hastings, Hurst Green, Battle, Bexhill, Dallington Forest, Ewhurst, Chobham, Barnet, Llanwrtyd (Butler); Portland, Glanvilles Wootton, Freshwater (Dale); Solway district (Robinson-Douglas);

Dublin (Halbert); Woking (Saunders); Renfrewshire (Young); Taynult (Beaumont).

The above description applies to the ordinary form of this species as found in inland situations, but in salt-marshes a form occurs in which both sexes are at least one-third larger than the ordinary form, the angle of the crown in the male is more acute, and its apex is more distinctly reflexed; the upper side of the female is pale, uniformly and more or less closely irrorated with fuscous or black, the apices of the claval veins are never white, nor are the elytra chequered with black and pale round the apex, as is generally the case in the ordinary form.

The males of this form occur in the following well-marked varieties:—

(a) Upper side dark brown, the white spots forming the bands on the elytra very much reduced.

(b) Upper side entirely very dark red-brown.

(c) Upper side brownish grey, the white space at the apex of the elytra bounded inwardly by a black band, as in *A. histrionicus*.

I have not found any appreciable difference in the male genitalia of the two forms.

4. *A. brunneo-bifasciatus*, Geoff—♂. Very similar in appearance to the ordinary form of the preceding species, but the crown, which is about as long as the pronotum, and has a fine middle keel, is feebly convex instead of impressed. The following differences in coloration, which are sufficiently constant, facilitate its separation from *albifrons*: the hind margin of the pronotum is broadly white, the space between the first and second white bands on the elytra is equal in depth of colour to the space between the second white band and the white space at the apex, which is seldom or never the case in the ordinary form of *albifrons*, and the apices of the tibiæ and the tarsi of the front pairs of legs, are much more conspicuously black. Length, 4 mm.

I have not hitherto been able to identify the female of this species with certainty, and, judging from the descriptions, it very nearly resembles that sex of the inland form of the last species.

Occurs in situations similar to those frequented by the last species, but is much less common.

Norwich District. Glanvilles Wootton, Holyhead (Dale); Hastings, Barnet, Lowestoft (Butler).

5. *A. histrionicus*, *Fab.*—♂. Face yellowish white; forehead black, with a roundish white spot in the middle, and sometimes another on each side; crown yellowish white, with a band across the apex, a roundish spot on each side of the base, and a line down the middle, black. Pronotum white, the hind margin narrowly, and a band on the front half, black. Scutellum blackish. Elytra whitish hyaline, the veins narrowly, and a band before the apex, black. Crown a trifle shorter than the pronotum, finely but distinctly reticulato-punctate, its middle keel very fine. Abdomen black. Legs pale; tarsi of the front pairs and tibiae and tarsi of the hind pair blackish. Length, 4 mm.

♀. Upper side dirty greyish white, more or less variegated with fuscous. Crown and pronotum with a coarse rough punctuation, which passes into transverse striation on the hinder half of the latter. The former tricarinate. Elytra longer than the abdomen; costa and inner margin blackish, widely interrupted with white; a fuscous spot on the hind margin in each of the apical areas; veins brownish, more or less interrupted with white. Length, $4\frac{1}{2}$ mm.

Occurs amongst low plants in dry gravelly or sandy places.

Mousehold Heath, near Norwich. Hayling Island (Saunders); Shiere (Butler); Portland, Lulworth (Dale); Albury Heath (Capron); Saltcoats (Douglas); Deal, Freshwater Bay, Pembrokeshire (Marshall).

6. *A. flavostriatus*, *Don.*—♂. Yellowish white; a black

patch on the disc of the face and one on each side above, a band across the apex, a toothed band on the hind margin and sometimes a line down the middle of the crown, a band across the pronotum, a spot on the disc and the angles of the scutellum, and the spaces between the veins of the elytra, black. Breast and abdomen beneath pale, a spot on each side of the former and a stripe on each side of the latter black. Legs pale; the apices of the tibiæ and tarsi of the front pairs, the apices of the hind thighs, and the hind tibiæ and tarsi wholly, black. Crown a little longer than the pronotum, finely reticulato-punctate, its middle keel very fine and indistinct, length, 3 mm.

♀. Upper side dirty greyish yellow, the fore parts more or less closely mottled with fuscous or black, the spaces between the veins of the elytra fuscous. Crown about one-third longer than the pronotum, tricarinate, the side keels obtuse and indistinct. Length, $3\frac{1}{4}$ –4 mm.

Very common amongst low plants, especially in damp places.

Norwich district, Cotswold district. Aberdeenshire, Solway district (Robinson-Douglas); Paisley (Young); Ewhurst, Shiere, Barnet, Fritton (Butler); Glanvilles Wootton, Portland, Tenby (Dale).

iii. *Eupelix*, Germ. (Pl. II., fig. 4.)

Head subtriangular, as long or longer than the pronotum and scutellum together, very thin and flat, more or less strongly reflexed at the apex. Crown with a strong middle keel and an oblong callus on each side at the base. Frons with a sharp middle keel. Pronotum with three keels, one in the middle and one behind each eye, its sides of considerable length, and separated from the prosternum by a distinct ridge. Elytra subcoriaceous, rounded and not overlapping at the apex; appendix very narrow; veins strongly raised; one transverse vein. Wings of the Jassid type.

It seems better to treat our representatives of this genus

as constituting one species only, although we certainly have all the three forms given as distinct in Dr. Puton's Catalogue. These forms are chiefly characterised by the following differences in the shape of the crown, but it is to be observed that all these forms have been taken in company, and that even in a moderate series intergrade specimens are not wanting.

1. *cuspidata*, *Fab.*—Crown broader than long, its sides strongly rounded, and the apex somewhat cuspidate (in the female with the sides nearly straight).

2. *spathulata*, *Germ.*—Crown longer than broad, with its sides strongly sinuate.

3. *producta*, *Germ.*—Intermediate between the two preceding, having the crown somewhat equilaterally triangular, its sides straight or very faintly concave near the ocelli.

Some authors indicate small differences of degree in the genitalia of the different forms.

1. *E. cuspidata*, *Fab.*—Yellowish grey; head with dark brown or black markings; elytra sparingly irrorate with dark brown or black, the spots being chiefly confined to the veins; abdomen with five black stripes, three above and two below.

♂. Crown with a wide central stripe, a transverse marking before the apex, and one or more curved bands proceeding from the middle keel to the side margin, and widening outwardly, dark brown or black. Of these markings the transverse one before the apex is the most constant.

♀. Paler, the irroration on the elytra almost or entirely wanting, and the markings on the crown reduced to a central stripe, and a few spots on the margin round the apex. Length, $5\frac{1}{2}$ – $7\frac{1}{4}$ mm.

Not uncommon at the roots of low plants. Norwich district, Cotswold district. Glanvilles Wootton, Chesil beach, Lulworth (Dale); Albury Heath (Capron); Middlehaugh, Morayshire (Norman); Boxhill (Beaumont); Deal, Milford

Haven, Swithland Slate Quarries (Marshall); Hastings, Battle, Camber, Bexhill, Chobham, Ewhurst, Dallington Forest, St. Martha's Hill, Surrey (Butler).

iv. **Platymetopius**, *Burm.* (Pl. II., fig. 5.)

Crown angularly produced, impressed across the base, its apex somewhat reflexed. Forehead forming a strong ridge in the male. Upper margin of the frons narrowly impressed. Sides of pronotum distinctly separated from prosternum. Elytra ample, with two or three extra transverse veins in the costal area towards the apex; appendix narrow. Wings of the *Jassid* type.

This genus is usually placed next to *Deltocephalus*, with which, however, it has really but little immediate affinity. Ten species are included in Dr. Puton's Catalogue, but of these we have only one, and there is little probability that any of the others will be found here.

1. **P. undatus**, *De. G.*—♂. Deep yellow; the disc of the crown, the pronotum, and an angularly-bisinate stripe narrowly white on its outer edge and occupying the inner half of each elytron, chocolate-brown, finely speckled with yellow; along the suture, and in the base of the apical and the apex of the subapical areas, a few (about nine) small round white spots; abdomen above widely black down the middle. Crown as long as the pronotum, distinctly longer than its width between the eyes. Elytra parallel-sided, their apex truncate, with rounded angles. Genital valve sub-equilaterally triangular, plates about twice as long as the valve, subnavicular, rather abruptly reflexed about the middle, acuminate at the apex.

♀. Similar in colour to the male, but the crown is distinctly shorter than its width between the eyes. Last ventral segment about one-half longer than the preceding, the subquadrate middle lobe of its hind margin bounded on each

side by a deep angular notch, and having its hind angles produced into a spine, and a small notch in the middle of its hind margin. Fieber's figure (Syn. Eur. Delt., t. 6, fig. 64, *f*) does not represent the last ventral segment of this species. Length, 5-6 mm

Occurs on *Pteris*. Cann Quarry, Bickleigh Vale, Devon (Bignell, Scott); Ewhurst (Butler); Hook Park, Dorset (Dale); Prickett Wood, Herts, on oak (Piffard).

v. **Graphocrærus**, *Thoms.* (Pl. II., fig. 6.)

Crown subangularly produced, impressed on each side at the base, reflexed at the apex. Frons convex, slightly impressed above. Pronotum separated from prosternum by a ridge. Elytra subopaque, with one transverse vein. Wings of the Jassid type

There is but one species of this genus, and that is found throughout Europe.

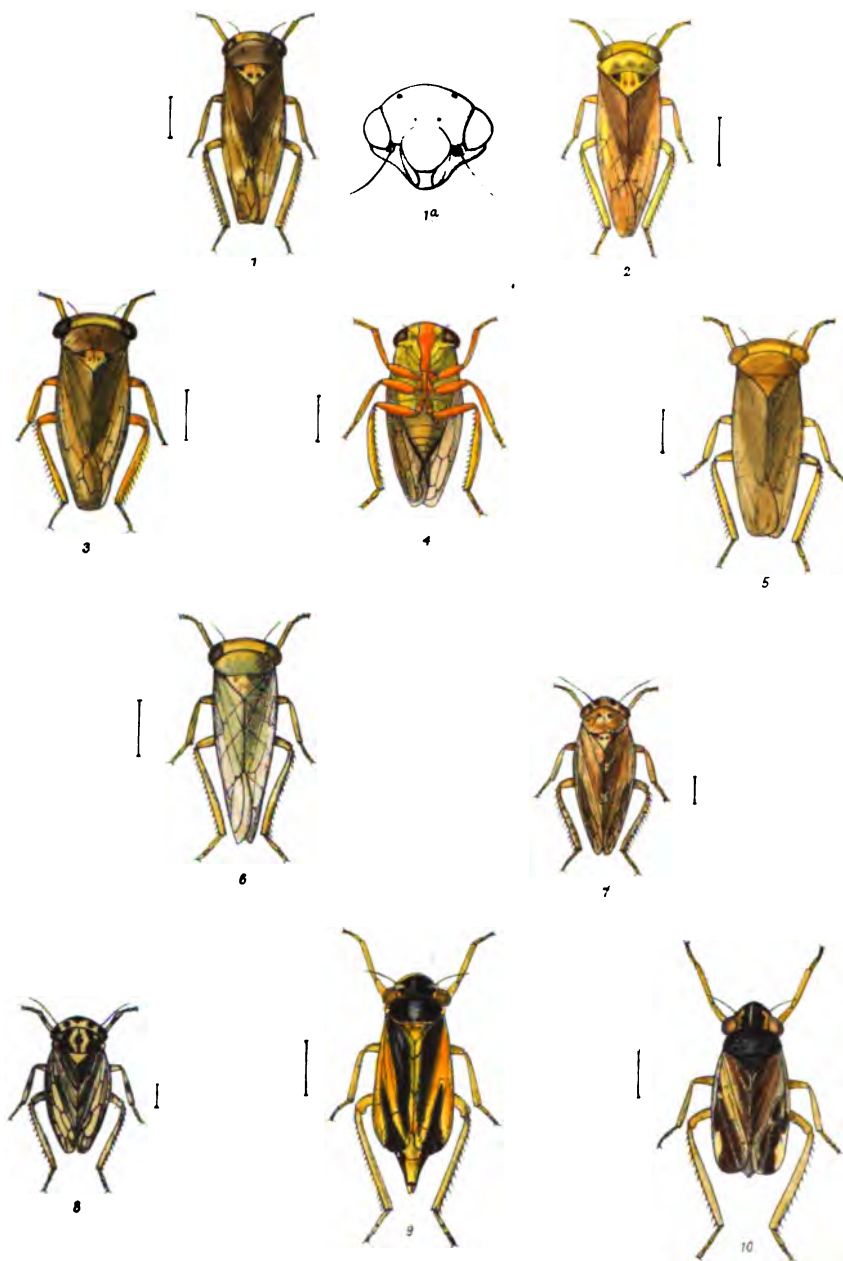
1. **G. ventralis**, *Fall.*—Greenish yellow; a point above the base of each antenna, a pair of points on the apex of the frons, a row of four equidistant points across the crown, and four points on the pronotum, one behind each eye and a pair in the middle near the front margin, black; abdomen black at the base in the male; tibiæ with black points. Crown somewhat longer than half the width of its hind margin, a trifle shorter than the pronotum, nearly twice as long in the middle as at the sides. Elytra somewhat longer than the abdomen (♂) or shorter than the same (♀); the apical areas short. In the female the two lateral, or all the black points on the pronotum, are sometimes wanting, and the elytra are occasionally clouded with grey in the middle. Length $5\frac{1}{4}$ -6 mm.

Not common. Weybridge, Lee, Abbey Wood (Douglas and Scott); Colesborne, Gloucestershire, by sweeping long grass (Edwards).

PLATE XIII.

FIG. 1. *Idiocerus tibialis*, Fieb.

- 1a. „ „ „ (face).
- 2. „ *vitreus*, Fab.
- 3. „ *fulgidus*, Fab.
- 4. „ *populi*, Lin. (underside).
- 5. „ *confusus*, Flor.
- 6. „ *albicans*, Kbm.
- 7. *Agallia puncticeps*, Germ.
- 8. „ *venosa*, Fall.
- 9. *Evacanthus interruptus*, Lin.
- 10. „ *acuminatus*, Fab.



R. Morgan del. et lith.

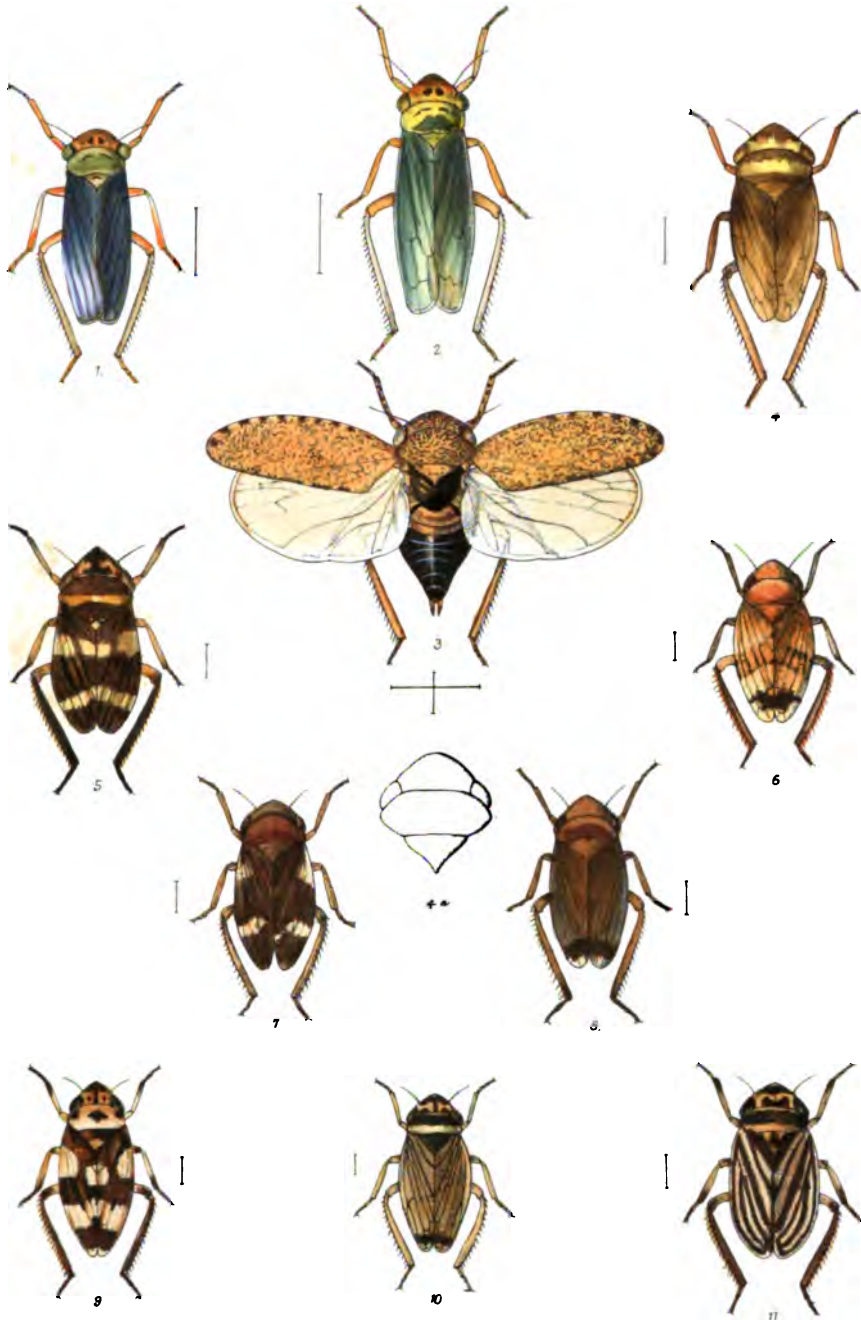
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PLATE XIV.

- FIG. 1. *Telligonia viridis*, Lin. ♂
2. " " " ♀
3. *Strongylocephalus agrestis*, Fall.
4. *Acocephalus nervosus*, Schr.
4a. " " var. (upper fore parts).
5. " *bifasciatus*, Lin.
6. " *albifrons*, Lin.
7. " " " var.
8. " " " " "
9. " *brunneo-bifasciatus*, Geoffr.
10. " *histrionicus*, Fab.
11. " *flavostriatus*, Don.

PLATE 14.



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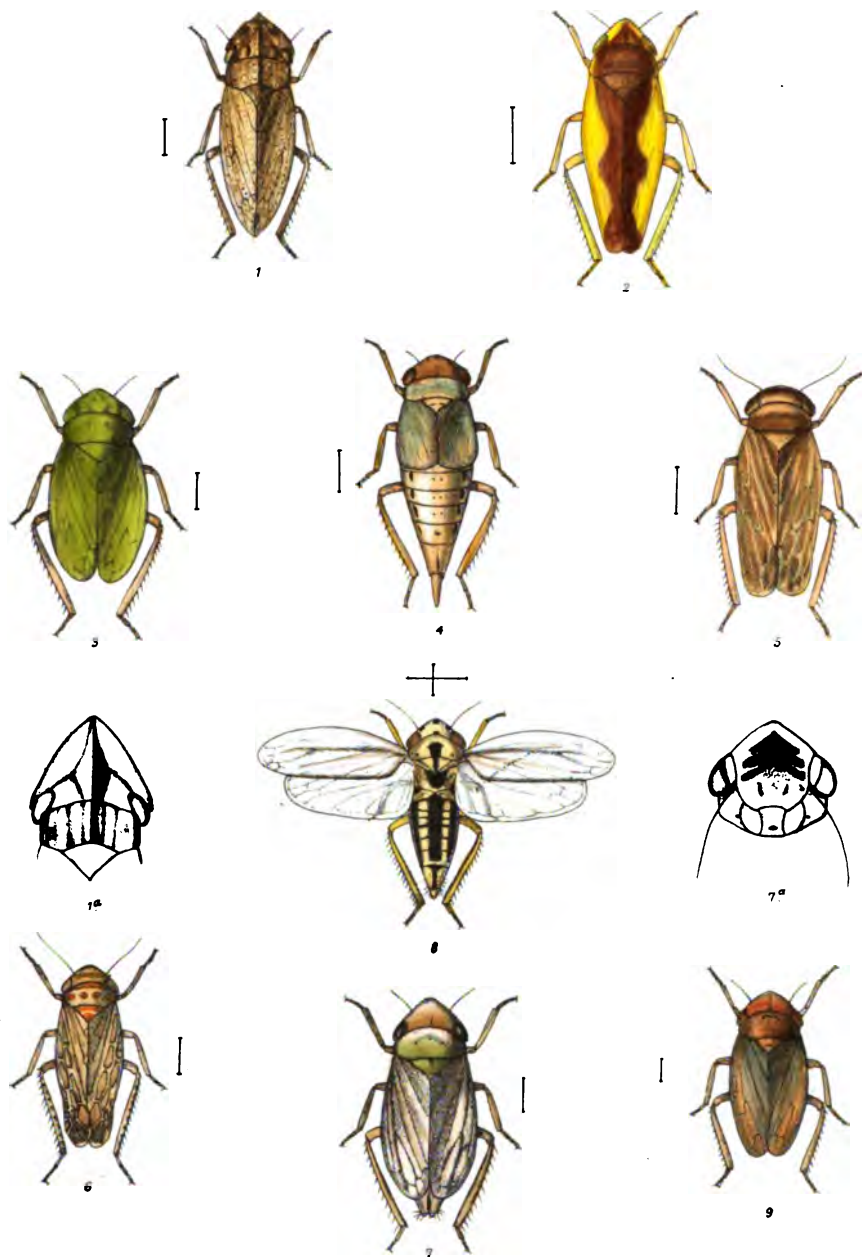
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PLATE XV.

FIG. 1. *Eupelix cuspidata*, Fab.

- 1a. " " " var. (upper fore parts).
2. *Platymetopius undatus*, De G.
3. *Graphocrocerus ventralis*, Fall.
4. *Doratura stylata*, Boh.
5. *Paramesus nervosus*, Fall.
6. " *phragmitis*, Boh.
7. *Glyptocephalus proceps*, Kbm.
- 7a. " " " (face).
8. *Stictocoris Preyssleri*, H.-S.
9. *Athysanus russeolus*, Fall.



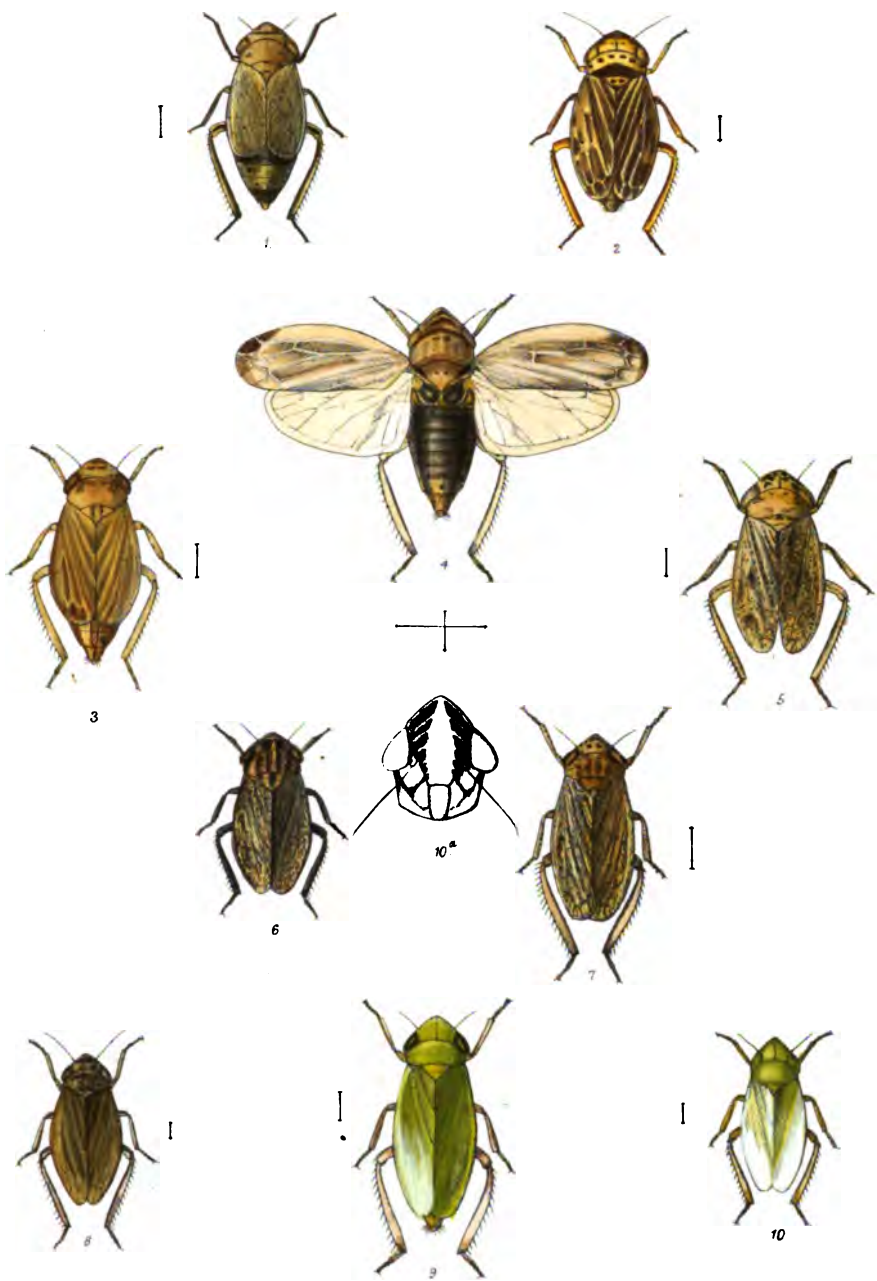
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PLATE XVI.

- FIG. 1. *Athysanus brevipennis*, Kbm.
2. „ *sordidus*, Zett.
3. „ *Sahlbergi*, Reut.
4. „ *grisescens*, Zett.
5. „ *communis*, J. Sahl.
6. „ *obscorellus*, Kbm.
7. „ *obsoletus*, Kbm.
8. „ *melanopsis*, Hardy.
9. *Deltoccephalus abdominalis*, Fab.
10. „ *striifrons*, Kbm.
10a. „ „ „ (face).



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THE
HEMIPTERA HOMOPTERA
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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vi. **Doratura**, *J. Sahl.* (Pl. 2, fig. 7.)

Crown subangularly produced, widely impressed across the base, reflexed at the apex. Frons flat, transversely impressed above. Sides of pronotum not margined. Insect generally brachypterous, in which case the elytra are less than one half as long as the abdomen and truncate behind. First and second wing-veins confluent and forming one vein shortly before the apex of the wing. Apex of the abdomen in the female strongly acuminate.

There are two European species of this genus, and it is possible that the second, *D. homophylla*, Flor, may yet be found here. It is very similar to *D. stylata*, but rather larger than average examples of that species; the genital valve in the male is nearly as long as the last ventral segment, and the last ventral segment in the female is twice as long as the preceding segment and roundly produced behind.

1. **D. stylata**, *Boh.*—♂. Pale grey or yellowish grey; three spots on the forehead, of which the middle one is the largest and oblong, two bands across the face, and sometimes some markings on the loræ and clypeus, black. Crown obtusely produced, one half longer in the middle than at the sides, and one-third longer than the pronotum, which is at least three times as wide as long. Elytra coriaceous, rugulose, rather more than one-third as long as the abdomen, their apex truncate, with rounded angles. Abdomen above with one or two fine black longitudinal lines on each side broken up into points or short lines, and frequently a transverse row of black points across each segment; on the under side each segment is occupied by a large crescent-shaped black spot. Legs pale; front pairs of thighs sometimes with a black band near the apex; hind tibiæ with a black stripe on the inner side and a row of black points on the outer side. Pygofer with three black spots above; genital valve extremely short; plates about as long as the last ventral segment, obtusely rounded at the apex.

♀. A small suboval spot in the middle of the last dorsal segment, the hind margin of the latter and a fine line down the middle of the pygofer above black; otherwise coloured like the male. Last ventral segment one-half longer than the preceding, subtruncate behind; saw-case about three times as long, its apical third free.

Macropterous form.—Elytra dirty whitish, subopaque, scarcely reaching to the apex of the last dorsal segment; appendix of nearly equal width throughout, reaching as far as the first apical area. Length $2\frac{3}{4}$ –4 mm.

Common amongst low plants in dry places. Norwich district, Cotswold district. Tring hills, Herts (Piffard); Albury heath (Capron); Middlehaugh, Perthshire (Norman); Wimbledon Common (Marshall); Perth district (Macgregor); Chobham (Saunders); Battle, Eridge, Boxhill, Ewhurst, St. Martha's Hill (Butler); Lulworth (Dale).

I once found a large pale race of this species on the sand-hills at Hunstanton, Norfolk. These specimens were about one-half larger than the ordinary form (♂ 4 mm., ♀ $5\frac{1}{2}$ mm.), but the difference in size was apparently much greater; the ordinary form occurred at the same time in a salt-marsh just behind the sand-hills. The two races were not intermingled, but I could not on subsequent examination detect any structural difference between the two.

vii. *Paramesus*, *Fieb.* (Pl. 2, fig. 8.)

Crown sublunate or slightly produced, with a wide transverse impression on the disc. Forehead and front of the crown transversely striate. Frons flattish, dull, exceedingly finely and closely punctured. Sides of pronotum very short, not margined. Elytra about as long or a little longer than the abdomen, normally with two transverse veins; appendix very narrow or entirely wanting. Wings of the Jassid type.

Our two species may be distinguished as follows:—

Frons between the antennæ nearly three times as wide as the base of the clypeus. Insect broad 1. *nervosus*.

Frons between the antennæ not more than twice as wide as the base of the clypeus. Insect narrow. 2. *phragmitis*.

Dr. Puton in his catalogue, doubtless following Fieber, puts *phragmitis*, Boh, as a *Deltocephalus*; it is, however, in all essential points a true *Paramesus*.

1. **P. nervosus**, Fall.—♂. Oblong, brownish yellow; forehead with a pale yellow transverse line, bounded above and below by an arcuate black one; frons black or brown, with a few pale curved transverse lines and some indication of a pale middle stripe below; outline of the loræ and clypeus and a line down the middle of the latter black; front margin of pronotum narrowly black. Scutellum sometimes with a dark triangle in each basal angle. Veins of the elytra pale, the areas of the corium evenly margined with black, the apical areas dark fuscous. Crown a little longer in the middle than at the sides, and about equal in length to one-half of its basal width. Pronotum about two and a half times as wide as long, one-third longer than the crown, and subequal in length to the scutellum. Abdomen black. Legs pale, striped, spotted, and banded with black.

♀. Similar in coloration to the male, but larger and much paler; the dark margins to the areas fuscous or entirely wanting. Abdomen pale, striped with fuscous. Length, 6–6½ mm.

Locally abundant on *Scirpus maritimus*. Norfolk coast. Swyre, Dorset, (Dale); Bexhill (Butler); Sandwich (Marshall).

2. **P. phragmitis**, Boh. Elongate. Crown slightly roundly produced, somewhat shorter than the pronotum, whitish, with two rust-yellow patches on the disc; forehead with a whitish band, bounded above and below by a black line. Frons narrow with nearly straight sides, pale brown, sometimes with a few pale curved lines on each side. Pronotum whitish, with six rust-yellow spots, two in front and four in a transverse row behind. Scutellum whitish, with

three sometimes confluent rust-yellow spots. Elytra greyish yellow, distinctly longer than the abdomen; veins thickened, whitish, narrowly margined with fuscous; two points near the apex and some streaks on the costa behind the middle black. Abdomen above black, sides pale, beneath pale with black side stripes. Legs pale yellow, with black points. Length, 4-5 mm.

On *Arundo phragmitis*, apparently local.

Haslemere (Buckton); Ranworth, Cley, Norfolk.

viii. **Glyptocephalus**, *Edw.* (Pl. 2, fig. 9.)

Crown subangularly produced, with a narrow impression running parallel with its front margin. The temples and front margin of the crown transversely striate. Frons rather flat, dull, exceedingly finely and closely punctured with some transverse curved rows of large shallow punctures above. Angle of the cheeks almost a right angle. Sides of pronotum exceedingly short, not margined. Elytra a trifle shorter than the abdomen, their apices rounded and overlapping; appendix extremely narrow; one transverse vein. Wings of the Jassid type.

The single species for which I proposed this genus may well be separated from *Athysanus* on account of the structure of the head.

1. **G. proceps**, *Kbm.*—Very pale yellow; elytra white, with a peculiar hoary appearance, which is very conspicuous during life; the areas, except the brachial, generally occupied by a black or fuscous stripe; a stripe along the lower margin of each eye as far as the antenna, a wide curved band across the upper part of the frons, the apex of the rostrum, the facial sutures very narrowly, three acuminate stripes on the upper side of the abdomen, and sometimes two or three on its under side, an angular patch on the mesosternum, a spot on each front coxa, and sundry lines, bands, and points on the legs, black. Crown pointed, twice as long in the middle as at the sides, about as long as half its basal width. Pro-

notum as long as the crown or a little longer, its hinder half transversely striate. Length, 4–5 mm.

Amongst grass; widely distributed, but not generally common.

Norfolk. Eridge, St. Martha's Hill, Surrey (Butler); Lulworth, Falmouth (Dale); Chobham, Esher Common (Saunders).

JASSIDÆ.

Oblong or elongate species of small or medium size. Ocelli on the forehead, which is more or less obtuse and never keeled. Upper branch of the cubital vein sometimes obsolete or wanting, the lower branch joined to the brachial vein by one or two transverse veins. Submarginal wing-vein complete; first and third wing-veins simple, the second forked, its upper and lower branches either connected with the first and third respectively by a transverse vein or shortly confluent with those veins, except in *Gnathodus*, where the upper branch is confluent with the first wing-vein as far as the submarginal vein. Front pairs of tibiæ subterete, spinose on the outer side; hind tibiæ quadrangular-prismatic, with four rows of spines.

A somewhat numerous group, distinguished from all our other species with multispinose hind tibiæ by the position of the ocelli, the absence of any well-defined border separating the crown from the face, and the branched veins of the corium.

The black markings which occur on the heads of many members of the genus *Athysanus*, and some others of this family, notwithstanding a great tendency either to exaggeration or reduction, frequently form valuable aids to identification, and I therefore propose the following names for the various members of what may be considered as the normal pattern.

Proceeding forwards from the hind margin of the crown we have:—

- 1st. Two *basal markings*, one on each side, generally either punctiform or annular.
- 2nd. An *interocular line*, running straight across the crown at the level of the apex of the inner margin of the eye.
- 3rd. The *interocellar line*, connecting the ocelli and sometimes extending as far as the eyes, widened, angularly bent forward, and generally interrupted in the middle.
- 4th. The *infraocellar line*, which runs across the forehead and adjoins the ocelli on their lower side. This line, which is frequently biarcuate and sometimes interrupted in the middle, is not to be confounded with the uppermost of the ordinary series of transverse lines on the frons, from which it is quite distinct in character.

These details are present in various combinations in different species, but the whole may generally be observed in a well-marked example of *Athysanus sordidus*, Zett. In several species of *Athysanus*, &c., there exists a dark form, generally of the male sex, in which all the dark markings proper to the species are very strongly developed, and which has consequently a very different appearance to the prevalent form. *Athysanus piceus*, Scott, which is the dark form of *Athysanus obsoletus*, Kbm., is a case in point. In working from descriptions of the female only it should be borne in mind that the crown in that sex is usually longer and more pointed than in the male, and the general coloration is paler.

TABLE OF GENERA.

1. (6) Elytra not overlapping at the apex.
2. (5) Crown not sharply angular in front, seldom longer than the pronotum. Species for the most part large and stout.
3. (4) Elytra hyaline i. *Stictocoris*.
4. (3) Elytra subcoriaceous ii. *Athysanus*.

5. (2) Crown sharply angular in front, frequently much longer than the pronotum. Species small and narrow. iii. *Deltocephalus*.
6. (1) Elytra distinctly overlapping at the apex.
7. (14) Inner margin of the clavus much longer than the membrane.
8. (11) Sides of pronotum of moderate length, separated from prosternum by a distinct keel.
9. (10) Crown widely rounded in front. Elytra with many supernumerary white transverse veins. iv. *Allygus*.
10. (9) Crown angularly produced in front. Supernumerary white transverse veins, if present, very few. v. *Thamnotettix*.
11. (8) Sides of pronotum extremely short; keel obsolete or wanting.
12. (13) Upper cubital vein complete, reaching the angular veins. *Limotettix*.
13. (12) Upper cubital vein obsolescent to a greater or less extent, sometimes running into the upper fork of the lower branch of the cubital vein, but never reaching the angular veins. *Cicadula*.
14. (7) Membrane as long as the inner margin of the clavus. *Gnathodus*.

i. **Stictocoris**, *Thoms.* (Pl. II., fig. 11.)

Body robust, ovate. Head with the eyes wider than the pronotum, obtuse in front. Crown convex, sublunate, very feebly roundly produced in the middle. Frons longer than its width across the base; cheeks wide, base of the loræ subequal in width to the base of the clypeus. Rostrum stout, longer than the clypeus. Sides of the pronotum very short, obtusely and indistinctly margined. Elytra hyaline, ample, about as long as the abdomen, not overlapping at the apex;

appendix very narrow ; four short apical and five subapical areas.

Three species—namely, *transversa*, Fall, *lineata*, Fab. and *flavola*, Boh—are associated by J. Sahlberg with *Preyssleri*, H.-S., in this genus.

1. **S. Preyssleri**, H.-S.—Pale yellowish white ; four spots on the crown, one at the base, and three at the front margin, the latter continued on to the frons, a spot at the base of each antenna sometimes, and a wide middle stripe on the pronotum and scutellum, black ; elytra hyaline, with the inner margin narrowly and a stripe running along the inner branch of the cubital vein and fading behind, fuscous or black. Crown obtusely pointed, one-half longer in the middle than at the sides, and about half as long as its basal width. Abdomen above black, narrowly yellow at the sides ; beneath yellow, with a black middle stripe. Legs yellow, with or without black lines and points. Length, 3–3½ mm.

Occurs on grasses and other low plants in dry places.

Cotswold district. Brickett Wood, Herts, on *Genista anglica*, Tring Hills, Herts, Cisbury Hill, Arundel Park, Sussex, on Common Burnet (Piffard).

Scott introduced this species to our list in 1875 without notice of the locality whence his specimens came.

ii. **Athysanus**, Burm. (Pl. II., fig. 10.)

Body robust, somewhat rounded at the sides. Head with the eyes somewhat wider than the pronotum, obtuse in front ; crown obtusely produced, convex above, ocelli near the eyes ; frons wide, somewhat convex ; clypeus wide, its base distinctly wider than the base of the lora ; cheeks wide, reaching to the apex of the clypeus. Pronotum short, transverse, its sides not or only faintly margined, Elytra subcoriaceous, not overlapping at the apex, sides slightly rounded ; five subapical areas ; appendix wanting or extremely narrow ; generally somewhat or even much shorter than the abdomen, with very

short apical areas, but occasionally longer than the abdomen, with the apical areas fully developed, in which case the elytra overlap somewhat at the apex, owing to the development of the appendix; wings frequently much abbreviated.

Dr. Puton in his catalogue includes one hundred species in this genus, but several of these are placed by other writers in different genera.

TABLE OF SPECIES.

1. (2) Upper side rust-red, with or without dark markings. 1. *russeolus*.
2. (1) Upper side not as above.
3. (10) Dark markings of the crown a transverse line or lines, or entirely wanting.
4. (9) Interocular line level with the apex of the inner margin of the eye.
5. (8) Front of crown angular.
6. (7) Species smaller, angle of crown more pointed; pronotum at least three times as broad as long. 2. *brevipennis*.
7. (6) Species larger, angle of crown less pointed; pronotum about twice as broad as long. 3. *sordidus*.
8. (5) Front of crown roundly produced. 4. *Sahlbergi*.
9. (4) Interocular line placed considerably behind the apex of the inner margin of the eye. 5. *griseszens*.
10. (3) Crown with several black spots, but no transverse line.
11. (16) Elytra more or less closely speckled with black.
12. (13) Transverse vein and the apices of the anal and axillary veins milk-white. 6. *communis*.
13. (12) No milk-white spots on the elytra.
14. (15) Length, 3-3½ mm. Outer margin of genital plates straight. 7. *obscurellus*.

15. (14) Length $4\frac{1}{2}$ - $5\frac{1}{2}$ mm. Outer margin of genital plates gently convex. *obsoletus* (var. *piceus*.)
 16. (11) Elytra not or scarcely speckled with black.
 17. (18) Frons suddenly narrowed at the level of the antennæ. Species large and wide.
 8. *obsoletus*.
 18. (17) Frons regularly narrowed throughout. Species small and narrow.
 9. *melanopsis*.

1. **A. russeolus**, *Fall.*—Fore parts rust-red; elytra pale brown, generally with all the areas narrowly margined with fuscous. Crown obtusely produced, one-half longer in the middle than at the sides, and about half as long as its basal width; interocular line straight, narrowly interrupted in the middle; interocellar line interrupted in the middle, the inner end of each half suddenly bent forward; infraocellar line biarcuate, interrupted in the middle. Frons with a double middle stripe, a few transverse curved lines down each side, and the facial sutures, black. Pronotum about one-third longer than the crown, sparingly speckled with black. Elytra subcoriaceous, about as long as the abdomen, narrowed behind; veins concolorous; appendix very narrow. Abdomen rust-red, darker down the middle of the back. Legs striped and spotted with fuscous. Length, $3\frac{1}{2}$ mm.

Occurs on heaths in July and August.

Pitlochry, Perthshire (Norman). The dark markings of the upper side are sometimes wanting, but the species may always be easily identified by the rust-red ground colour of its fore parts.

2. **A. brevipennis**, *Kbm.*—Upper side shining lighter or darker brownish yellow; frons with the usual curved transverse lines. Crown as long or slightly longer than the pronotum, at least twice as long in the middle as at the sides, subequal in length to half its basal width; interocular line abbreviated at each end, scarcely interrupted in the

middle; infraocellar line biarcuate, generally very faint; interocellar line wanting. Elytra about one-third shorter than the abdomen, obliquely subtruncate at the apex, the apical areas extremely short; veins pale, frequently narrowly bordered with fuscous. Abdomen pale, blackish towards the base; each of the apical dorsal segments frequently bearing a transverse row of dark points. Legs concolorous, with the usual dark markings. Length, $3\frac{1}{2}$ –4 mm.

Hastings, Hatfield, Barnet, Ewhurst, Lowestoft (Butler); Morayshire (Norman); Braemar, Rannoch (Marshall); Perth district (McGregor); Woking (Saunders).

This is a rather small flat species, resembling in appearance an abnormally robust *Deltocephalus*.

3. *A. sordidus*, Zett.—Oblong, slightly rounded at the sides; female much narrowed behind; elytra slightly (σ) or one-third or more (ϕ) shorter than the abdomen; veins whitish. Crown a little longer than half its basal width, twice as long in the middle as at the sides, a trifle shorter than the pronotum, its free sides nearly straight, the angle pointed; interocular line generally widely interrupted in the middle; interocellar line feeble; infraocellar line biarcuate. A very variable species in point of colour. The normal form is pale yellowish grey, with the lines on the head and some markings on the pronotum and scutellum black, and the areas of the elytra more or less filled up with fuscous. The dark form of the male has the elytra black with pale veins, but a very pale immaculate form of both sexes is perhaps the most frequent. Of the dark markings on the elytra, a spot next the transverse vein is the last to disappear. Hind margin of the last ventral segment in the female subangularly concave, with a strong black triangular tooth in the middle. Length, $3\frac{1}{2}$ –4 $\frac{1}{2}$ mm.

Norfolk, common. Wotton-under-Edge (Perkins); Dublin (Halbert); Glanvilles Wootton, Freshwater (Dale); Bexhill, Ewhurst, Fritton (Butler).

The macropterous form, which is rare, has the elytra a little longer than the abdomen, and slightly overlapping at the apex.

A. Sahlbergi, *Reut.*—Similar to the preceding, but larger and stouter, with both the crown and forehead much more obtuse. Crown one-fourth longer in the middle than at the sides, in the female as long, in the male a little longer than half its basal width, its free sides curved, and the angle rounded off. All the markings on the head, except the infraocellar line, more or less distinct. A few black or fuscous points on the front half of the pronotum, a double fuscous stripe on the scutellum, sometimes continued on the hinder half of the pronotum, and the areas of the elytra, more or less filled up with fuscous. Length, $4\frac{1}{2}$ – $5\frac{1}{2}$ mm.

Norfolk. Paisley (Young); Pitlochry (Norman).

Not common; sometimes it occurs in company with *A. sordidus*, but it appears to be restricted to very marshy places; in the field it might be easily passed over as *A. obsoletus*, although I have seldom met with it in company with that species.

5. **A. grisescens**, *Zett.*—Greyish yellow; veins of the elytra whitish. Crown two-thirds longer in the middle than at the sides, subequal in length to the pronotum, its free sides straight, and the angle pointed; interocular line not interrupted in the middle, forked at each end, the lower branch joining the basal spot; interocellar line entire; infraocellar line obsolete or wanting. Pronotum and scutellum sometimes with a few fuscous markings. Elytra a little shorter than the abdomen, narrowly rounded at the apex, in the macropterous form as long as or a little longer than the abdomen, with the suture and some of the areas narrowly margined with blackish, and the apical areas more or less filled up with the same colour. Hind margin of the last ventral segment in the female subangularly concave, with a bifid process in the middle. Length, 5– $5\frac{1}{2}$ mm.

Norwich district, Cotswold district. Wotton-under-Edge (Perkins); Dublin district (Halbert); Lowestoft (Butler); Glanvilles Wootton (Dale).

6. *A. communis*, *J. Sahl.*—Pale brownish yellow; elytra sparingly speckled with black along the veins; transverse veins and the apices of the anal and axillary veins milk-white. Crown in the male as long as half its basal width, one-half longer in the middle than at the sides; in the female a little shorter than half its basal width, twice as long in the middle as at the sides; the free margin in the male subparallel with the curve of the hind margin, in the female forming an obtuse but distinct angle. Pronotum about two-thirds longer than the crown. Markings on the crown precisely similar in form to those of *A. obscurellus*, but in point of intensity only equal to the female of that species. Frons pale, with black transverse lines, its middle line pale at least below. Elytra as long as or a little shorter than the abdomen, widely rounded at the apex; veins whitish. Abdomen above black, margins of the segments narrowly yellow, under side black, with a row of yellow spots down each side, or yellow, with a wide more or less interrupted black stripe down the middle. Legs striped and spotted with black; thighs only occasionally with a black band near the apex. Length, 4–5½ mm.

Norfolk. Glanvilles Wootton, Freshwater (Dale); Hastings, Battle, Hurst Green, Ewhurst, Chingford, Bexhill, Abbot's Wood, Sussex (Butler); Wotton-under-Edge (Perkins); Perth (McGregor).

Common amongst grasses, especially in damp places. Very closely allied to *A. obscurellus*, but distinguishable by its larger size, wider and more obtuse form, paler colour, and the milk-white spots on the elytra.

7. *A. obscurellus*, *Kbm.*—Brownish yellow; elytra closely and finely speckled with black. Crown subequal in

length to half its basal width, nearly one-half longer in the middle than at the sides, its free sides gently arcuate, the angle obtuse; basal markings annular; the interocular line thickened and more or less widely interrupted in the middle; interocellar line broken up into four spots; infraocellar line biarcuate, well defined. Frons black, the usual lines yellow. Pronotum one-third longer than the crown, with a few black spots in front, behind with four dark stripes, each composed of short transverse black lines. Scutellum with some black spots. Elytra gently rounded at the sides, a little longer than the abdomen, widely rounded at the apex; veins a little paler than the disc. Abdomen black. Legs striped, spotted, and banded with black. In the female the crown is nearly twice as long in the middle as at the sides, the speckling on the elytra is confined to a little along the veins, the other dark markings are much reduced, and the frons is brownish yellow, with a double black middle stripe and black or fuscous transverse lines. Length, 3-3½ mm.

Norwich district, Cotswold district. Wotton-under-Edge (Perkins); Dublin district (Halbert); Glanvilles Wootton, Isle of St. Kilda (Dale); Hastings, Bexhill, Ewhurst (Butler).

Very abundant in grassy places. The male is easily recognised by its small size and dusky appearance, but the female is liable to be confounded with *A. communis*, from which it is best separated by its narrower, more pointed form, and the absence of milk-white spots on the elytra.

8. *A. obsoletus*, *Kbm.*—Greyish yellow; crown with six black points placed in two oblique lines meeting in the apex. Crown in the male as long as half its basal width, two-thirds longer in the middle than at the sides; in the female a little longer than half its basal width, one-half longer in the middle than at the sides, its free sides gently arcuate, the angle obtuse; basal markings punctiform, close to the eyes; interocular line thickened and widely interrupted in the middle, most frequently represented by a pair of spots on

the disc; interocellar line thickened and interrupted in the middle, often broken up into four spots, and most frequently represented by a pair of spots on the apex; infraocellar line obsolete or wanting. Frons yellow, with black transverse lines. Pronotum three times (♀) or nearly three times (♂) as long as the crown. Elytra variable in length, in the prevalent form with scarcely any traces of black speckling along the whitish veins. Abdomen in the male black, with the connexivum yellow; in the female yellow, with an acuminate black middle stripe on both upper and under sides; hind margin of the last ventral segment (♀) concave, with a blunt triangular tooth in the middle. Legs striped and spotted with black; intermediate thighs with a black band before the apex. Length, $4\frac{1}{2}$ – $5\frac{1}{2}$ mm.

Very abundant in damp grassy places. Norwich district, Cotswold district. Glanvilles Wootton, Portland (Dale); Deal, Ewhurst, Dallington Forest, Chobham, Chingford (Butler); Solway district, West Ross-shire (Robinson-Douglas); Dumfally, Perthshire (Norman); Ireland (Haliday); Dublin (Halbert); Perth (McGregor); Renfrewshire (Young); var. *piceus*, Taynult (Beaumont); Glanvilles Wootton (Dale); Eridge (Butler).

Of the same robust build as *A. grisescens*, but easily distinguished by the markings on the crown. The dark form (*A. piceus*, Scott) has the frons black, with yellow transverse lines; the crown (by reason of the exaggeration and confluence of the normal markings) black, with a few yellow spots, or entirely black; and the pronotum, scutellum, and elytra lighter or darker pitch-brown, in the latter owing to the close black speckling, after the manner of the male of *A. obscurellus*.

9. *A. melanopsis*, Hardy.—Brownish yellow; areas of the elytra often narrowly margined with fuscous or black. Crown one-half longer than half its basal width, one-half longer in the middle than at the sides, its free sides nearly straight,

angle distinct but obtuse; basal markings large, horseshoe-shaped; interocular line interrupted, but scarcely thickened in the middle, often broken up into four spots, on the hinder half of the disk a pair of whitish stripes narrowly margined with fuscous reaching as far as the interocular line; interocellar line broken up into four spots; infraocellar line biarcuate, very distinct. Frons black, with a middle stripe and the transverse lines yellow. Pronotum a little longer than the crown, sometimes with four wide dark stripes. Scutellum yellow, generally without markings. Elytra in the male a little longer, in the female a little shorter, than the abdomen, narrowly rounded at the apex, the areas frequently more or less distinctly ocellate, but very often without markings; veins pale. Abdomen black; hind margins of the distal dorsal segments narrowly whitish. Last ventral segment (♀) a little longer than the preceding, its hind margin simple, very feebly concave. Legs black, the knees and the outer side of the tibiae for some distance from the base brownish yellow. Length, 3 mm.

Norfolk. Shiere (Butler); Chobham (Saunders).

This is one of the species which one finds in company with *Deltocephalus argus* and, more rarely, *D. coroniceps*, amongst a fine grass which grows on heaths under *Pteris*. It is easily distinguished by its small size and Deltocephaloid facies; it forms, in fact, a connecting link between the genera *Athysanus* and *Deltocephalus*, if we pass to the latter by way of *D. pulicaris*.

iii. *Deltocephalus*, Burm. (Pl. II., fig. 12.)

Body oblong or elongate. Head with the eyes as wide as the pronotum, pointed in front; crown flat or slightly convex, more or less angularly produced in front; frons at the apex three or four times as wide as the temples; cheeks generally subangularly dilated; temples linear; ocelli somewhat distant from the eyes. Side margins of pronotum short. Elytra

usually subcoriaceous, with five subapical areas, generally shorter than the abdomen, with very short apical areas, sometimes longer than the abdomen in consequence of the development of the membrane and appendix, and in that case the elytra overlap a little at the apex. Wings often very short.

The species of this genus are for the most part small obscure insects, and in a few cases very difficult to determine with certainty. Puton gives eighty-nine species for the Palearctic fauna, and of these we have twenty-five, which are, for the most part, found by sweeping in grassy places.

TABLE OF SPECIES.

1. (38) Crown flat or slightly depressed.
2. (37) Elytra without a black spot at the apex of the fourth subapical area.
3. (10) Elytra green, greyish green, or yellow (dark margins to the areas exceptional in this group).
4. (5) Corium opaque throughout; apical areas sometimes with dark hind margins 1. *abdominalis*.
5. (4) Corium never entirely opaque; elytra generally transparent.
6. (7) Frons with a wedge-shaped yellowish-white stripe reaching from the forehead to the clypeus.
2. *striifrons*.
7. (6) Frons without a yellowish-white stripe.
8. (9) Genital plates reaching nearly three times as far as the valve; hind margin of the last ventral segment in the female concave, with a deep acutangular notch in the middle.
3. *pascuellus*.
9. (8) Genital plates reaching only twice as far as the valve; hind margin of the last ventral segment in the female nearly straight. 4. *citrinellus*.
10. (3) Species lighter or darker brownish yellow or greyish or ochreous white. Nerves frequently

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wholly or partly milk-white (dark margins to the areas of frequent occurrence in this group).

11. (12) Clavus divided into several small areas. 5. *ocellaris*.
12. (11) Clavus not divided into small areas.
13. (32) ♂; genital plates not shorter than the valve; ♀; hind margin of the last ventral segment toothed or notched or triangularly produced.
14. (15) Front margin of crown with four or six equidistant black spots, or a black band bearing three or five pale spots. 6. *coronifer*.
15. (14) Crown not as above.
16. (31) ♂; side lobes of pygofer more or less pointed, not connivent: ♀; hind margin of the last ventral segment without a triangular notch in the middle.
17. (24) All or most of the areas of the elytra margined with fuscous.
18. (23) All the areas, including the basal one, margined with fuscous.
19. (20) Veins concolorous. 7. *repletus*.
20. (19) Veins white.
21. (22) Fuscous margins of the areas regular. 8. *oculatus*.
22. (21) Fuscous margins of the areas irregular. 9. *picturatus*.
23. (18) Nearly all the areas, except the basal one, irregularly margined with fuscous. 10. *Flori*.
24. (17) The fuscous markings of the elytra either confined to a narrow border to the apical areas, and one or two spots on the corium, or entirely wanting.
25. (26) Outline of the hind margin of the last ventral segment in the female resembling an ogee arch. 11. *Linnei*.
26. (25) Not as above.
27. (30) Hind margin of last ventral segment in the

- female with two small triangular teeth, the length of that part of the segment lying between the two teeth a little greater than that of the part lying between each tooth and the side of the segment. Veins of elytra concolorous.
28. (29) These teeth about equidistant from the sides of the segment and from each other. Genital styles in the male black clavate with simple margin.
12. *distinguendus*.
29. (28) These teeth nearly twice as distant from each other as from the sides of the segment. Genital styles in the male pale, crenulate on the outer side from the apex downwards. 13. *Falleni*.
30. (27) Hind margin of last ventral segment in the female with a large projection in the shape of a short truncate cone, the length of this projection about equal to one third of the greatest length of the segment, its width equal to about half the width of the segment. Veins of elytra milk-white. 14. *paleaceus*.
31. (16) ♂ ; side lobes of pygofer wide, inflexed, and connivent: ♀ ; hind margin of the last ventral segment with a small triangular notch in the middle. 15. *socialis*.
32. (13) ♂ ; genital plates very short, distinctly shorter than the valve: ♀ ; hind margin of the last ventral segment simple, faintly concave or straight.
33. (36) The three innermost apical areas not white.
34. (35) Elytra with five or six distinct black spots. Inhabits coast-sands. 16. *sabulicola*.
35. (34) Elytra not spotted, the inner areas more or less bordered, sometimes entirely filled up with black or brown. Abundant everywhere.
17. *striatus*.

36. (33) The costal and three innermost apical areas white. 18. *Normani*.
 37. (2) Elytra with a small black spot at the apex of the fourth subapical area. 19. *punctum*.
 38. (1) Crown distinctly though slightly convex.
 39. (40) Elytra with two broad white bands. 20. *argus*.
 40. (59) Elytra not banded with white.
 41. (42) Membrane with two distinct black spots, one in the first and the other in the fourth apical area. 21. *costalis*.
 42. (41) Membrane without black spots.
 43. (44) Front of crown with a black band bearing five white spots. 22. *coroniceps*.
 44. (43) Crown not as above.
 45. (46) Crown with two round black spots. 23. *maculiceps*.
 46. (45) Crown without round black spots.
 47. (48) Prevailing colour brownish-yellow. Frons brownish-yellow with scarcely visible whitish side-lines. 24. *Panzeri*.
 48. (47) Prevailing colour leaden-black. Frons black with or without pale side-lines. 25. *pulicaris*.

1. **D. abdominalis**, *Fab.*—Upper side greenish yellow or greyish green; hind margins of the apical areas frequently fuscous. Crown distinctly shorter than its width at the base, nearly twice as long in the middle as at the sides, the free sides straight, angle blunt. Frons black, with yellow transverse lines; apical half sometimes yellow, with a double black middle stripe. Pronotum about one-third shorter than the crown, elytra coriaceous, as long as or a little longer than the abdomen, widely rounded at the apex; membrane and the apices of the subapical areas whitish, subpellucid; veins yellow. Legs yellow, striped, spotted, and banded with black; hind tarsi black, yellow at the base. ♂; abdomen black; genital plates separately rounded at the apex, their

outer margin angularly excised on the apical third, their inner margin about one and a half times as long as the valve; pygofer reaching beyond the plates. ♀; abdomen above black, below yellow spotted with black; last ventral segment black, sides and hind margin more or less widely yellow, the latter with a longitudinally striate depression on each side and a pair of triangular teeth in the middle. Length, 4-4½ mm.

Norfolk. Rannoch, Wimbleton Common, Leicestershire (Marshall); Perth district (McGregor); Renfrewshire (Young); Chesil Beach (Dale).

2. **D. strifrons**, *Kbm.*—Oblong. Upper side bright yellow; three narrow stripes on the crown, five on the pronotum, and the basal half of the costa, white; a pair of short black lines on the apex of the crown. Crown in the male as long, in the female one-fourth longer, than its width at the base, about one-third longer in the middle than at the sides, the free sides nearly straight, angle pointed. Frons black, with whitish tranverse lines, its central space occupied by a large whitish-yellow triangle, of the same width at the base as the clypeus, and reaching thence to the forehead; infraocellar line broad, gently curved, and very well defined, interrupted in the middle, and joined to the two short lines on the apex of the crown which represent the interocellar line. Pronotum about one-third shorter than crown. Elytra about as long as the abdomen, coriaceous on the basal half, afterwards subpellucid; veins whitish. Legs yellow, striped, banded, and spotted with black. ♂; abdomen black, sides and apex yellow; genital plates yellow, reaching as far as the pygofer, separately rounded at the apex, their inner margin at least two and a half times as long as the valve, each one bearing a longitudinal impressed line, which is subparallel with the outer margin. ♀; abdomen above yellow; a few of the basal segments black in the middle; under side yellow, with a wide black middle stripe, or entirely black; last

ventral segment yellow, its hind margin semicircularly concave, with a deep narrow black-bordered angular notch in the middle. Length, $3\frac{1}{2}$ – $3\frac{3}{4}$ mm.

Swanage (Marshall); Herne Bay (Saunders); amongst *Ononis* on the south coast (Thouless).

According to Reuter it is found on *Trifolium*.

3. *D. pascuellus*, Fall.—Elongate. Upper side pale yellow; apical areas and those adjoining frequently margined with fuscous; costa yellowish white; interocellar line represented by two or four black or fuscous spots. Crown in the male as long, in the female a little longer, than its width at the base, about one-third longer in the middle than at the sides, free sides distinctly arcuate, angle blunt. Frons black or brown, with a few curved transverse whitish lines down each side; infraocellar line represented by a black V near the middle of the forehead, the ends of which sometimes merge into the ground colour of the frons. Pronotum very little shorter than the crown. Elytra subpellucid, a little longer than the abdomen in the male, a little shorter in the female, widely rounded at the apex; veins yellow. Legs pale yellow, striped, spotted, and banded with black. ♂; abdomen black, sides and apex yellow; genital plates yellow, basal half black, long, triangular, separately rounded at the apex, their inner margin rather more than twice as long as the valve; on the basal two-thirds of each a longitudinal impressed line. ♀; abdomen coloured as in *D. striifrons*; hind margin of the last ventral segment gently concave, with a deep angular notch in the middle. Length, 3 – $3\frac{1}{2}$ mm.

Very common amongst grasses in damp places in Norfolk, and also in the Cotswold district. Glanvilles Wootton, Freshwater (Dale); Battle, Lowestoft, Fritton (Butler).

4. *D. citrinellus*, Kbm.—Oblong-ovate. Upper fore parts greenish yellow, elytra pale greyish green, breast black. Crown subequal in length to its width at the base, nearly

twice as long in the middle as at the sides, free sides nearly straight, angle blunt; interocellar line when present fuscous. Frons pale brown, with a middle stripe and the usual side lines yellow. Pronotum about one-third shorter than the crown. Elytra whitish hyaline at the apex, a little longer than the abdomen, costa rounded, apex widely rounded; veins stout, yellow, inner apical areas and those adjoining sometimes narrowly margined with fuscous. Legs yellow, striped and spotted with black. ♂; abdomen black; genital plates very small, separately rounded, scarcely half as long as the trapeziform valve. ♀; abdomen black, with the sides more or less widely yellow; last ventral segment yellow at the sides or entirely yellow, its hind margin nearly straight. Length, $2\frac{3}{4}$ - $3\frac{1}{4}$ mm.

Amongst grasses in damp places; local. Norfolk. Ambleside, Freshwater (Dale); Rannoch (Marshall).

5. *D. ocellaris*, *Fall.*.—Crown yellowish white with fulvous spots, in the male as long, in the female a little longer, than its basal width, about three-fourths longer in the middle than at the sides, free sides feebly arcuate, angle blunt. Frons blackish brown, sometimes with a large yellow patch on the apical half; side lines short, whitish. Pronotum one-third or less shorter than the crown, fulvous, with three or five narrow yellowish white stripes. Scutellum yellowish white, with fulvous spots. Elytra dirty yellow, obliquely subtruncate at the apex; veins white, the transverse ones and those at the base and apex of the first subapical area dilated; clavus divided into several small areas, which, together with those of the corium and membrane, are margined with black. Abdomen black, yellow at the apex. Legs: thighs black, yellow at the apex; tibiæ yellow with black points, hind pair widely black on the inner side. ♂; elytra somewhat longer than the abdomen; genital plates elongate, triangular, reflexed, subnavicular, with a common narrow oval impression at the apex. ♀; elytra shorter than

the abdomen ; hind margin of the last ventral segment with a strong triangular, sometimes bifid, tooth in the middle. Length, 3-3½ mm.

Very abundant amongst grasses. Norfolk, Cotswold district. Hastings, Battle, Bexhill, Ewhurst, Gomshall, Albury, Highgate (Butler) ; Glanvilles Wootton, Freshwater (Dale).

6. **D. coronifer**, *Marsh.*—Brownish yellow. Crown distinctly longer than the pronotum, about twice as long in the middle as at the sides, nearly as long as its basal width ; infraocellar line complete, biarcuate, and combining with the interocellar line to form a black band bearing three or five pale spots ; cheeks black, with a few pale spots ; frons pale, with a few black transverse lines. Elytra about as long as the abdomen, the areas margined with fuscous feebly at the base, more strongly towards the apex ; a blackish spot in the base of the third subapical area ; veins white, those at the base and apex of the first subapical area not thickened ; one transverse vein. Basal half of the abdomen blackish. Legs pale, distinctly spotted with black. Length, 3 mm.

Amongst grass beneath furze-bushes at Esher, in September (Marshall) ; Lowestoft, Maidenhead (Butler).

7. **D. repletus**, *Fieb.*—Narrow, parallel-sided. Crown one-third longer than its basal width, twice as long in the middle as at the sides, free sides feebly arcuate, angle pointed ; yellow-brown becoming whitish in front, four spots representing the interocellar line and two on the disk fuscous or blackish. Frons blackish brown, the side lines and sometimes a middle stripe on the lower half yellowish. Pronotum one-third shorter than the crown, yellow-brown, with three or five more or less distinct linear white stripes, sometimes with a blackish spot on each side. Elytra yellow-brown, much longer than the abdomen, the membrane well developed, all the areas regularly margined with fuscous ; veins concolorous, the dilated ones at the base and apex of the first

subapical area and the apices of those in the clavus scarcely whitish. Abdomen black, upper side more or less widely yellow at the apex. Legs brownish yellow, striped, spotted, and banded with black. Length, $3\frac{1}{2}$ mm.

Norfolk. Chingford (Butler); Forres, Morayshire (Norman); Woking, Chobham (Saunders).

8. *D. oculatus*, *J. Sahl.*—Narrow, parallel-sided; eyes abnormally large. Upper side yellowish; a short oblique line on each side of the apex of the crown, the hind part of the disc of the pronotum, some markings on the scutellum, and wide margins to the areas of the elytra, fuscous. Crown strongly angularly produced, nearly twice as long in the middle as at the sides. Eyes one-fifth longer than half the front margin of the crown. Frons blackish brown, with very short pale side-lines; clypeus yellow, with a fuscous middle stripe. Pronotum somewhat shorter than the crown. Elytra shining, somewhat longer than the abdomen, elongate, parallel-sided, obtusely rounded at the apex, the strongly thickened veins and two spots on the suture white; all the areas widely margined with fuscous. Abdomen black, its sides and the margins of the segments yellow. Legs yellow, spotted and striped with fuscous. Length, $3\frac{1}{2}$ mm.

Introduced to our list without locality by Scott in 1876, and I am not aware that its capture has been recorded since that time. It is closely allied to the preceding species, from which it is mainly distinguished by its white veins.

9. *D. picturatus*, *Fiéb.*—Narrow, parallel-sided. Crown one-third longer than its basal width, twice as long in the middle as at the sides, free sides nearly straight, angle pointed; white, with large blotches of pale rust-brown, the interocellar line broken up into four blackish lines. Frons blackish-brown, the apex narrowly, a fine linear middle stripe on the lower half, and the side-lines, whitish. Pronotum about one-third shorter than the crown, pale brown, with

three or five linear white stripes, and sometimes a blackish spot on each side. Elytra yellow-brown, much longer than the abdomen, the membrane well-developed, all the areas strongly and irregularly margined with fuscous, the basal one filled up with that colour; veins milk-white, strongly and irregularly dilated; the scutellar margin and two roundish spots at the apices of the veins of the clavus white. Abdomen black, upper side yellow at the apex. Legs greyish yellow, striped, banded, and spotted with black. Length, $3-3\frac{1}{2}$ mm.

Norwich district. Pitlochry, Perthshire (Norman).

10. **D. Flori**, *Fieb.*—Crown a little longer than its basal width, about twice as long in the middle as at the sides, free sides nearly straight, angle pointed; white with some large rust-yellow blotches occupying almost all the disc. Frons blackish brown, a linear middle stripe on the lower half, the apex narrowly and the subclavate side-lines whitish. Pronotum one-third or more shorter than the crown, rust-yellow, with five linear white stripes. Elytra brownish yellow, subequal in length to the abdomen, widely rounded at the apex; membrane well-developed; areas with the exception, generally, of the costal, subcostal, and basal, feebly and irregularly margined with fuscous; veins milk-white, the transverse ones, the apices of those in the clavus, and those at the base and apex of the first subapical area much dilated. Abdomen black, upper side more or less widely yellow at the apex. Legs greyish yellow, banded, striped, and spotted with black. Length, 3 mm.

Amongst long grass in woods.

Norfolk. Battle, Hurst Green (Butler); Wotton-under-Edge (Perkins); Pitlochry, Forres (Norman); Esher (Douglas).

11. **D. Linnei**, *Fieb.*—Crown a little longer than its basal width, nearly twice as long in the middle as at the sides, free sides feebly arcuate, angle pointed; yellowish white, with some rust-yellow blotches. Frons black, its lower half and

the usual transverse side-lines yellow. Pronotum about one-third shorter than the crown, rust-yellow, with five more or less distinct linear white stripes. Elytra pale brownish yellow, as long or longer than the abdomen, some of the areas, especially on the apical half, narrowly margined with fuscous; veins milk-white, the first transverse one much thickened. Legs yellow, striped, spotted, and banded with black. ♂; pygofer reaching a little beyond the genital plates, the inner margin of the latter about twice as long as the valve. ♀; abdomen black, apical half yellow, outline of the hind margin of the last ventral segment resembling an ogee arch. Length, 4-4½ mm.

Battle, Chobham (Butler).

12. **D. distinguendus**, *Flor.*—Crown a little longer than its basal width, twice as long in the middle as at the sides, free sides straight, angle pointed; yellow, sometimes with two brown patches on the disc; interocellar line represented by a point at each ocellus, and a pair of short oblique lines on the apex of the crown. Pronotum little more than half as long as the crown, yellow, with three or five more or less distinct linear white stripes. Scutellum yellow. Elytra greyish yellow, as long or a little longer than the abdomen, subtruncate at the apex, their hind margin, the apical half of the costa, and some of the areas narrowly margined with fuscous or black; veins white, but, with the exception of the dilated ones at the base and apex of the first subapical area, not conspicuously milk-white. Abdomen black, more or less widely yellow at the apex. Legs yellow, with black points and linear stripes and bands. ♂; genital valve short, triangular, one-half longer than the last ventral segment; plates reflexed, elongate-triangular, three times as long as the valve, outer margins sinuate, apices separately rounded; styles black clavate, outer edge simple; side lobes of the pygofer much shorter than the plates, and somewhat shorter than the anal tube, in the middle of the lower margin a

strong tooth. ♀; last ventral segment twice as long as the preceding, its hind margin with two small triangular teeth about equidistant from the sides of the segment and from each other, the length of that part of the segment lying between the two teeth a little greater than that of the part lying between each tooth and the side of the segment. Length, $2\frac{1}{4}$ –3 mm.

With the exception of *D. striatus*, this is probably the commonest species of the genus with us.

Norwich district, Cotswold district. Fritton, Totteridge, Holmbury, Albury, Shiere, Ewhurst, St. Martha's, Chingford, (Butler); Glanvilles Wootton, Lulworth (Dale); Perth (McGregor).

13. *D. Falleni*, *Fieb.*—Scarcely distinguishable from the preceding, except by the characters of the genitalia. ♂; genital plates reflexed, three times as long as the valve, sinuate on their outer margin, and obtusely rounded at the apex; styles pale, crenulate on the outer side from the apex downwards; side lobes of pygofer scarcely shorter than the anal tube, but somewhat shorter than the plates, a small incurved tooth at the apex, and a strong tooth in the middle of the lower margin. ♀; last ventral segment nearly twice as long as the preceding, its hind margin with two small triangular teeth nearly twice as distant from each other as from the sides of the segment. Length, $2\frac{1}{4}$ –3 mm.

Norwich district.

Introduced to our list by Scott in 1876 without note of locality.

14. *D. paleaceus*, *J. Sahl.*—Resembles *D. Flori* in size and the milk-white veins of the elytra, but may be distinguished from that species by the reddish rust-yellow ground colour of the upper side, the almost entire absence of fuscous markings on the elytra (the most prominent fuscous markings on the latter, except the dark hind margin to the apical areas, being a fuscous border to the hind margin of the third

subapical area) and the shape of the hind margin of the last ventral segment in the female, which has a large projection in the shape of a short truncate cone, the length of this projection being about equal to one-third of the greatest length of the segment, its width equal to about half the width of the segment. The apical angles of the last ventral segment are rounded off and have no small tooth between the sides of the projection and the sides of the segment as in *Flori*.

Brooke Wood, Norfolk. A wood-frequenting species like *D. Flori*, from which it may be distinguished in the net by its general rust-yellow colour.

15. *D. socialis*, *Flor*.—Crown a little longer than its basal width, nearly twice as long in the middle as at the sides, free sides very feebly arcuate, angle blunt; white, with rust-yellow blotches; interocellar line represented by a point near each ocellus, and a pair of triangular black spots on the apex. Frons brown, the side-lines, a middle stripe on the lower half, and the apex, yellow. Pronotum one-third to one-half shorter than the crown, pale brown, with five linear white stripes. Elytra dirty yellow, shorter than the abdomen, widely rounded at the apex; veins white, but not anywhere dilated, the areas, especially towards the apex, faintly margined with fuscous. Abdomen above yellow, its basal half, a linear stripe down each side, and some traces of a double line down the middle, black; upper side of the pygofer in the male with a large roundish black spot on each side. Legs yellow, with black points and narrow black bands and stripes. ♂; genital plates rather more than twice as long as the valve, yellow, each bearing a large black patch at its separately rounded apex; lateral lobes of the pygofer inflexed, connivent. ♀; hind margin of the last ventral segment rather strongly concave, with a small angular black-bordered notch in the middle, not reaching half the length of the segment. Length, $2\frac{3}{4}$ –3 mm.

Widely distributed, but local. In the macropterous form

all the areas of the elytra are more or less broadly margined with black.

Norfolk, Cotswold district. Glanvilles Wootton, Lulworth, Freshwater (Dale); Fairlight (Butler); Wotton-under-Edge (Perkins); Dublin (Halbert); Pitlochry (Norman); Rannoch, Leicester, Buddon Wood, London district (Marshall).

16. *D. sabulicola*, *Curt.*—Crown distinctly shorter than its basal width, about one-half longer in the middle than at the sides, free sides feebly arcuate, angle blunt; yellowish-white, the markings when present rust-brown, ill-defined, and frequently coalescent. Frons pale brown, the lower half and the side-lines yellowish white. Pronotum a little shorter than the crown, pale brown, with three or five linear white stripes. Elytra much longer than the abdomen, greyish yellow, with a few isolated black spots, of which the following are the most constant, *viz.*, one on the basal third of the clavus next the claval suture, one at the base of the supra-brachial area, and one at the apex of the third subapical area; inner margin of the clavus, except the basal third, narrowly black, and the third apical area more or less filled up with the same colour; veins milk-white, the transverse ones dilated. Abdomen black, sides and apex more or less widely yellow. Legs greyish yellow, with a few black points. Genitalia very similar to those of the next species. Length 4 mm.

Very common on coast-sands.

Norfolk. Freshwater (Marshall); Lowestoft (Curtis); Newcastle-on-Tyne (Bold); Perth (McGregor); Chesil Beach, Bournemouth (Dale).

17. *D. striatus*, *L.*—Crown and pronotum as in *D. sabulicola*. Frons brown, the apex narrowly, a linear middle stripe, and the side-lines, whitish. Elytra greyish-yellow, much longer than the abdomen, the areas of the inner half more or less distinctly margined with fuscous the third apical

area frequently filled up with the same colour; veins white, the transverse ones not conspicuously dilated. Abdomen black, sometimes yellow at the sides and apex. Legs greyish-yellow, with some black points; hind tibiæ narrowly striped with black. ♂; genital plates very small and short, separately pointed, less than half as long as the trapeziform genital valve. ♀; hind margin of the last ventral segment simple, feebly concave. Length, $3\frac{1}{4}$ – $3\frac{1}{2}$ mm.

Very abundant amongst grasses in a variety of situations. Varieties in which the inner areas of the elytra are entirely filled up with black are not uncommon. The salt-marsh form is smaller, with the elytra scarcely as long as the abdomen, and hardly any traces of dark margins to the areas.

Norfolk, Cotswold district. Wotton-under-Edge (Perkins); Paisley, Renfrewshire (Young); Perth (McGregor); Ireland (Haliday); Glanvilles Wootton, Penzance, Freshwater (Dale); Hastings, Camber, Ewhurst, Albany, Barnet, Lowestoft (Butler).

18. **D. Normani**, Scott.—♂. Closely allied to *D. striatus*, to the pale forms of which it bears a very great resemblance. Upper side very pale yellow-brown, a stripe down the middle of the crown and pronotum, and the costal and three innermost apical areas, white. Elytra as long as the abdomen. The genital valve and plates are like those of *D. striatus*, save that the apices of the latter in the original example are a trifle more oblique within. ♀; elytra shorter than the abdomen; veins of the clavus dark brown. Length, 3 – $3\frac{1}{2}$ mm.

I believe that this insect is a variety of *D. striatus* of uncommon occurrence, *i.e.*, that if *D. striatus* be collected in quantity a small percentage of specimens will be found to possess the characters assigned to *D. Normani*. It was described from specimens taken in Morayshire by Norman, and I have it from two localities in the Norwich district.

19. **D. punctum**, *Flor.*—Crown almost one-third longer than its basal width, nearly twice as long in the middle as at the sides, free sides straight, angle pointed; yellowish grey with three linear white stripes, interocellar line represented by a very fine fuscous line on each side of the apex. Frons yellowish grey, the interstices of the white side-lines brown. Pronotum about one-half as long as the crown, yellowish-grey, with five linear white stripes. Elytra whitish hyaline, shorter than the abdomen, apical areas short, narrowly margined with fuscous, in the apex of the fourth subapical area a black or fuscous spot, veins white, not anywhere dilated. Abdomen greyish yellow, upper side near the base and the chief part of the under side black; upper side of the pygofer in the female with a rounded black spot on each side of the base. Legs greyish yellow, with a few black points. Length, $2\frac{1}{4}$ – $2\frac{1}{2}$ mm.

Not uncommon amongst fine grasses in dry situations. The macropterous form has the elytra longer than the abdomen, with ample membrane and the hind margin of the apical areas broadly fuscous.

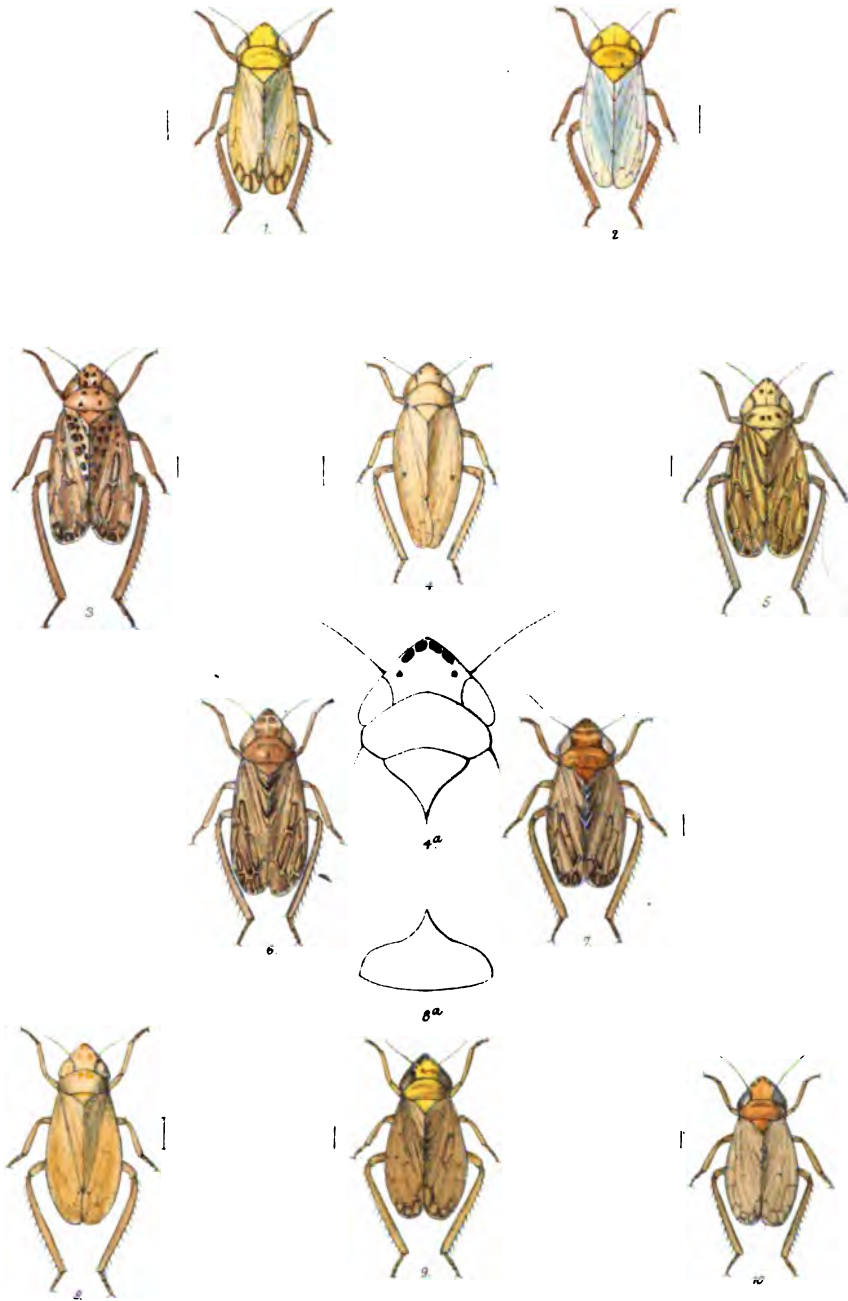
Norwich district, Cotswold district. Milford Haven (Marshall); Chobham (Saunders); Albury, St. Martha's, Lowestoft (Butler); Tenby, Croxton (Dale).

20. **D. argus**, *Marsh.*—Upper side brownish yellow; elytra with two broad white bands, one before and the other behind the middle; base of the suprabrachial area filled up with black. Crown subequal in length to its basal width, nearly twice as long in the middle as at the sides, free sides distinctly arcuate, angle blunt; basal markings subannular, interocular line represented by a point near each eye and two short lines placed end to end on the disc, interocellar line broken up into four spots, infraocellar line biarcuate, distinct. Frons black, with yellowish side lines, sometimes with a middle stripe on the lower half and the apex yellowish. Pronotum slightly longer than the crown, yellow brown, with

PLATE XVII.

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|---------|----------------------|--|
| FIG. 1. | <i>Deltocephalus</i> | <i>pascuellus</i> , Fall. |
| 2. | " | <i>citrinellus</i> , Kbm. |
| 3. | " | <i>ocellaris</i> , Fall. |
| 4. | " | <i>coronifer</i> , Marsh. |
| 4a. | " | " " (upper foreparts). |
| 5. | " | <i>repletus</i> , Fieb. |
| 6. | " | <i>picturatus</i> , Fieb. |
| 7. | " | <i>Flori</i> , Fieb. |
| 8. | " | <i>Linnei</i> , Fieb. ♀. |
| 8a. | " | " " " (outline of last ventral segment). |
| 9. | " | <i>distinguendus</i> , Flor. |
| 10. | " | <i>Falleni</i> , Fieb. |

PLATE 17.



R. Morgan del, et lith

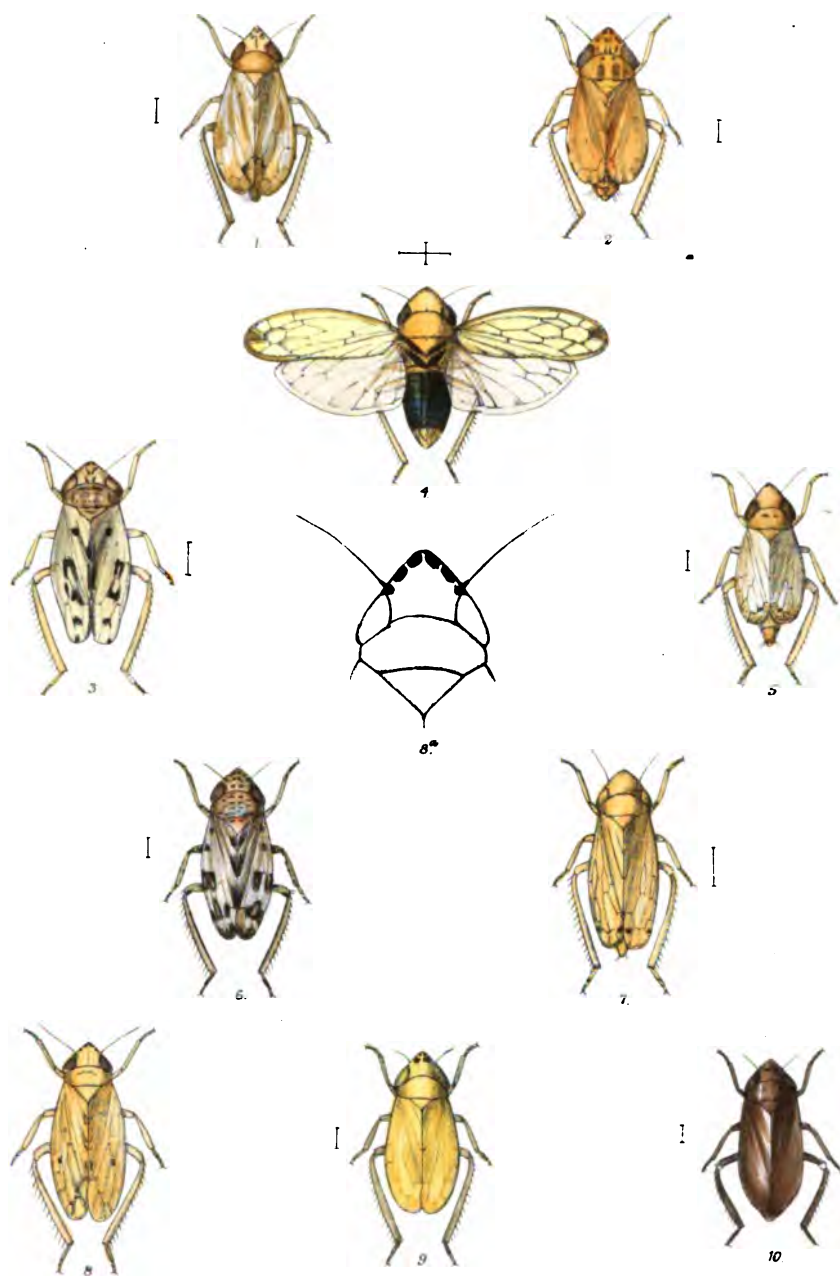
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PLATE XVIII.

FIG. 1. *Deltocephalus paleaceus*, J. Sahl.

- | | | |
|-----|---|---------------------------|
| 2. | „ | <i>socialis</i> , Flor. |
| 3. | „ | <i>sabulicola</i> , Curt. |
| 4. | „ | <i>striatus</i> , Lin. |
| 5. | „ | <i>punctum</i> , Flor. |
| 6. | „ | <i>argus</i> , Marsh. |
| 7. | „ | <i>costalis</i> , Fall. |
| 8. | „ | <i>coroniceps</i> , Kbm. |
| 8a. | „ | „ „ (upper foreparts). |
| 9. | „ | <i>maculiceps</i> , Boh. |
| 10. | „ | <i>pulicaris</i> , Fall. |



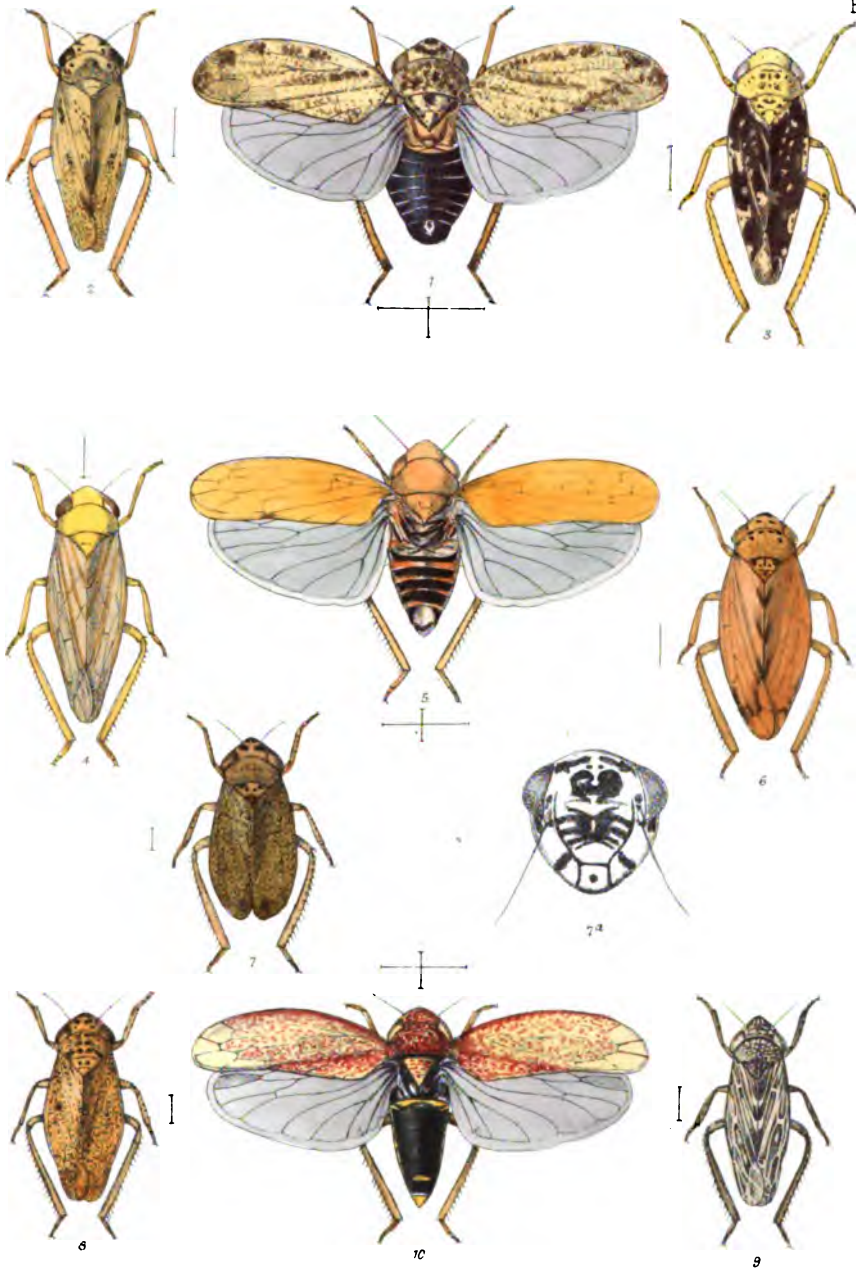
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PLATE XIX.

- FIG. 1. *Allygus commutatus*, Fieb.
2. „ *modestus*, Fieb.
3. „ *mixtus*, Fab.
4. *Thamnotettix prasina*, Fall.
5. „ *dilutior*, Kbm.
6. „ *subfuscula*, Fall.
7. „ *variegata*, Kbm.
7a. „ „ „ (forehead, &c.).
8. „ *plebeja*, Fall.
9. „ *striatula*, Fall.
10. „ *cruentata*, Panz.



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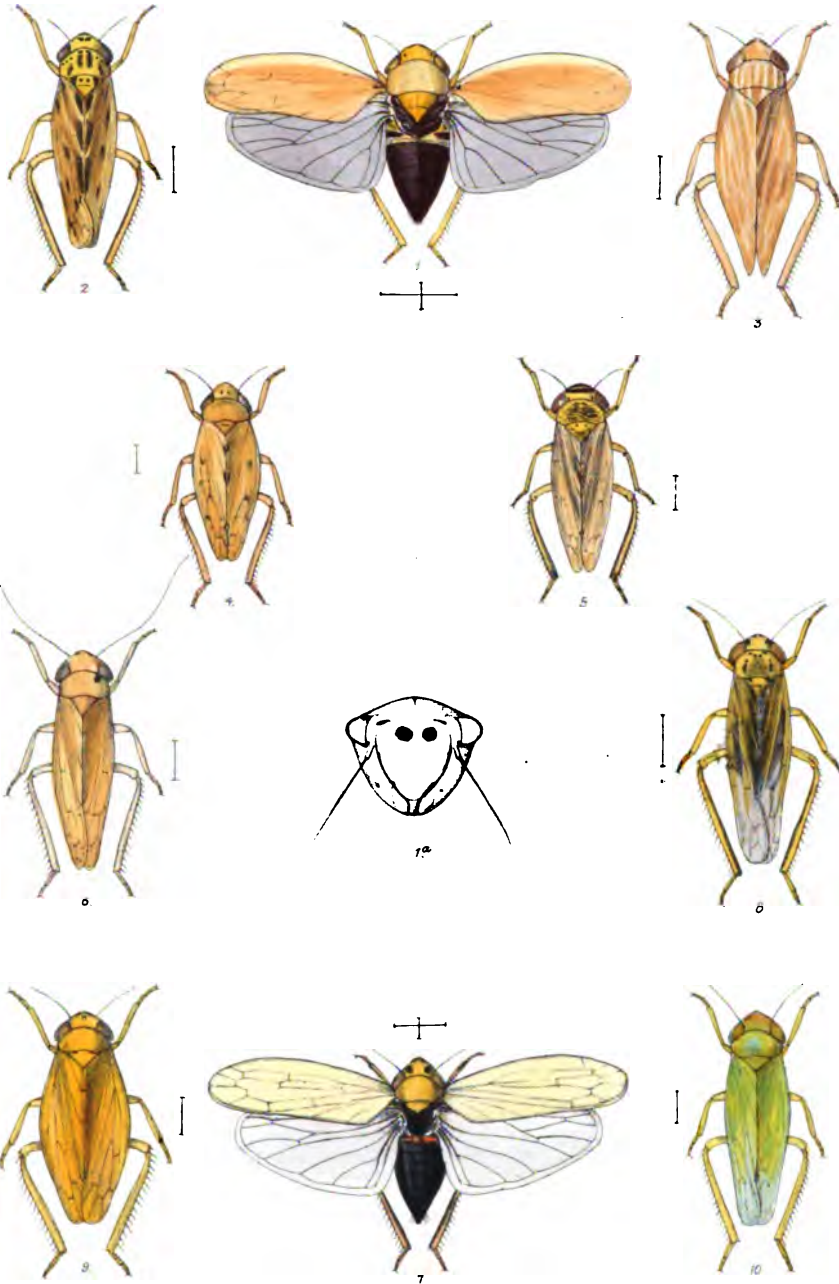
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PLATE XX.

FIG. 1. *Thamnotettix* Torneella, Zett.

- 1a. ,, ,, ,, (forehead. &c.)
2. ,, *splendidula*, Fab.
3. ,, *crocea*, H.-S.
4. ,, *attenuata*, Germ.
5. *Limotettix striola*, Fall.
6. ,, *antennata*, Boh.
7. ,, *quadrinotata*, Fab.
8. ,, *nigricornis*, J. Sahl. ♀
9. ,, *5-notata*, Boh.
10. ,, *sulphurella*, Zett.

PLATE 20.



R. Morgan del. et lith.

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three or five linear whitish stripes. Scutellum whitish, with some dusky markings at the base. Elytra longer than the abdomen, feebly rounded at the sides, veins white, areas generally narrowly margined with fuscous. Abdomen black. Legs pale, banded, striped, and spotted with black. ♂; genital valve very small and short, almost semicircular, not half so long as the separately rounded plates, which scarcely reach half so far as the pygofer. ♀; hind margin of the last ventral segment simple, almost semicircularly concave. Length, 3-3½ mm.

Found sparingly amongst fine grasses, especially when growing under *Pteris*.

Norwich district. Esher, Surbiton (Marshall); Woking, Chobham (Saunders); Dallington Forest, Albury, Lowestoft (Butler); Chesil Beach, Lulworth, Freshwater (Dale).

21. *D. costalis*, *Fall.*—Elongate; upper side white, elytra towards the apex pale reddish brown, a deep black roundish spot in the first and fourth apical areas. Crown without markings, subequal in length to its basal width, about one-third longer in the middle than at the sides, free sides strongly arcuate, angle blunt. Face, breast, and legs white, the latter with some black points. Pronotum as long as the crown. Elytra parallel-sided, longer than the abdomen, the apex subtruncate; veins white. Abdomen yellow, more or less marked with black in the middle towards the base both above and below. ♂; genital plates at least three times as long as the valve, with a large common roundish black spot in the middle. ♀; hind margin of the last ventral segment nearly straight, with an angular black-bordered notch in the middle. Length, 3-3½ mm.

Amongst low plants in marshes.

Ranworth, Norfolk.

22. *D. coroniceps*, *Kbm.*—♂. Upper side dirty greyish yellow, with some ill-defined whitish markings on the crown,

L

pronotum, and scutellum ; forehead and temples with a black band bearing about nine equidistant whitish spots, of which each ocellus forms one ; frons with a few irregular blackish transverse curved lines. Crown a trifle shorter than its basal width, one-half longer in the middle than at the sides, free sides feebly arcuate, angle blunt. Pronotum subequal in length to the crown. Elytra longer than the abdomen ; membrane ample ; veins whitish, feebly and irregularly margined with fuscous. Abdomen pale, with black markings. Genital valve very widely rounded, about half as long as the preceding segment ; plates large and wide, their joint outline almost semicircular, and their inner margin rather more than twice as long as the valve. Length, $3\frac{1}{2}$ mm.

One specimen taken on Coxford Heath, Norfolk, in August, 1887, amongst fine grass growing under *Pteris*.

23. *D. maculiceps*, Boh.—Oblong-ovate ; upper side dirty greyish yellow, crown with two large roundish black spots in front. Crown as long or shorter than its basal width, about one-third longer in the middle than at the sides, free sides distinctly arcuate, angle very blunt. Frons blackish, with the upper part and the side-lines pale. Pronotum distinctly, sometimes almost one-third, shorter than the crown. Elytra subpellucid, rounded at the sides. Abdomen black, upper side at the apex more or less widely yellow in the female. Legs pale, base of the thighs marked with black, hind tibiae black, except at the base. ♂ ; genital plates about three times as long as the valve, their outline paraboloid ; elytra much longer than the abdomen. ♀ ; last ventral segment black, with a subquadrate greyish yellow spot in the middle of its hind margin, or greyish yellow with a pair of wide black stripes converging towards the base ; the outline of its hind margin forms two large rounded lobes, separated by a short straight line. Length, $2\frac{1}{2}$ mm.

Not common ; occurs amongst low plants on heaths. In highly coloured examples the costa and inner margin of the

elytra are narrowly black, the nerves are brown, and the interocellar line is represented by a pair of black points on the apex of the crown.

Norwich district. Wimbledon Common (Marshall); Woking, Chobham (Saunders).

24. *D. Panzeri*, *Flor.*—Pale brownish yellow, shining, veins of elytra pale, scarcely perceptibly bordered with fuscous and therefore appearing abnormally wide. Crown, in the male a little shorter than its basal width, about one-third longer in the middle than at the sides, in the female subequal in length to its basal width, one-fifth longer in the middle than at the sides, free sides feebly arcuate, angle blunt, the markings undeveloped, front margin very finely punctulate and therefore opaque. Frons pale brownish yellow, side-lines inconspicuous, whitish. Pronotum in the male as long as, in the female a little shorter than, the crown. Elytra a little longer than the abdomen, membrane well developed, appendix narrow but distinct, apical areas generally broadly margined with fuscous behind. Abdomen, in the male black, yellow at the sides, in the female brownish yellow, the segments more or less broadly black in the middle both above and below. Legs pale, the spines of the hind tibiæ set in conspicuous black spots, joints of hind tarsi blackish, except at the base. Male; genital valve small, rounded-triangular, about one-third as long as the plates which are narrowly jointly rounded at the apex. Female; last ventral segment brownish yellow, hind margin black, except at the angles, very feebly concave, with a narrow angular notch in the middle reaching about one-fourth of the segment. Length, 3–3½ mm.

Chobham (Saunders). In the only female specimen that I have seen there is on both elytra a transverse vein in the clavus standing on the basal third of the anal vein; this, I believe, is merely a symmetrical aberration.

25. *D. pulicaris*, *Fall.*—Oblong-ovate; upper side pale

brown, under side and legs black, knees and front tibiae brownish yellow. Crown in the male as long as, in the female shorter than, its basal width, twice as long in the middle as at the sides, free sides strongly arcuate, angle very blunt; brownish yellow, variously spotted with fuscous or black, or entirely brownish yellow; in well-marked examples the basal markings are present, the interocular line is represented by a pair of black spots on the disc, the interocellar line by two or four black spots, and the infraocellar line is biarcuate. Frons black, with or without a few brownish yellow transverse lines. Pronotum one-third or more shorter than the crown, frequently blackish on the hinder half. Elytra about two-thirds as long as the abdomen, widely rounded behind, apical areas extremely short, suprabrachial area and those adjoining filled up or at least margined with fuscous; not unfrequently the costa is dark fuscous, and all the areas except the costal are filled up with that colour; veins pale, the transverse ones white. ♂; abdomen black, hind margin of the genital valve white, genital plates about three times as long as the valve, their outer margin slightly sinuate just before the apex. ♀; abdomen black, hind margin of the last dorsal segment white, hind margin of the last ventral segment forming three rounded lobes, of which the middle one is less than half as large as either of the others. Length, 2-2½ mm.

Common amongst grasses in damp places.

Norwich district, Cotswold district. Wotton-under-Edge (Perkins); Solway district (Robinson-Douglas).

***Allygus*, Fieb.** (Pl. II., fig. 13.)

Body oblong, widest across the middle. Crown somewhat convex, with the eyes as wide as the pronotum, evenly rounded in front, not or scarcely longer in the middle than at the sides. Side margins of pronotum sharp, of moderate length, hinder angles obliquely truncate. Elytra convolute

at the apex, much longer than the abdomen, with several irregularly disposed white transverse veins; appendix ample.

Our species of this genus, which are very much alike in general appearance, are comparatively large pale brown insects with ample elytra and wings, the former speckled with black and having many more or less conspicuous milk-white transverse veins.

Under the generic name *Jassus*, Fab. Puton gives sixteen species of this genus for the Palearctic fauna; of these we have three.

TABLE OF SPECIES.

1. (2) ♂; genital plates a little shorter than the valve.
♀; last ventral segment somewhat shorter than the preceding. 1. *commutatus*.
2. (1) ♂; genital plates much longer than the valve.
♀; last ventral segment much longer than the preceding.
3. (4) Crown with an oblique dark line running inwards from the front margin of each eye. 2. *modestus*.
4. (3) Crown without any oblique dark line. 3. *mixtus*.

1. **A. *commutatus***, *Fieb.*—♂. Genital valve as long as the preceding segment, rounded-triangular; plates shorter than the valve, separately rounded-triangular, and leaving uncovered a piece of the apices of the styles about equal in length to the genital valve; the styles, when viewed from below, appear as two narrow horn-like processes converging at the apex; their real form, which is determinable when viewed from the side, is that of a recumbent letter Y, having the upper arm the longer. ♀; last ventral segment a little shorter than the preceding, its hind margin nearly even, with a very feeble arcuate notch in the middle; the lateral angles rounded. Length, $6\frac{1}{2}$ mm.

Occurs on elm. Trowse, near Norwich, and Brooke Wood (Norfolk); Tintern (Wollaston).

2. *A. modestus*, *Fieb.*—Crown with the basal markings punctiform, the interocular line is represented by a fine straight line running obliquely inwards from the front angle of each eye half-way to the base, and the interocellar line by a punctiform spot adjoining each ocellus. ♂; genital plates triangular, about three times as long as the triangular genital valve, completely covering the styles. ♀; last ventral segment much longer than the preceding, its hind margin with a very feeble angular notch in the middle; lateral angles much produced. Length, 7 mm.

Widely distributed, but less common than the next species. Norwich district, Cotswold district. Blackheath (Beaumont); Barnet, Shiere, Wymondley (Butler); Glanvilles Wootton (Dale),

3. *A. mixtus*, *Fab.*—Crown with the basal markings obsolete, the interocular line represented by a punctiform spot on each side of the disc, and the interocellar line by four punctiform spots. ♂; genital plates triangular, more than twice as long as the triangular genital valve, completely covering the styles. ♀; last ventral segment more than twice as long as the preceding, its hind margin nearly straight; the lateral angles not produced. Length, $6\frac{1}{2}$ –7 mm.

Common on oaks. This is a very variable species in the matter of the black speckling of the elytra; sometimes this is very scanty, and at others is so much exaggerated and confluent that the elytra appear deep black with white transverse veins; immature examples have the upper fore parts tinged with green.

Norwich district, Cotswold district. Dublin (Halbert); Glanvilles Wootton (Dale); Battle, Bexhill, Ewhurst, Barnet, Wymondley, Dallington Forest (Butler).

***Thamnotettix*, *Zett.* (Pl. II., fig. 14.)**

Body oblong, widest in the middle. Crown somewhat convex, with the eyes about as wide as the pronotum, dis-

tinotly produced in front. Frons longer than wide. Pronotum obtusely rounded in front, side margins sharp, of moderate length, hind angles obliquely truncate. Elytra much longer than the abdomen, widened in the middle, overlapping or even convolute at the apex; appendix ample.

We have in this genus twelve species all distinguished from the species of *Limotettix* by the greater length of the side margin of the pronotum, the latter being separated from the prosternum by a distinct keel.

TABLE OF SPECIES.

1. (20) Elytra broadly rounded at apex.
2. (15) Side margin of frons from base of antenna to base of clypeus distinctly shorter than the width of the frons between the antennæ.
3. (12) Veins of elytra not regularly margined with black.
4. (9) Elytra not speckled with black.
5. (6) Upper side dirty greenish yellow or greyish green, with or without a reddish tinge on the crown pronotum and scutellum. 1. *prasina*.
6. (5) Upper side greyish yellow or yellow brown.
7. (8) Elytra greyish yellow. 2. *dilutior*.
8. (7) Elytra yellow brown. 3. *subfuscata*.
9. (4) Elytra greyish yellow, speckled with black.
10. (11) Frons with two large black spots above, each formed by the confluence of about three short transverse lines. 4. *variegata*.
11. (10) Frons without large black spots above. 5. *plebeja*.
12. (3) Veins of elytra regularly margined with black.
13. (14) Length 4 mm. Elytra longer than the abdomen. 6. *striatula*.
14. (13) Length $2\frac{1}{2}$ – $2\frac{3}{4}$ mm. Elytra about as long as the abdomen. 7. *striatulella*.

15. (2) Side margin of frons from base of antenna to base of clypeus longer than the width of the frons between the antennæ.
16. (19) Head with the eyes as wide as pronotum.
17. (18) Elytra pale yellow more or less closely speckled with red. 8. *cruentata*.
18. (17) Elytra pale brown, costa widely hyaline. 9. *Torneella*.
19. (16) Head with the eyes narrower than the pronotum. 10. *splendidula*.
20. (1) Elytra lanceolate.
21. (22) Larger; elytra more pointed at apex, the white markings on the crown and pronotum more distinct, clavus without a distinct black spot. 11. *crocea*.
22. (21) Smaller; elytra less pointed at apex, the white markings on the crown and pronotum less distinct, suture with a small black spot just above the apex of the anal vein. 12. *attenuata*.

1. *T. prasina*, Fall.—Upper side greenish yellow or greyish green. Crown in the male as long as half its basal width, about one-half longer in the middle than at the sides, free sides feebly arcuate, angle widely rounded; in the female distinctly longer than half its basal width, nearly twice as long in the middle as at the sides, free sides straight, angle blunt; the dark markings are of the same type as in *Athysanus Sahlbergi*, &c., but are rarely developed, although their position is generally indicated by sundry pale brown spots or lines. Frons pale brown, with the apex, a linear middle stripe, and the side lines yellow. Pronotum about one-third longer than the crown. Elytra more or less strongly tinged with fuscous at the apex; veins yellow. Abdomen black, connexivum and the apex beneath yellow. Legs yellow, with black points; under side of thighs sometimes

with a black line indicating the commencement of a band on the apical third. Length, $6\frac{1}{2}$ –7 mm.

Common on various trees. A variety of this species, which has the inner areas of the elytra more or less filled up with dark fuscous, is the *Thamnotettix stupidula*, Zett., and another, in which the head, pronotum, and scutellum are tinged with red, is the *T. tincta* of the same author.

Norwich district. Cotswold district. Solway district (Robinson-Douglas); Dublin (Halbert); Paisley (Young); Woking, Chobham (Saunders); Glanvilles Wootton (Dale); Ewhurst, Shalford, Shiere, Wymondley, Dallington Forest (Butler).

2. *T. dilutior*, *Kbm.*—Crown, pronotum, and scutellum yellowish white, generally with indistinct rust-yellow markings. Crown (with the eyes) almost crescent-shaped, obtusely produced in front, its length down the middle about one-fourth longer than half its basal width, in the male one-third, in the female about one-half, longer in the middle than at the sides. Frons brownish yellow, with pale side-lines. Pronotum about one-third longer than the crown. Elytra greyish yellow, sometimes with a few isolated blackish spots, or suture narrowly blackish, or a black spot in the apex of the clavus; veins fine, whitish. Abdomen above in the male black, hind margins of the segments narrowly pale, genital valve semicircular; in the female yellow, sometimes with the base of the segments more or less widely black. Legs pale yellow, striped, spotted, and sometimes banded with black. Length, 6 – $6\frac{1}{2}$ mm.

Not uncommon on oaks.

Norwich district. Hastings, Battle, Bexhill, Ewhurst, Fritton (Butler); Glanvilles Wootton (Dale); Woking, Chobham (Saunders).

3. *T. subfuscata*, *Fall.*—Upper side yellow brown, suture of elytra frequently blackish. Crown in the male as long as half its basal width, about one-third longer in the

middle than at the sides; in the female about one-third longer than half its basal width, nearly twice as long in the middle as at the sides; free sides nearly straight and angle blunt in both sexes; interocular line, when present, widened and interrupted in the middle; interocellar line widened, angular, and interrupted in the middle; infraocellar line feeble, biarcuate. Frons black, a linear middle stripe dilated at the clypeus and the side-lines yellow. Pronotum about one-third longer than crown, with four or six black points in front, and some feeble traces of three or five whitish stripes on the hinder two-thirds. Scutellum generally with a dark triangle on each side of the base, and a pair of black points on the disc. Elytra in the male with the suture narrowly and the part adjoining the angular veins blackish, apical areas fuscous; veins, especially those near the suture, whitish; in the female uniform yellow brown, with the veins but little paler than the ground colour. Abdomen black; hind margin of the last dorsal segment reddish yellow brown in the female; genital valve in the male triangular. Legs greyish yellow, striped, spotted, and banded with black. Length, 5-6 mm.

Common on various trees and bushes.

Norwich district, Cotswold district. Wotton-under-Edge (Perkins); Dublin (Halbert); Paisley (Young); Woking, Chobham (Saunders); Glanvilles Wootton (Dale); Hastings, Battle, Guestling, Shiere, Chingford (Butler).

4. *T. variegata*, *Kbm.*—Crown in the male as long, in the female about one-fourth longer than half its basal width, one-third longer in the middle than at the sides, free sides very feebly arcuate, angle blunt; interocular line much dilated and interrupted in the middle, its hind margin angularly indented near each eye; interocellar line represented by four black points, of which the middle pair are occasionally wanting; infraocellar line biarcuate, abbreviated at each end, and interrupted in the middle, each half forming the upper margin of one of the two black patches on the frons.

Frons yellow with black markings, which are reduced or obsolete between the antennæ and the apex. Pronotum greyish yellow, with a few black points in front, and four longitudinal series of short transverse fuscous lines on the hinder two-thirds. Scutellum greyish yellow, with a triangle on each side of the base, a pair of points on the disc, a linear stripe on the basal half, and a pair of wide stripes on the apical half, black. Elytra greyish yellow, more or less closely speckled with black, the transverse vein, the apices of the anal and axillary veins, and the ramifications of the others, white. Abdomen above black, sides and apex yellow. Legs greyish yellow, banded, striped, and spotted with black. Length, 4 mm.

Widely distributed, but probably overlooked; occurs amongst grasses in dry places.

In highly coloured males the frons is sometimes entirely black with a pale spot above the clypeus and another in the middle of the upper margin.

Norwich district. Deal (Hall). It is the *Athysanus irroratus* of Scott (*Ent. Mo. Magazine*, xii. p. 96), but the locality of his specimens is not there given.

5. *T. plebeja*, Fall.—Very nearly resembles the preceding in colour and markings, but is larger and wider, with the white portions of the veins more decidedly milk-white, and the two uppermost of the black transverse side-lines on the frons, although stronger than the rest, never coalesce with the infraocellar line to form a pair of black patches, as in the last species. Crown in the male a little longer than half its basal width, about one-fourth longer in the middle than at the sides, in the female one-third longer than half its basal width, one-third longer in the middle than at the sides, free sides distinctly arcuate, angle blunt. Length, 5 mm.

This species occurred in profusion some years ago amongst long grass in a badly kept garden at Norwich in July and August, and I have seen no other examples.

6. *T. striatula*, *Fall.*.—Upper side greyish yellow, with strong black markings; all the areas of elytra regularly margined with black. Crown (in the female) about one-fourth longer than half its basal width, one-third longer in the middle than at the sides, free sides nearly straight, angle blunt; basal markings represented by a black transverse line, which touches the interocular line in three equidistant points; interocular line complete; interocellar line represented by a pair of short curved lines running parallel with the biarcuate infraocellar line, the latter interrupted in the middle. Frons black, with the apex, a fine middle stripe, and the side-lines, pale. Pronotum about one-third longer than the crown, greyish yellow mottled with black. Scutellum greyish yellow, with distinct black markings. Elytra greyish yellow, all the areas margined with black, and the first subapical area filled up with the same colour; veins concolorous, the transverse ones widened; one, sometimes two, transverse veins between the anal vein and the claval suture. Breast and abdomen black, the latter with the hind margins of the segments narrowly pale. Legs brownish yellow, striped, spotted, and more or less widely banded with black. Appendages of the œdeagus (viewed from above) four, of which the two outer are short and spiniform, and the two inner are long, strap-shaped, pointed, bisinuate, and crossing one another after the manner of the lines which form the figure 8. Length, 4 mm.

Found by Marshall at Rannoch, on *Pteris*, in open places where the heather had been burnt.

Wotton-under-Edge (Perkins); Woking. Common, by sweeping where the gorse, &c., had been burnt, Chobham (Saunders); Ambleside (Dale).

7. *T. striatulella*, *Edw.*.—Very similar to the preceding species, but considerably smaller, with the elytra subequal in length to the abdomen. Appendages of the œdeagus (viewed from above) two, lateral, gradually narrowing to their pointed

apex, connivent about their apical third, afterwards recurved. Length, $2\frac{1}{4}$ – $2\frac{3}{4}$ mm.

On *Calluna*. Roudham Heath, Norfolk.

8. **T. cruentata**, *Panz.*—Upper side pale greyish yellow, finely and more or less closely speckled with blood-red. Forehead in the male with a pair of roundish black spots, and these are sometimes indicated in the female. Abdomen above black, narrowly pale at the sides. Legs pale; inner edge of hind tibiæ generally narrowly black. Length, 5–6 mm.

Dallington Forest, Ewhurst, Chingford (Butler); New Forest, Bowden (Dale); Glen Rosa, Arran, one specimen on heather (Douglas); Witherslack, on *Teucrium scorodonia* (B. Cooke); Woking and Chobham (sallows), Esher (Saunders).

9. **T. Torneella**, *Zett.*—Crown sublunate, a little longer than half its basal width, yellowish white, with a black or brown transverse band. Frons yellowish white; forehead with two round black spots. Pronotum yellowish white, about one-half longer than the crown, narrowly black in front, greyish behind. Elytra pale brown, with fine yellowish white veins, the costa widely and the membrane hyaline, the latter smoky at the apex. Breast and abdomen black, sides of the latter and the margins of the segments narrowly yellow. Legs yellowish white; hind tibiæ with a black stripe on the inner side. Length, $4\frac{1}{2}$ –5 mm.

Cotswold district, by sweeping in woods. New Forest (Dale); Wotton-under-Edge (Perkins); Solway district (Robinson-Douglas); Rannoch, Epping Forest (Marshall).

10. **T. splendidula**, *Fab.*—Crown and forehead yellow, each with two subquadrate black spots. Frons yellow with black side-lines. Pronotum greyish yellow, with a few black points in front and sometimes four abbreviated fuscous stripes on the hinder two-thirds. Scutellum yellow, a triangle

on each side of the base and a pair of points on the disc black. Elytra pale brownish yellow, the first apical area, a more or less distinct spot at the base and apex of the third and fourth subapical areas, a spot at the apex of the brachial area, and the suture narrowly, blackish brown; the transverse vein, the apices of the anal and axillary veins, and the ramifications of the others distinctly whitish. Abdomen above black; hind margin of the last dorsal segment in the female yellow. Legs greyish yellow; inner edge of hind tibiae narrowly black. Length, 5 mm.

By general sweeping, not uncommon. I once found it swarming on ivy, on a garden wall, at Norwich, in September.

Norwich district, Cotswold district. Bexhill, Shalford, Ewhurst, Barnet, Wymondley (Butler); Glanvilles Wootton (Dale).

11. **T. crocea**, *H.-S.*—Crown and pronotum rust-yellow, the former with four, the latter with five white stripes; intercellar line represented by an oblique black line on each side of the apex of the crown. Scutellum rust-yellow, with three white stripes. Elytra pale brownish yellow, second apical area filled up with dark fuscous, and sometimes the third subapical, the subcostal area, and the suture are narrowly bordered with fuscous; veins whitish, that of the suture conspicuously white. Abdomen above black, sides narrowly yellow; genital plates in the male narrowly rounded at the apex; hind margin of the last ventral segment in the female nearly straight. Legs pale greyish yellow, a point at the apex of the hind thighs on the inner side and the inner side of the hind tibiae narrowly black. Length, $4\frac{1}{2}$ – $5\frac{1}{2}$ mm.

Very common on grasses. Norwich district, Cotswold district. Hastings, Ewhurst, St. Martha's (Butler); Glanvilles Wootton (Dale); Dublin district (Halbert); Leicester, Milford Haven (Marshall).

12. **T. attenuata**, *Germ.*—Very similar in appearance to

the preceding species, but smaller, with the white stripes on the crown, pronotum, and scutellum less distinct, the elytra less pointed, bearing on the disc a few irregular blackish spots, and a very constant small blackish spot on the middle of the suture of each. Genital plates subtruncate at the apex; hind margin of the last ventral segment in the female strongly concave. Length, 4 mm.

On grasses in dry places. Norwich district. Milford Haven (Marshall); Woking, Chobham (Saunders); Hastings, Rye, Ewhurst, Shiere, Chingford (Butler); Glanvilles Wootton, Freshwater (Dale).

***Limotettix*, J. Sahl. (Pl. II., fig. 15.)**

Body elongate or oblong, generally much narrowed behind. Head obtuse in front; crown sublunate or more or less produced; frons nearly straight-sided, its width between the antennæ equal to or somewhat greater than the width of one of the cheeks. Sides of the pronotum very short, subterete. Elytra ample, longer than the abdomen, overlapping at the apex, upper cubital vein complete, reaching the angular veins; appendix well developed.

The species of this genus are distinguished from those of *Thamnotettix* by their more slender form, and the very short sides of the pronotum.

TABLE OF SPECIES.

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|----|------|--|-----------------------|
| 1. | (2) | Crown with a black transverse band. | 1. <i>striola</i> . |
| 2. | (1) | Crown not banded with black. | |
| 3. | (14) | Forehead with black spots. | |
| 4. | (5) | Male brownish yellow, face and legs strongly tinged with red; female greyish yellow. | |
| | | | 2. <i>antennata</i> . |
| 5. | (4) | Species yellow or greenish yellow, sometimes with black stripes on the elytra. | |

- 6. (9) Subocellar black spots on the crown minute, punctiform.
- 7. (8) Temples with a black transverse spot. 3. *intermedia*.
- 8. (7) No black spot on the temples. Middle of the front of the crown in the male with a pair of very short black longitudinal lines. 4. 5—*notata*.
- 9. (6) Subocellar black spots on the crown large.
- 10. (11) Upper side greenish yellow; elytra pellucid with greenish yellow veins, rarely with ill-defined fuscous stripes in the clavus. 5. 4—*notata*.
- 11. (10) Upper side deep yellow, elytra with or without broad black stripes.
- 12. (13) Elytra sometimes with some of the areas towards the suture narrowly and irregularly margined with fuscous; front pairs of legs in the male red-yellow. 6. *aurantipes*.
- 13. (12) Elytra with distinct black stripes, which in the male coalesce and occupy almost the entire surface. 7. *nigricornis*.
- 14. (3) Forehead without black spots. 8. *sulphurella*.

1. *L. striola*, Fall.—Upper side dirty greyish or greenish yellow. Crown sublunate, a little produced in front in the female; interocular line broad, complete; infraocellar line biarcuate, sometimes confluent with the interocular line in the male. Frons in the male black, with the apex narrowly, a fine middle stripe, and the side-lines, yellow; in the female yellow, with a fine double middle stripe and the side-lines black. Pronotum about one-fourth (♂) or one-third (♀) longer than the crown, sometimes sparingly speckled with black. Elytra greyish yellow, pellucid; veins whitish or yellow, sometimes margined with fuscous; claval suture frequently narrowly black. Breast and abdomen black, the sides and margins of the segments narrowly yellow; hind

margin of last ventral segment in the female strongly concave. Legs yellow, spotted, striped, and banded with black. Length, $3\frac{1}{2}$ – $4\frac{1}{2}$ mm.

Locally abundant in damp grassy places.

Norfolk. Morayshire (Norman); Glen Rosa, Arran (Douglas); Chobham (Saunders); Glanvilles Wootton, Bournemouth (Dale).

2. **L. antennata**, Boh.—♂. Brownish yellow; face and legs strongly tinged with red; ♀ greyish yellow; generally with a spot on each temple, a pair of large roundish or oblong ones on the forehead, and the frontal sutures, black; occasionally there is a punctiform black spot behind each ocellus. Antennæ nearly as long as the body. Crown about one-third longer than half its basal width, one-third or (in the female) more than one-third longer in the middle than at the sides, free sides gently arcuate, angle pointed. Pronotum subequal in length to the crown. Elytra subhyaline, veins pale. Breast black, sides widely pale; abdomen above black, sides narrowly pale, beneath black, connexivum yellow; last ventral segment in the female roundly produced behind, at least one-half longer than the preceding segment. Hind tibiæ with some points on the outer side and a narrow stripe on the inner side black. Length, $5\frac{1}{2}$ –6 mm.

Common in marshes. A dark form of the male occurs rarely in which the areas of the elytra, especially those near the suture, are more or less filled up with fuscous.

Norfolk, Cotswold district. Fritton (Butler); Leicester (Marshall); Glanvilles Wootton (Dale).

3. **L. intermedia**, Boh.—Yellow or greenish yellow, a point behind each ocellus, and sometimes a pair (which are frequently confluent) between them, a transverse spot on each temple, a pair of sublunate spots on the forehead, a spot at the base of each antenna, a few transverse side-lines on the frons, and the facial sutures, black. Crown in the male

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subequal in length to half its basal width, about one-half longer in the middle than at the sides, free sides nearly straight, angle blunt. Pronotum scarcely one-fourth longer than the crown. Elytra flavo-hyaline, veins yellow. Breast black, sides of the pro- and mesosternum yellow. Abdomen black, its sides and the margins of the segments narrowly yellow. Legs yellow, with black stripes and points. Length, 5 mm.

Loch Greenin, September, 1866 (Douglas).

4. **L. 5-notata**, Boh.—Distinguished from *L. intermedia*, Boh., our only other species in which the sub-ocellar black spots on the crown are minute and punctiform, by the want of a black spot on the temples, and (in most specimens of the male, at least) by having in the middle of the front margin of the crown a pair of very short, fine, germinate, longitudinal, black lines; the deep yellow colour of its upper side and the two black spots on the forehead sufficiently distinguish it from *L. sulphurella*.

Ranworth, Norfolk, September and October 1890.

In the sweeping-net it may be distinguished from *L. 4-notata* by its larger size, different colour, and the want of the large black spots on the crown.

5. **L. 4-notata**, Fab.—Yellow or greenish yellow, a large roundish spot behind each ocellus, two others on the forehead, a spot at the base of the antennæ, the facial sutures, and occasionally some traces of side-lines on the frons, black. Crown subequal in length to half its basal width, about one-half longer in the middle than at the sides, free sides arcuate, angle rounded. Pronotum about one-fourth longer than the crown. Scutellum sometimes with black markings. Elytra pellucid, frequently fumose on the apical third; veins yellow, sometimes becoming fuscous towards the apex. Breast black, sides of pro- and mesosternum narrowly yellow. Abdomen black, its sides and the margins of the segments very narrowly

yellow. Legs striped and spotted with black. Length, 4-4½ mm.

Very common amongst grasses. A form with the dark markings exaggerated and some fuscous stripes in the clavus occurs somewhat rarely, and is the *Cicadula strigipes*, Zett., Fieb.

Norfolk, Cotswold district. Glanvilles Wootton (Dale); Hastings, Chobham, Chingford, Hatfield, Shiere, Ascot, Highgate (Butler); Perth district (McGregor); Woking (Saunders).

6. *L. aurantipes*, Edw.—♂. Differs from *L. quadrinotata*, Fab., which it otherwise very closely resembles, in its rather larger size, the deep (gamboge) yellow colour of the upperside, and its yellow-red legs, of which the front tibiae want the black stripe on the outerside, which is the rule in *quadrinotata*. Appendages of the apex of the oedeagus, viewed from above, three, the two lateral ones slightly incurved and about twice as long as the central one, of which the apical third is forked. In *L. quadrinotata* the two lateral appendages are twice as long as the simple middle one, and strongly curved outwards.

Occurs in very boggy places.

Wonersh, Chobham, Gomshall, Burnham Beeches (Butler).

7. *L. nigricornis*, J. Sahl.—Closely allied to *L. quadrinotata*, but about one-half larger, and also distinguished by the black stripes on the elytra; the latter in the male occupy almost the entire surface, but in the female they are confined to the clavus or entirely wanting; apical areas blackish. Length, 5-5½ mm.

Not common. Colton, Somersetshire (Power); Bewdley (Blatch); Glanvilles Wootton (Dale); Perth (McGregor).

8. *L. sulphurella*, Zett.—Sulphur-yellow; at the base of each antenna a black spot; crown subequal in length to

half its basal width, about one-third longer in the middle than at the sides, free sides gently arcuate, angle blunt. Frons sometimes with traces of fuscous side-lines. Pronotum nearly twice as long as the crown. Elytra flavo-hyaline, veins yellow, Middle of the breast black. Abdomen above in the male black, sides narrowly yellow; in the female yellow, broadly black down the middle; under side black at the base in both sexes. Outer side of hind tibiæ with some black points. Length, 4-5 mm.

Common on grasses.

Norfolk, Cotswold district. Dublin (Halbert); Paisley (Young); Woking (Saunders); Perth, (McGregor); Battle, Barnet, Highgate, Ewhurst, Fritton (Butler); Glanvilles Wootton (Dale).

Cicadula, *Fieb.* (Pl. II., fig. 16.)

Body elongate or oblong, usually much narrowed behind. Head obtuse in front; crown sublunate or more or less produced; frons nearly straight-sided, its width between the antennæ equal to or somewhat greater than the width of one of the cheeks. Sides of pronotum subterete, very short. Elytra ample, longer than the abdomen, overlapping at the apex; upper cubital vein obsolescent to a greater or less extent, and never reaching the angular veins; appendix well developed. First wing-vein and the upper branch of the second connected by a transverse vein or very shortly confluent at some distance before the apex of the wing.

The species of this genus are readily distinguished from those of *Limotettix* by the fewer ramifications of the veins in the elytra, the corium and membrane being divided into ten areas only, whilst in *Limotettix*, and also in *Thamnotettix*, they are divided into twelve areas. In *Gnathodus*, which also has only ten areas in the corium and membrane, the first wing-vein and the upper branch of the second coalesce before the apex, and run as one vein into the marginal vein.

TABLE OF SPECIES.

1. (22) Head with the eyes as wide or wider than the pronotum.
2. (5) The two subocellar black spots wanting.
3. (4) Frons without transverse dark lines; crown as long or longer than its basal width.
1. *metria*.
4. (3) Frons with more or less distinct brown transverse lines; crown about one-third shorter than its basal width.
2. *opacipennis*.
5. (2) Subocellar black spots present (frequently confluent with each other and the adjacent markings).
6. (7) Elytra pale sea-green, in the male with black veins.
3. *Dahlbomi*.
7. (6) Elytra not pale sea-green, nor with the veins black in the male.
8. (13) Frons without black transverse lines.
9. (10) Frons with a black spot just above the clypeus.
4. *7-notata*.
10. (9) Frons without a black spot at the apex.
11. (12) Subocellar spots below the ocelli; crown with two large præbasal spots.
5. *variata*.
12. (11) Subocellar spots behind the ocelli; præbasal spots of the crown wanting or punctiform.
6. *punctifrons*.
13. (8) Frons with more or less confluent black transverse lines, or entirely black.
14. (15) Subocellar frontal spots each composed of two short parallel curved lines.
7. *fasciifrons*.
15. (14) Subocellar spots entire, or confluent with the adjacent markings.
16. (19) Markings of crown and frons, as a rule, distinct.
17. (18) Size larger; elytra brown, with white streaks, indicating more or less distinct transverse

bands at the base and apex of the corium, and a white streak next the middle of the inner margin, or entirely brown. 8. *frontalis*.

18. (17) Size smaller; elytra generally subdiaphanous, pale greenish-grey; convexity of the curve of the arms of the ædeagus beneath.

9. *6-notata*.

19. (16) Subocellar spots merged with the interocular line, and frequently with the basal markings of the crown and the black lines on the frons also, so that the crown and face appear entirely black, or black with a few yellow markings.

20. (21) Size smaller; elytra greenish-grey, with or without brown or piceous markings; convexity of the curve of the arms of the ædeagus above.

10. *Fieberi*.

21. (20) Size larger; entire upper side pitch-black, with a bluish tinge; the first transverse vein, and those immediately adjoining it, frequently forming a kind of pale H near the base of each elytron.

11. *livida*.

22. (1) Head with the eyes distinctly narrower than the pronotum.

12. *cyanaæ*.

1. *C. metria*, *Flor.*—♂. Fore parts deep yellow; elytra pale greyish yellow. ♀ dirty yellowish white; the areas towards the apex of the elytra sometimes faintly margined with fuscous; suture occasionally blackish. Crown nearly twice as long as half its basal width, one-half longer in the middle than at the sides, free sides distinctly arcuate, angle blunt. Pronotum subequal in length to the crown. Veins of the elytra yellow in the male, whitish in the female. Abdomen above more or less widely black, beneath marked with black on the sides and in the middle of the base; hind margin of the last ventral segment in the female with a small rounded lobe in the middle, bounded on each side by a

notch; opposite to each notch a comma-shaped black spot. Legs pale; hind tibiæ with conspicuous black points on the outer side. Length, $3\frac{1}{2}$ –4 mm.

Amongst long herbage in marshes; not uncommon in East Norfolk. Shalford, Maidenhead (Butler).

2. *C. opacipennis*, *Leth.*—Crown, pronotum and scutellum yellow, the former sometimes with two punctiform black spots, which are nearer to the hind than the front margin, and about equidistant from each other and from the eyes. Elytra sordid greenish-grey. Crown: in the male, one-third shorter than the pronotum, one-third longer in the middle than at the sides, its free sides nearly straight, apex obtuse; in the female, one-fourth shorter than the pronotum, one-third longer in the middle than at the sides, free sides arcuate, apex broadly rounded; frons generally with a few fuscous side lines, infraocellar line rarely developed, and then biarcuate and more or less widely interrupted in the middle. Elytra subopaque, with slightly paler veins but without fuscous streaks or other markings. Abdomen: above black, narrowly pale at the sides; beneath, black, with pale hind-margins to the segments. Legs pale, front tibiæ with a dark line, hind tibiæ with black points. Length, $3\frac{1}{4}$ – $3\frac{3}{4}$ mm.

Ranworth Marshes, Norfolk; in very wet places.

3. *C. Dahlbomi*, *Zett.*—♂. Head yellow with black markings, frons black; interocellar line widened and interrupted in the middle, the inner end of each half produced at a right angle towards the base of the crown, interocellar line represented by two large transversely oval black spots on the disc, a black double line from the middle of the hind margin of the crown as far as the oval spots, a punctiform black spot on each side of the hind margin of the crown, and a black line next the inner margin of each eye. Crown subequal in length to half its basal width, about one third longer in the middle than at the sides, free sides gently arcuate, angle obtusely rounded. Pronotum yellow, its disc irregularly

black with a middle line and a small round spot on each side in front yellow. Scutellum yellow, with a black triangle on each side of the base, the disc blackish. Elytra pale sea-green, veins black, membrane fumose. Abdomen black, sides and hind margins of the segments narrowly yellow. Legs yellow, striped and banded with black.

♀. Crown yellow, with black markings as in the male, but reduced in size, those of the hind margin sometimes wanting; its proportions similar to those of the male. Frons yellow, with a black triangle on each side bearing a few yellow transverse lines. Pronotum yellow. Scutellum yellow, with a small black triangle on each side of the base. Elytra yellowish, inclining to very pale bluish-green, inner margin narrowly black, membrane fumose, veins of the corium concolorous, those of the clavus and membrane piceous. Abdomen and legs as in the male. Length 4-4½ mm.

Hilcot Wood, Gloucestershire; very local on *Epilobium angustifolium*.

4. *C. septemnotata*, Fall.—Head, pronotum, and scutellum yellow, a large spot in each basal angle of the latter, a pair of points on the base of the crown, two large roundish spots on the forehead, a spot at the base of each antenna, and another just above the clypeus, black. Crown subequal in length to its basal width, about one half longer in the middle than at the sides, free sides gently arcuate, angle obtusely rounded. Clavus and corium whitish hyaline, each with a broad yellow stripe, reaching about two-thirds of its length; inner margin of elytra very narrowly blackish; membrane fumose. Abdomen yellow, with a wide black stripe down the back; saw-case black. Legs yellow; hind tibiae with a few black points. Length, 3½ mm.

Locally abundant amongst low plants in damp places. Norfolk, Cotswold district. Gomshall (Butler); Glanvilles Wootton, Holyhead (Dale); Woking (Saunders).

The subantennal spots and the points at the base of the crown are frequently wanting; and a variety of the female occurs in which the pronotum is strongly marked with black, and the claval suture, the brachial vein, and a narrow stripe just below the costa are blackish.

5. *C. variata*, *Fall.*.—Head, pronotum, and scutellum yellow, a roundish spot in each basal angle of the latter, a pair of roundish spots on the base of the crown, another pair on the forehead, and the frontal sutures narrowly black. Crown about one-fourth shorter than its basal width, one-half longer in the middle than at the sides, free sides feebly arcuate, angle blunt. Pronotum about one-fourth longer than the crown. Elytra whitish hyaline, tinged with yellow next the inner margin, with a broad irregular curved fuscous stripe, which commences at the base and ends at the apex of the clavus, and is produced in the middle of its outer edge about half-way across the corium; second and third subapical areas with a fuscous streak in each. Abdomen above black, sides yellow, beneath yellow, black at the base. Legs yellow; hind tibiæ with a few black points. Length 4 mm.

Local, but widely distributed.

Norfolk, on oak; Cotswold district, on nettle. Bovingdon, Herts (Piffard); Parton Hill and Buddon Wood, Leicestershire (Marshall); Glanvilles Wootton, Charmouth (Dale); Ewhurst, Shiere (Butler).

6. *C. punctifrons*, *Fall.*.—Crown yellow, with a large round black spot adjoining the hind-margin of each ocellus; sometimes there is a black point on each side of the hind-margin about equidistant from the central line and each eye, and an irregular, generally subgeminat, dark spot in the middle of the front margin; in the male subequal in length to half its basal width, one-half shorter than the pronotum, a little longer at the sides than in the middle; in the female one-third shorter than the pronotum, one-fourth longer in the middle than at the sides, its free sides gently arcuate, apex

obtuse. Face generally pale brown, with the margins, the side lines, and a middle stripe yellow. Pronotum yellow, the disc frequently occupied by an irregular blackish spot, which is divided in the middle by a pale stripe. Scutellum yellow, sometimes with a black triangle on each side at the base. Elytra whitish hyaline tinged with yellow, veins bright yellow, the clavus and the inner areas of the corium frequently more or less completely occupied by black or fuscous stripes; membrane fuscous, veins pale. Abdomen: above black, yellow at the sides; beneath yellow, black towards the base. Legs yellow, with black lines and points. Length $4\frac{1}{2}$ – $5\frac{1}{2}$ mm.

Working, on dwarf sallows (Saunders).

7. *C. fasciifrons*, *Stal.*—Upper foreparts sordid greyish-yellow, elytra pale yellow-brown with fuscous streaks, a pair of short black parallel curved transverse lines on each side of the forehead. Crown: in the male two-fifths shorter than the pronotum, one-fifth longer in the middle than at the sides, free sides feebly arcuate, apex widely rounded; basal markings round, interocular line widely interrupted in the middle; frons with black side-lines and sometimes a dark middle stripe. Pronotum with a few black points near the front margin, its disc frequently more or less occupied by a dusky patch, which is divided in the middle by a stripe of the pale ground colour. Base of the scutellum generally with a triangle on each side, and a pair of points in the middle, black. Areas of the elytra frequently more or less filled up by fuscous streaks, veins pale, except that of the inner margin, which has its basal and apical thirds blackish. Abdomen black, the connexivum beneath, and the hind margins of the ventral segments narrowly, yellow. Legs greyish-yellow with black lines and points. Length $3\frac{1}{2}$ – $4\frac{1}{2}$ mm.

On *Juncus articulatus*; probably generally distributed.

Norfolk, Southwold, Cotswold district. Solway district (Robinson-Douglas); Taynult (Beaumont).

8. *C. frontalis*, *Scott.*—Much larger than average specimens of *C. sexnotata*, which it resembles in the markings and proportions of the head, thorax and scutellum. Elytra brown, the base of the clavus and a large streak next its inner margin, the costal and basal areas of the corium, the apical half of the brachial vein and the one next above it, and the veins of the membrane in part, white. Sometimes the elytra are entirely brown with the veins but slightly paler. Abdomen and legs as in *C. sexnotata*. Length, 5 mm.

In a swampy place near Lasingham, in September (Marshall); there are also specimens in the British Museum from Norman's collection.

9. *C. sexnotata*, *Fall.*—Head yellow, basal markings roundish; interocular line widely interrupted in the middle; on the forehead a pair of large roundish, subquadrate, or oblong black spots; frons with black side-lines. Pronotum yellow, sometimes suffused with blackish. Scutellum yellow, sometimes with a subtriangular black spot on each side of the base. Elytra yellowish grey, generally subpellucid without markings, sometimes with a greater or lesser number of the areas each occupied by a fuscous streak; membrane sometimes smoky. Abdomen black, yellow at the apex beneath. Legs yellow, with black lines and points. Length, $2\frac{3}{4}$ –4 mm.

Very abundant on grasses. Glanvilles Wootton (Dale); Battle, Hurst Green, Barnet, Chingford, Hatfield, Fritton (Butler); Paisley, Renfrewshire (Young).

The markings on the head are very variable in extent, being more prone to vary by way of reduction than in the allied species, and all, or any of them, may be absent.

10. *C. Fieberi*, *Edw.* (*frontalis*, *Fieb.*)—Upperfore parts bright yellow; prevalent form of marking on the head of the male a pair of round basal spots and a broad black band across the forehead interrupted in the middle by a cuneate stripe

of the pale ground colour, on this black band the pale ocelli are very conspicuous, and there is generally a short oblique yellow line continued outwardly from each ocellus to the lower angle of the band; sometimes the markings of the crown spread in such a manner that it is wholly, or in greater part, black; this is the state described by Fieber. Markings on the forehead of the female irregularly oblong, slightly arched, sometimes (by reduction) perfectly crescent-shaped. Crown: in the male, one-fourth to one-fifth shorter than the pronotum, one-third longer in the middle than at the sides, free sides feebly arcuate, apex broadly rounded; in the female, one-fifth to one-seventh shorter than the pronotum, one-third longer in the middle than at the sides, free sides straight, apex rounded; frons yellow, with the side lines, and sometimes a middle stripe, blackish; sometimes black, with the side lines and apex yellow. Disc of the pronotum frequently occupied by a dark fuscous patch, which is divided in the middle by a stripe of the pale ground colour, near the front margin a few black points. Markings of the scutellum as in *C. fasciifrons*. Elytra very variable in colour; in many males uniform pale fuscous, with the veins concolorous, and the costa, and sometimes the inner margin, very narrowly blackish; in many females pale grey, with a greenish tinge, and the veins paler, or even yellow; in others, some or all of the areas are occupied by a broad fuscous stripe, when the pale veins are very conspicuous, and that of the inner margin is blackish in its basal and apical thirds, with the intervening space whitish. Abdomen and legs coloured as in the preceding species. Length, $3\frac{1}{2}$ – $4\frac{1}{2}$ mm.

Weybourne and Cley, Norfolk, by sweeping in marshes near the sea; probably generally distributed in coast-marshes.

11. *C. livida*, *Edw.*—General colour of the upper side varying from dark fuscous to black with a bluish tinge; the transverse vein and portions of those adjoining it frequently

forming a whitish **H** near the base of each elytron. Crown sometimes entirely black, at others exhibiting the normal markings in various degrees of confluence; in the male, three-fifths shorter than the pronotum, the curves of its front and hind margins nearly parallel; in the female, one-half shorter than the pronotum, one-third longer in the middle than at the sides, its free sides nearly straight, apex rounded; frons black, generally with a yellow spot in each apical angle, and sometimes with yellow side lines. Pronotum sometimes entirely black, but generally yellow, with its disc more or less completely occupied by a fuscous or black patch, which is divided by a stripe of the pale ground colour, near the front margin a few black points. Elytra varying in colour from fuscous, with the white **H** before mentioned, to uniform pitch-black, with a bluish tinge; veins concolorous; in many females the fuscous pigment is arranged in streaks, which more or less completely occupy the areas, and leave the veins pale; in these specimens the middle third of the inner marginal vein is generally conspicuously whitish. Abdomen: above, black, the hind margins of the segments very narrowly yellow; in the male, black beneath, with the connexivum narrowly, and the upturned apices of the genital plates, yellow; in the female black beneath, with some spots on the connexivum, and the pygofer yellow; saw-case black. Legs sordid yellow striped and spotted with black. Length 4-4½ mm.

Weybourne, Norfolk, October 18, 1888, by sweeping grasses in a swampy marsh near the sea.

12. *C. cyanæ*, Boh.—♀. Head, with the eyes, narrower than the pronotum; elytra lighter or darker brown with a blue bloom during life, which is retained to a certain extent after death; veins dark brown. Crown: one-fifth shorter than the pronotum, subequal in length to its basal width, one-half longer in the middle than at the sides, free sides nearly straight, angle blunt; brownish yellow, forehead with

two large transversely oval black spots touching in the middle, interocular line biarcuate produced in the middle as far as the hind margin, a black line next the inner margin of each eye and a black point on each side of the base; the subocellar spots and the interocular line frequently coalesce so that the front of the head appears black with three pale points, of which the lateral two are the ocelli. Face brownish yellow, the cheeks whitish, side lines of the frons and the sutures black. Pronotum brownish-yellow, its disc suffusedly fuscous near the middle of the hind margin, along the front margin a few more or less confluent black points. Scutellum brownish-yellow with a large triangle on each side of the base and a pair of points on the disc black. Elytra yellowish fusco-hyaline, veins dark brown, the latter colour spreading on the disc of the corium, membrane fusco-hyaline. Abdomen black, its apex and the hind margins of the segments narrowly yellow. Legs yellow brown, striped and spotted with black. Length 4-5 mm.

Loughton and Fifield, on *Potamogeton natans* (E. A. Butler).

GNATHODUS, Fieb. (Pl. II., fig. 17.)

Body oblong, obtuse in front, much narrowed behind. Crown very short, about one-fourth as long as the pronotum, scarcely longer in the middle than at the sides. Elytra much longer than the abdomen, overlapping at the apex; outer branch of the cubital vein obsolete; membrane very large, as long as the inner margin of the clavus; appendix large. Submarginal wing-vein complete; upper branch of the second wing-vein confluent with the first, and running into the submarginal vein as one vein; third wing-vein joined to the lower branch of the second by a transverse vein.

Besides *G. punctatus*, which occurs throughout Europe generally, two other species of this genus are recorded for the Palearctic region. These are distinguished from *G. punc-*

tatus as follows: *G. roseus*, Scott, which occurs in France, Spain, Germany, and Italy, by the slightly arcuate, not obtusangular, front margin of the crown; and *G. angustus*, Then, which occurs on grass at Levico in the Tyrol, by its smaller and narrower form and the absence of black points on the outer side of the hind tibiæ; the latter character, however, is hardly diagnostic, as several of my specimens of *G. punctatus* have the hind tibiæ entirely pale.

1. *G. punctatus*, *Thunb.*—♂. Greyish yellow or pale salmon-coloured; elytra with a few black spots arranged in two oblique bands, one on the basal third, the other next the angular veins; ♀, pale green, the spots on the elytra reduced to two on the clavus, one at the apex, the other near the base, and one or two on the corium next the angular veins. Crown obtusely produced in front. Head, pronotum, and scutellum sometimes marked with fuscous or black; in the apex of each wing a fuscous streak. Abdomen black, hind margins of the segments narrowly pale. Legs pale; tibiæ sometimes dark towards the apex, and with dark points on the outer side. Length $3\frac{1}{2}$ –4 mm.

On grasses in early summer and on fir trees in winter, not very common. Norwich district. Pitlochry, hibernating in moss in March (Norman); Leicestershire, Weybridge (Marshall); Perth district (McGregor); Woking (Saunders).

TYPHLOCYBIDÆ.

Small, elongate species, for the most part brightly coloured. Ocelli not or scarcely perceptible, sometimes indicated on the forehead. Face very long, triangular. Elytra much longer than the abdomen, overlapping at the apex; appendix wanting (except in *Alebra*). Corium with three simple longitudinal veins only. The latter character distinguishes this group from all others. The genera are readily separable by the characters derived from the venation of the elytra and wings.

This is a homogeneous group of small and often gaily-coloured insects. Many of the species swarm on their food-plants, and a large number of specimens may be taken in winter and spring by beating shelter-plants such as spruce-fir, Scotch-fir and ivy; and during the first strong winds of November the fences and walls of suburban gardens produce a large number of individuals of the species which have lived on the trees and shrubs close by.

TABLE OF GENERA.

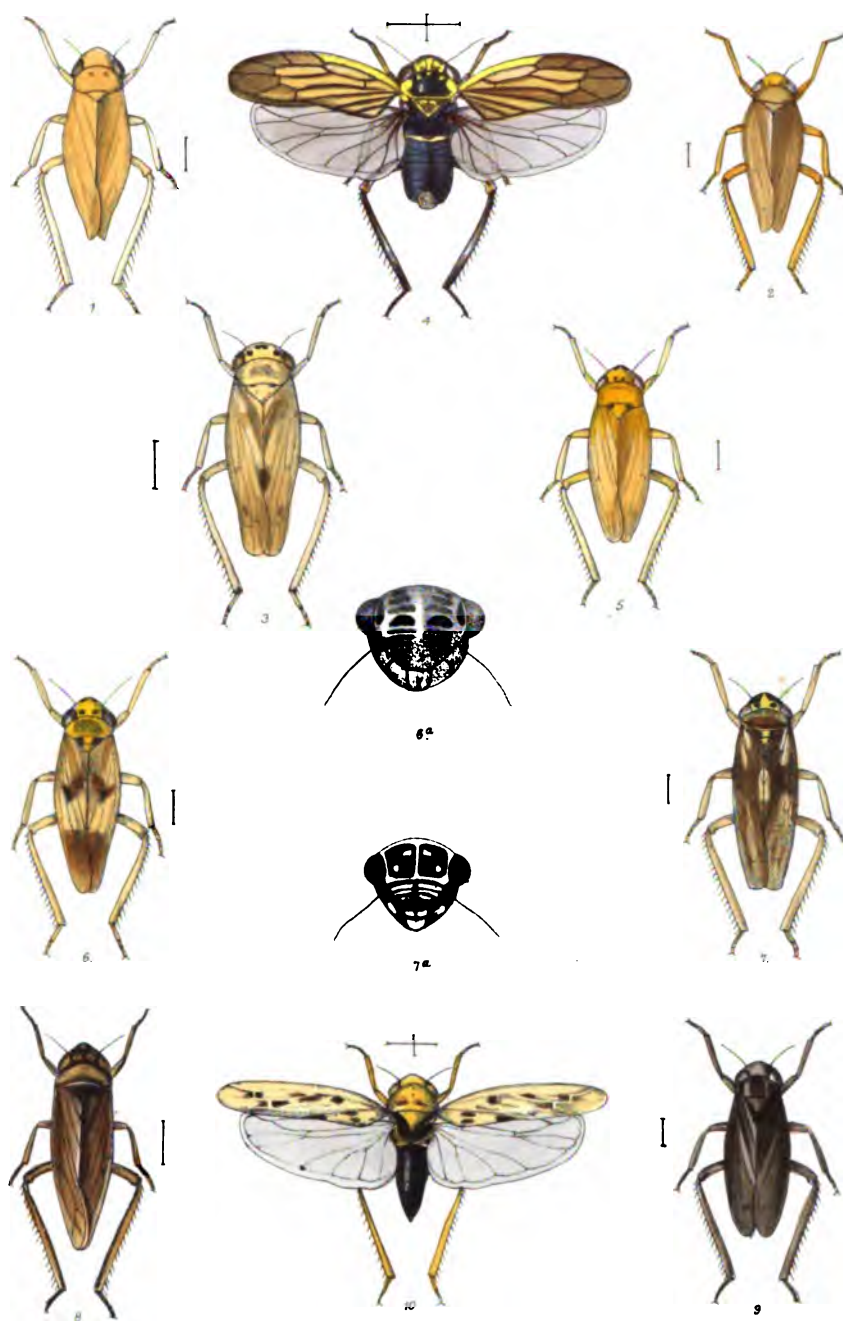
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|---|------------------------|
| 1. (2) Membrane with an appendix. | 1. <i>Alebra</i> . |
| 2. (1) Membrane without an appendix. | |
| 3. (8) Submarginal wing-vein continued round the apex of the wing. | |
| 4. (5) Third wing-vein forked. | 2. <i>Dicrancura</i> . |
| 5. (4) Third wing-vein simple. | |
| 6. (7) Second apical area triangular. | 3. <i>Kybos</i> . |
| 7. (6) Second apical area oblong. | 4. <i>Chlorita</i> . |
| 8. (3) Submarginal wing-vein running out to the margin before the apex of the wing. | |
| 9. (10) First two wing-veins subparallel throughout. | 5. <i>Eupteryx</i> . |
| 10. (9) First two wing-veins confluent near the apex. | |
| 11. (12) First apical area ample, third irregular in figure. | 6. <i>Typhlocyba</i> . |
| 12. (11) First apical area very small, third oblong. | 7. <i>Zygina</i> . |

Alebra, Fieb. (Pl. II., fig 18.)

Body linear. Front and hind margins of the crown parallel, feebly curved. Ocelli distinct. Pronotum distinctly wider than the head with the eyes. Elytra much longer than the abdomen, overlapping at the apex, with a distinct appendage, the three inner apical areas oblong, truncate at the base. Submarginal wing-vein running into the first

PLATE XXI.

- FIG. 1. *Cicadula metria*, Flor.
2. „ *opacipennis*, Leth.
3. „ *punctifrons*, Fall.
4. „ *Dahlbomi*, Zett. ♂.
5. „ *septemnotata*, Fall.
6. „ *variata*, Fall.
6a. „ *fasciifrons*, Stal. (forehead, &c.)
7. „ *frontalis*, Scott. ♀.
7a. „ *Fieberi*, Edw. (forehead, &c.)
8. „ *cyanæ*, Boh.
9. „ *livida*, Edw.
10. *Gnathodus punctatus*, Thunb.



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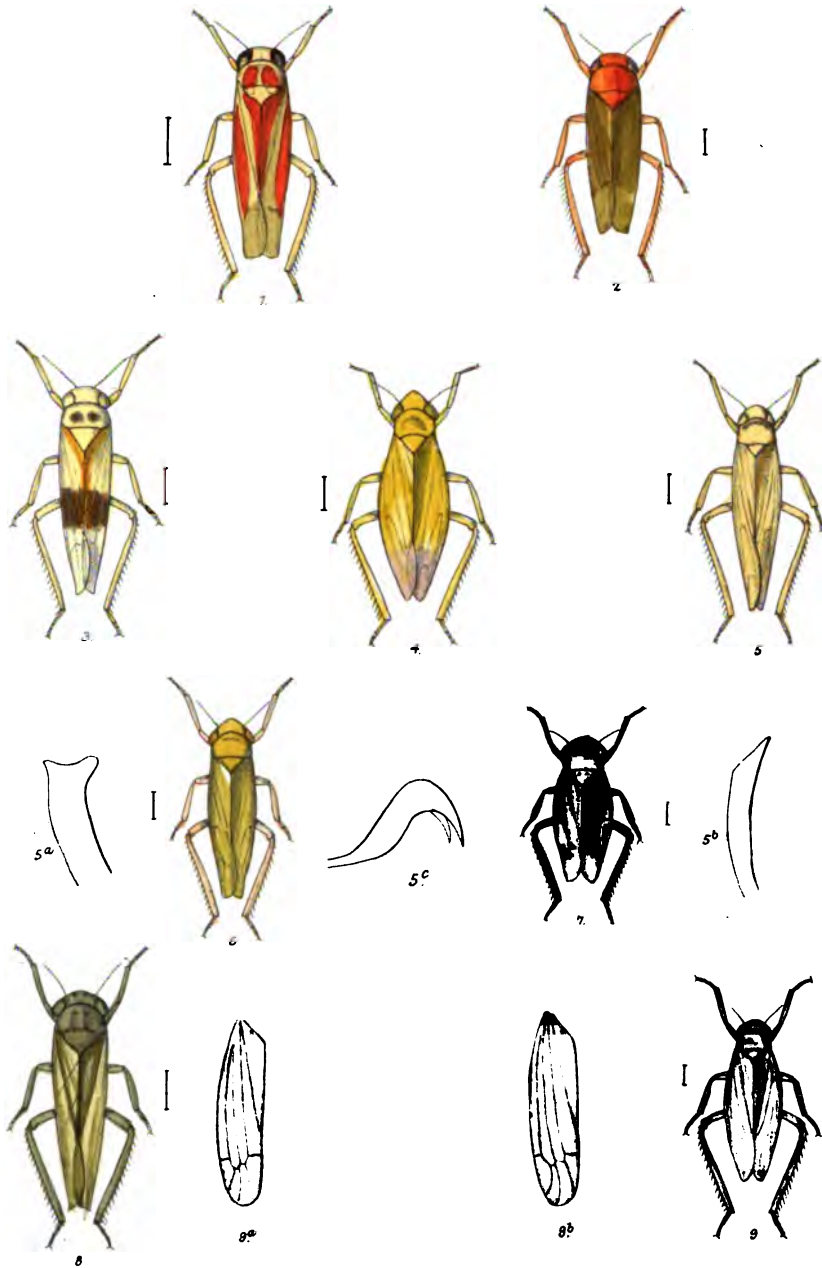
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PLATE XXII.

- FIG. 1. *Alebra albostriella*, Fall.
2. " " var. *fulveola*, H.-S.
3. " " " *Wahlbergi*, Boh.
4. *Dicraneura flavipennis*, Zett.
5. " *citrinella*, Zett.
- 5a. " " (outline of lateral aspect of
 genital plate).
- 5b. " *similis*, Edw. " " "
- 5c. " *mollicula*, Boh. (outline of lateral
 aspect of œdeagus).
6. " *variata*, Hardy.
7. " *aureola*, Fall.
8. *Kybos smaragdulus*, Fall.
9. *Chlorita flavescens*, Fab.
- 9a. " " (elytron).
- 9b. " *viridula*, Fall. "

PLATE 22.



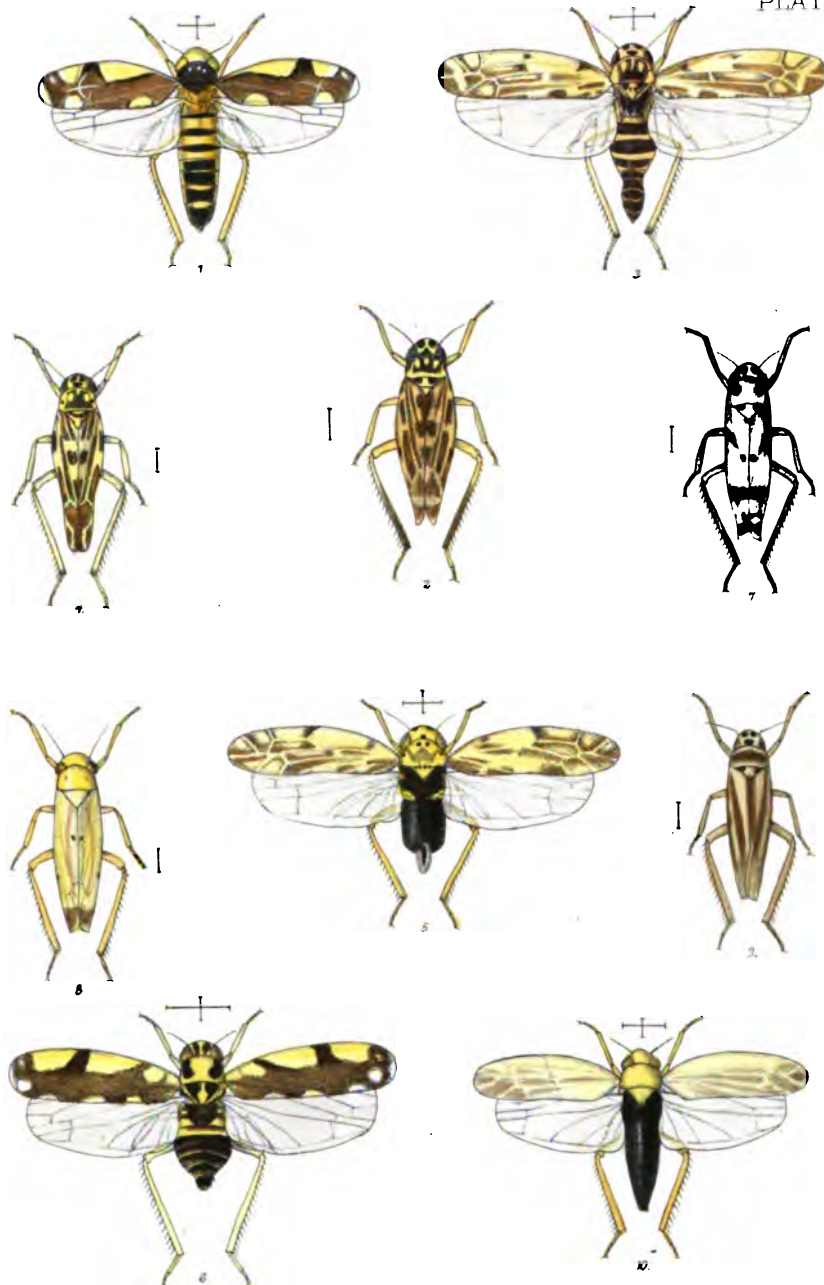
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PLATE XXIII.

- FIG. 1. *Eupteryx vittatus*, Lin.
2. „ *urticæ*, Fab.
3. „ *stachydearum*, Hardy.
4. „ *collinus*, Flor.
5. „ *melissæ*, Curt.
6. „ *auratus*, Lin.
7. „ *atropunctata*, Goeze.
8. „ *signatipennis*, Boh.
9. „ *tenellus*, Fall.
10. „ *abrotani*, Dougl.



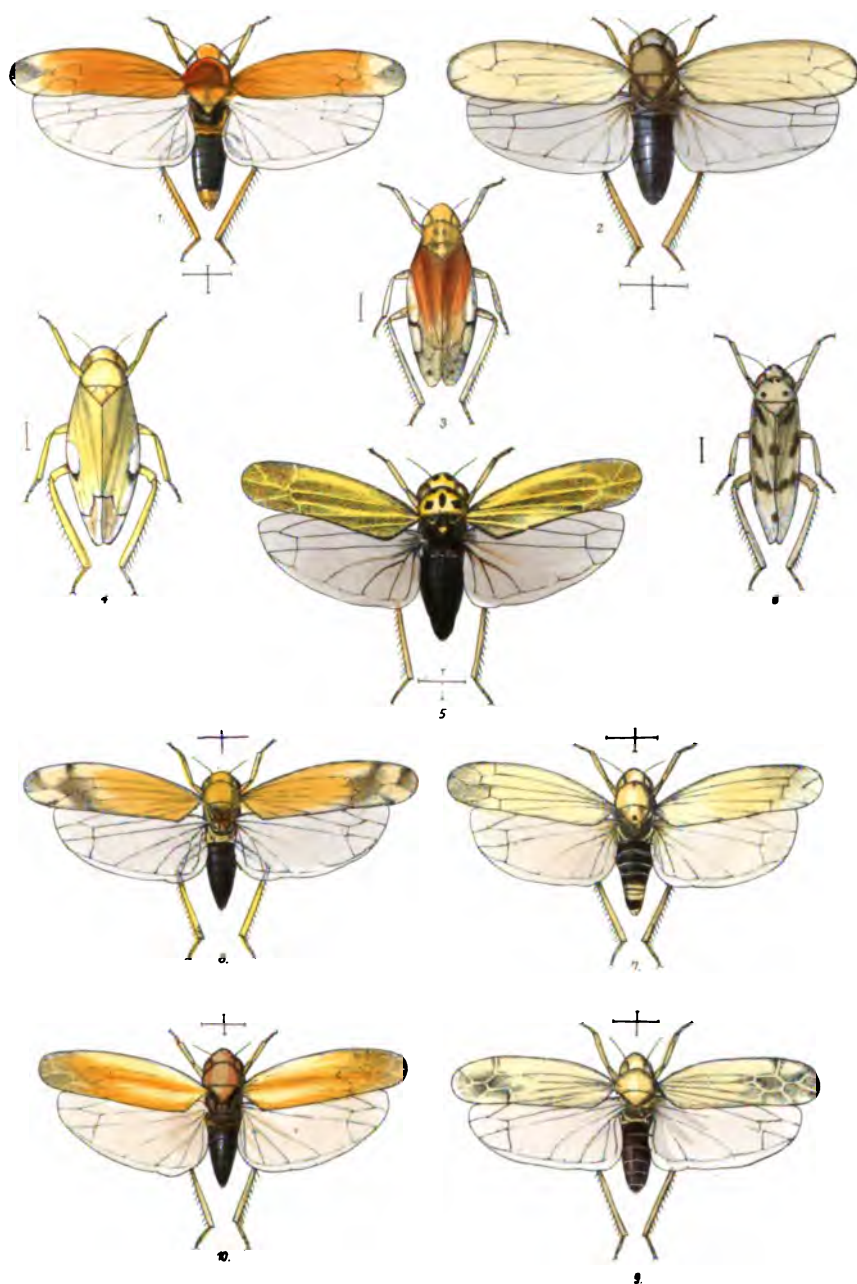
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PLATE XXIV.

- FIG. 1. *Eupteryx filicum*, Newm.
2. „ *Germari*, Zett.
3. „ *pulchellus*, Fall.
4. „ *concinna*, Germ.
5. *Typhlocyba jucunda*, H.-S.
6. „ *sexpunctata*, Fall.
7. „ *debilis*, Dougl.
8. „ *ulmi*, Lin.
9. „ *tenerrima*, H.-S.
10. „ *aurovittata*, Dougl.



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NOTES AS TO LOCALITIES, HABITATS, ETC.*

BY

JAMES EDWARDS, F.E.S.



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vein; in the apex of the wing three oblong areas. Genital valve wanting in the male.

This is a monotypic genus and occurs throughout Europe.

1. *A. albostriella*, Fall.—This handsome insect presents the following well-marked colour varieties:—

♂. Fore parts and legs yellow or red-yellow; elytra yellow or greenish yellow; apices of the areas of the corium and the membrane fumose.

fulveola, H.-S.

♀. *a.* Upper side, face and legs white, the two latter sometimes tinged with yellow; two broad stripes on the pronotum, the suture of the elytra broadly, a stripe in the brachial area, and a broad one along the costa, yellow; apices of the areas of the corium and the membrane faintly fumose. The stripes on the pronotum and the suture of the elytra are frequently red.

albostriella, Fall.

b. Upper side, face and legs white, the two latter sometimes tinged with yellow; hind part of the crown, the pronotum, (except at the sides), and the scutellum, dark brown; elytra with a stripe along the suture, one in the brachial area, and another along the costa, yellow; on the inner margin just behind the middle a large ill-defined dark brown spot.

Wahlbergi, Boh.

Length, $2\frac{3}{4}$ – $3\frac{1}{2}$ mm.

Common on various trees; the var. *Wahlbergi* seems to be confined to elm.

Norwich district. Cotswold district. Battle, Hurst Green, Dallington Forest, Shalford, Ewhurst, Chobham, Guestling, Barnet (Butler); Glanvilles Wootton (Dale); Solway district (Robinson-Douglas); Renfrewshire (Young); Ireland (Haldy).

***Dicraneura*, Hardy. (Pl. II., fig. 19.)**

Body small, linear. Head obtusely produced in front. Elytra much longer than the abdomen; veins of the membrane sub-parallel; appendix wanting. Submarginal wing-

N

vein complete; first and second wing-veins confluent before the apex, and running into the submarginal vein as one vein; third wing-vein forked and joined to the second by a transverse vein.

We have only seven species out of the twenty-three given by Puton for the Palearctic region.

TABLE OF SPECIES.

1. (8) Wing-veins pale.
2. (3) Front of crown angular (more conspicuously in the ♀). 1. *flavipennis*.
3. (2) Front of crown not angular.
4. (7) Genital plates subcylindrical, curved, approaching at the base and apex.
5. (6) Genital plates wide and stout, their apices (viewed from the side) truncate, bounded on each side by an erect blackish tooth. 2. *citrinella*.
6. (5) Genital plates long, slender, their apices pointed; on the inner margin just below the apex a strong triangular tooth. 3. *similis*.
7. (4) Genital plates elongate-triangular, flat, their inner margins subcontiguous. Edeagus black, resembling the claw-joint of a *Carabus*. Lobes of pygofer in the male each with a large blackish horn on the inner side near the apex. 4. *mollicula*.
8. (1) Principal wing-veins fuscous or black.
9. (10) Scutellum with a distinct black spot at the apex. 5. *pygmaea*.
10. (9) Scutellum immaculate.
11. (12) Elytra membranous, more than three times as long as wide; suprabrachial area and the apical half of the subcostal area hyaline. 6. *variata*.

12. (11) Elytra subcoriaceous, about $2\frac{1}{2}$ times as long as wide, opaque throughout. 7. *aureola*.

1. **D. flavipennis**, Zett.—Deep yellow; abdomen above black. Hind margin of pronotum with an arcuate notch of equal width with the base of the scutellum. Elytra deep yellow; membrane whitish hyaline. Hind tibiæ with a row of distinct black points. Length, $3\frac{1}{4}$ mm.

Locally common amongst *Carices*. This species is readily distinguished by its Deltocephaloid crown and the uniform distribution of the yellow pigment in the elytra.

Norwich district. Cotswold district. Woking (Saunders); Ascot, Battle, Chobham (Butler). This species is the same as *D. armata*, Buckton.

2. **D. citrinella**, Zett.—Dirty yellow; abdomen above black, paler towards the apex. Corium dirty yellow, the apical half of the subcostal area, the suprabrachial area, and the apical third of the brachial area, hyaline. Membrane fusco-hyaline. Hind tibiæ with a row of distinct black points. Length, $3\frac{1}{2}$ mm.

This species is easily recognised by the broad genital plates of the male, which are of equal width throughout and notched at the tip.

Occurs on long grass in woods.

Norwich district. Cotswold district. Glanvilles Wootton (Dale); Hurst Green (Butler); Rannoch, Swithland Woods, Leicestershire, Deal (Marshall).

3. **D. similis**, Edw.—Similar in size and colour to the last, from which it is best distinguished by the structure of the male genitalia. The genital plates are subterete, connivent, enclosing between them an oval space, and the tooth on their inner side near the apex is well marked. The female of this species may be distinguished from that of the last by its brighter colour (at least when fresh) and the straighter

free sides of the crown. Both sexes of *similis* are always much brighter in colour than *citrinella*. Length, $3\frac{1}{2}$ mm.

By sweeping grasses on wet commons in Norfolk. Woking (Saunders).

4. **D. mollicula**, *Boh.*—Yellow, in some examples inclining to orange; abdomen above generally black towards the base. Hind margin of pronotum at most faintly concave. Elytra yellow, the membrane and a spot in the apex of the subcostal and suprabrachial areas hyaline. Length, $3\frac{1}{2}$ mm.

Very common amongst Labiatae.

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

5. **D. pygmaea**, *Dougl.*—♂. Orange-yellow; abdomen above black, genitalia yellow. Corium and clavus inwardly paler orange than on their outer sides, veins deeper orange, inner margin of the clavus with a fuscous line. Membrane with a slightly fuscous tinge; veins pale orange. Legs pale orange; claws infuscated. Length, $2\frac{1}{2}$ mm.

This species, which is easily recognised by its small size and the black spot on the scutellum, is only known from a single male taken casually at Darenth Wood by Mr. Douglas on the 7th of October, 1875.

6. **D. variata**, *Hardy.*—Pale greenish yellow, dull; abdomen black. The colour of the elytra varies to dark green, sometimes with a reddish tinge, or occasionally deep orange-red, the latter in northern examples. Length, $3\frac{1}{4}$ mm.

Locally common amongst low plants.

Norwich district, Cotswold district. St. Martha's (Butler); Glanvilles Wootton (Dale); Perth district (McGregor); Renfrewshire (Young).

7. **D. aureola**, *Fall.*—Short and stout. Crown, pronotum, and scutellum yellow; elytra light yellowish green; abdomen above black. Fore parts and legs, particularly the

face and the latter, frequently tinged with red. Length, $2\frac{3}{4}$ – $2\frac{1}{2}$ mm.

On *Carices*, Findhorn Marsh, Forres, Morayshire (Norman). It is said to occur on *Calluna* in August and September. Flor records it as rather abundant in mountain meadows in July and August.

Kybos, *Fieb.* (Pl. II., fig. 20.)

Body moderately stout. Crown one-half or less than half as long as the pronotum, its front and hind margins feebly curved, subparallel. Ocelli distinct. Elytra longer than the abdomen; second apical area triangular; appendix wanting. Submarginal wing-vein running into the confluent continuation of the first and second vein: third wing-vein simple, joined to the second by a transverse vein. Genital valve well-developed in the male.

A small genus comprising for the Palearctic fauna but two species; our common British insect and *K. commissuralis*, Stol from Siberia.

1. **K. smaragdula**, *Fall.*—Green or greenish yellow, shining; crown, pronotum, and scutellum with a narrow pale stripe; the latter is frequently bounded on each side by a dark stripe, or the upper fore parts are entirely reddish or dark brown. Inner margin of elytra generally bearing a fuscous stripe, which sometimes extends to the membrane; claval suture frequently narrowly fuscous. Abdomen above black; hind margins of the segments more or less widely pale. Legs green, claws black. Length, 4– $4\frac{1}{2}$ mm.

Common on poplars, willows, and sallows.

Norwich district, Cotswold district. Glanvilles Wootton (Dale); Hastings, Battle, Dallington Forest, Ewhurst, Barnet, Gomshall (Butler); Paisley (Young); Woking (Saunders); Dublin district (Halbert); Taynult (Beaumont).

Chlorita, *Fieb.* (Pl. II., fig. 21.)

Elongate, delicate species, pale green in colour. Crown (with the eyes) crescent-shaped, more or less pointed. Elytra longer than the abdomen; second apical area oblong; appendix wanting. Venation of the wings as in the last genus. Genital valve wanting in the male.

No less than seventeen species of this genus are given by Puton for the Palearctic fauna. Beyond the two we have already, only two of these seem likely to occur with us. These are, *C. solani*, Koll. a species which should have the head narrower than the pronotum, but authors are not agreed as to whether it has the suprabrachial area hyaline or not; and *C. apicalis*, Flor, which has the suprabrachial area sometimes hyaline and the membrane and apex of the areas of the corium dark smoke-coloured, "membrana corioque apice late determinatim fuscis" (*J. Sahlberg*), the veins of the membrane yellow. Lethierry, in his "Catalogue des Hemipteres du Department du Nord," speaks of *C. solani* as generally common throughout the year, but he does not mention *C. viridula*, and this circumstance raises a suspicion that the latter common European insect was the one he had in view. With regard to *C. apicalis*, all the authors who mention it agree as to its rarity; Flor's original specimens, of which he had but two of each sex, were taken off lime and elm at the end of July and the beginning of August. *C. apicalis* has been recorded as British, but I have not seen any specimens which agreed with the description of that species.

Our two species may be thus distinguished:—

- | | |
|--|------------------------|
| Suprabrachial area hyaline throughout. | 1. <i>flavescens</i> . |
| Suprabrachial area hyaline at the apex only. | 2. <i>viridula</i> . |

1. *C. flavescens*, *Fab.*—Yellowish green; a spot in the apex of the subcostal area, the entire suprabrachial area, a large sub-triangular spot in the apex of the brachial area, and the membrane, hyaline; the latter very faintly tinged

with fuscous. The white silky hairs on the apex of the male genital plates twice as long as the erect bristles which clothe the other portions of the same. Length, $3\frac{1}{2}$ –4 mm.

Common on various trees and bushes in autumn, and on firs in winter and spring.

Norwich district, Cotswold district. Dublin (Carpenter); Hastings (Butler); Glanvilles Wootton (Dale).

2. *C. viridula*, *Fall.*.—Green, with pale or white markings on the head, pronotum, and scutellum; these markings are very variable, and are best seen in the fresh insect; the most constant of them seems to be a white stripe on the basal two-thirds of the scutellum. A spot in the apex of the subcostal and suprabrachial areas, a large sub-triangular spot in the apex of the brachial area, and the membrane, hyaline; the latter very faintly tinged with fuscous. The white silky hairs on the apex of the male genital plates subequal in length to the erect bristles on the remainder of the same. Length, 3 mm.

Equally common with the last species and frequently taken in company with it.

Norwich district, Cotswold district. Pitlochry (Norman); Ardara (Johnson); Ireland (Haliday); Glanvilles Wootton (Dale); Hastings, Hurst Green, Ewhurst, Chingford (Butler).

Eupteryx, *Curt.* (Pl. II., fig. 22.)

Body elongate. Crown for the most part crescent-shaped. Elytra much longer than the abdomen; apical areas four, the second triangular; appendix wanting. Submarginal wing-vein incomplete; first and second wing-veins simple, as well as the third, the two former connected near the apex by a short transverse vein, the latter joined by a transverse vein to the second vein above and the submarginal vein below.

We have fifteen out of the twenty-nine species recorded for the Palearctic fauna, including one, *E. abrotani*,

Douglas, which does not appear to have been recorded except from Britain.

It seems probable that amongst the insects which at present fall within the definition of *E. stachydearum* there are two or three species which could be distinguished by the form of the appendages to the cedeagus as well as some slight, but correlated, distinctions in the markings.

TABLE OF SPECIES.

1. (4) Elytra obliquely subtruncate at apex.
2. (3) Length, 3 mm. 1. *vittatus*.
3. (2) Length, 2—2½ mm. 2. *notatus*.
4. (1) Elytra evenly rounded at apex.
5. (24) Head across the eyes as wide or wider than the pronotum.
6. (7) Hind tibiæ black, widely pale at the base. 3. *urtica*.
7. (6) Hind tibiæ entirely pale, or only black at the extreme apex.
8. (19) Elytra with a black spot on the costa, or the inner margin, or both.
9. (14) Vein forming the upper boundary of the fourth apical area springing from the middle of the apex of the subcostal area.
10. (11) Length, 3½ mm. 4. *stachydearum*.
11. (10) Length, 3mm.
12. (13) Crown with two black spots on the hind margin, confluent behind, and forming a V. 5. *collinus*.
13. (12) Hind margin of the crown with one black spot, which is generally small and roundish. 6. *melissæ*.
14. (9) Vein forming the upper boundary of the fourth apical area springing from about the middle of the apex of the suprabrachial area, or continuous with the brachial vein.

15. (18) Pronotum with two large subreniform black spots.
16. (17) Length, 4 mm. The wide irregular fuscous stripe along the elytra continuous.
 7. *auratus*.
17. (16) Length, 3½ mm. The fuscous stripe on the elytra usually interrupted near the middle.
 8. *carpini*.
18. (15) Pronotum unspotted, or, if spotted, the spots small and not subreniform.
 9. *signatipennis*.
19. (8) Elytra without black spots on the costa or inner margin.
20. (21) Elytra with alternate pale and fuscous stripes.
 10. *tenellus*.
21. (20) Elytra not striped.
22. (23) Elytra pale green, generally infuscated down the middle.
 11. *abrotani*.
23. (22) Elytra yellow, more or less tinged with fuscous at the apex.
 12. *flicum*.
24. (5) Head across the eyes narrower than the pronotum.
25. (26) Elytra without markings.
 13. *Germari*.
26. (25) Elytra with a fine oblique black line about the middle of the costa.
27. (28) A deep black round spot on the membrane.
 14. *pulchellus*.
28. (27) Membrane without any round black spot.
 15. *concinna*.

1. **E. vittatus**, *Lin.*.—Head yellow; hind part of crown blackish brown, with a pale middle stripe. Pronotum blackish brown, sometimes with a few (three to five) pale points. Scutellum blackish brown, a fine middle stripe and the apex yellow. Corium blackish brown, a large irregular patch on the costa reaching half-way across the elytron, a subtriangular spot in the apex of the costal area, and a semi-

circular spot on the inner margin just below the apex of the scutellum, yellow; membrane blackish brown, a roundish spot in the base of the fourth apical area, two spots in the third apical area, a minute point in the base of the second apical area, a large roundish spot occupying almost the whole of the first apical area, and the apex narrowly, shining white; on the apex of the vein dividing the first apical area from the second a small roundish yellow spot. Abdomen in the male black, hind margins of the segments yellow, genital plates yellow; in the female, above black with yellow hind margins to the segments, beneath yellow, pygofer black. Breast and legs yellow. Length, 3 mm.

Common amongst *Mentha* and other low plants in damp places.

Norwich district, Cotswold district. Paisley (Young); Woking (Saunders); Ireland (Haliday); Battle, Hurst Green (Butler).

2. *E. notata*, Curt.—Like the preceding species in colour and facies, but one-third smaller, with the crown more pointed. Length, 2–2½ mm.

Common amongst low plants in dry places.

Norwich district, Cotswold district. Folkestone Warren (Douglas); Woking (Saunders); Rannoch, near a mountain top, recorded as a dwarf specimen of *E. vittatus* (Marshall); Hurst Green, Ewhurst (Butler); Glanvilles Wootton, Arthur's Seat (Dale).

3. *E. urticae*, Fab.—Frons yellow, sides and apex frequently black, just below the forehead a pair of black points. Crown yellow, a triangular spot on the hind margin and two roundish spots on the disc black. Pronotum yellow, with a black spot on each side and about four others on the front margin, on the hinder half a double fuscous middle stripe bounded on each side by a black triangular spot. Scutellum yellow, with two black spots at the base. Elytra greenish white; clavus with two streaks at the base, a suboval spot in

the middle, and the apex fuscous; brachial area fuscous; suprabrachial area apparently divided into two, of which the basal one is filled up with fuscous and the other is margined with the same colour, more widely at the base and apex; the apical half of the subcostal area is also margined with fuscous in a similar manner; on the costa two oblique black spots, one before, the other which reaches the suprabrachial area, just behind the middle. Membrane dark fuscous, a spot at the base of the fourth apical area, an irregular interrupted band across the middle, the apex rather widely, and a small roundish spot on the apex of the vein dividing the first apical area from the second, white. Breast and abdomen black; hind margins of the segments of the latter narrowly yellow. Legs yellow; hind tibiæ black, except at the base; apex of the hind tarsi black in the male. Length, $3\frac{1}{4}$ – $3\frac{1}{2}$ mm.

Common on nettles.

Norwich district, Cotswold district. Solway district (Robinson-Douglas); Ireland (Haliday); Hastings (Butler); Glanvilles Wootton (Dale).

4. *E. stachydearum*, Hardy.—Head, pronotum, and scutellum yellow, with dark markings as in *E. urtica*, save that the spot on the back of the crown is generally transversely suboval and somewhat irregular in outline, and the double stripe on the hind part of the pronotum is more or less suffused over the disc. Elytra greenish white, the areas a little darker and narrowly margined with fuscous, the costal spot nearest the base obsolete, and the one beyond the middle divided by the pale vein which separates the costal area from the subcostal. Membrane dark fuscous, a spot in the fourth apical area, a bisinuate band across the middle, the apex very narrowly, and a large roundish spot on the first apical area, white. Breast and abdomen black, hind margins of the segments of the latter yellow. Legs yellow: ♂; hind tibiæ narrowly black at the apex, some fuscous spines as well as

pale ones on the outer side, first joint of hind tarsi black, pale on the basal third or a little more, third joint fuscous at the extreme apex; ♀ generally with the extreme apex of both the hind tibiæ and the hind tarsi fuscous, but very frequently only the basal joint of the latter is fuscous at the apex. Length, $3\frac{1}{2}$ mm.

Very common on *Tencrium Scorodonia* and other Labiates.

Easily distinguished from the two following species by its larger size and darker colour. The two points on the frons are not unfrequently wanting in the male. Norwich district, Cotswold district. Paisley (Young); Lewisham, on tansy (Douglas); Woking (Saunders); Boxhill (Beaumont); Highgate (Butler); Mount Edgecombe (Dale).

5. *E. collinus*, *Flor.*—Similar to the preceding, but smaller and paler, and having the basal black spot on the crown always V-shaped. Legs yellow: ♂; hind tibiæ narrowly black at the apex, with some of the spines on the outer side fuscous, first joint of the hind tarsi black on the apical third or a little less; third joint black, pale at the base: ♀; hind tarsi dark only at the extreme apex, outer edge of hind tibiæ without fuscous spines. Length, 3 mm.

Locally abundant on *Ballota nigra* at Norwich.

Shalford (Butler); Woking (Saunders).

6. *E. melissæ*, *Curt.*—Very similar to the last in size and appearance, but the basal black spot on the crown is never V-shaped. Legs yellow, only the extreme apex of the tarsi fuscous. Very rarely in the male the hind legs are coloured as in that sex of *E. collinus*, but there are no fuscous spines on the outer edge of the hind tibiæ in either sex. Length, 3 mm.

Locally common on various Labiates.

Norwich district. Devonport, on rosemary (Scott); Isle of Wight (Curtis); Woking (Saunders); Glanvilles Wootton, Freshwater, Scilly Isles, on tree mallow (Dale).

7. **E. auratus**, *Liv.*—Fore parts yellow or greenish yellow; sides and apex of the frons sometimes black; on the crown two large black spots, which are occasionally more or less confluent behind; on the pronotum a large sometimes subreniform black spot on each side, and often a pair of black points near the front margin; scutellum with two large black spots at the base, which sometimes leave only a fine middle stripe and the apex pale. Elytra yellow or greenish yellow, with a wide irregular fuscous stripe down the middle; on the costa near the base an oblique black line, and just beyond the middle a large black spot; on the middle of the inner margin a round black spot. Membrane fuscous, a large spot in the first, third, and fourth apical areas, a minute spot on the apex of the vein dividing the first and second apical areas, and the apex broadly, white. Abdomen black; hind margins of the segments more or less narrowly yellow; genital plates yellow. Legs entirely yellow. Length 4 mm.

Common amongst nettles and other wayside plants.

Norwich district, Cotswold district. Solway district (Robinson-Douglas); Dublin (Halbert); Paisley (Young); Woking (Saunders); Hastings, Holmbury (Butler); Glanvilles Wootton (Dale).

8. **E. atropunctata**, *Goeze*. (**pictus**, **auct.**)—Similar to the preceding, but smaller, with all the dark markings much reduced. The fuscous stripe down the elytra is very frequently more or less interrupted on the disc, when the dark markings consequently take the form of two irregular curved bands, one before and the other behind the middle; this band-like arrangement of the markings is best appreciated when the elytra are closed. Genital plates black, the outer sides and apices broadly yellow. Length, $3\frac{1}{2}$ mm.

Common on various low plants, especially Labiates, in autumn. Norwich district. Glanvilles Wootton (Dale); Hastings, Battle (Butler).

9. **E. signatipennis**, *Boh.*—Face yellow; upper fore parts very pale green, sometimes with a pair of black triangles on the base of the scutellum, and more rarely a black point on each side of the pronotum, with or without some indication of a pair of spots on the crown. Elytra very pale green, the brachial area and the apical half of the suprabrachial and subcostal areas whitish hyaline, near the costa beyond the middle a small black spot and a round black spot on the inner margin about the middle, the disc occasionally with some ill-defined fuscous stripes; rarely the elytra are without spots. Membrane whitish hyaline, more or less suffused with fuscous and frequently having an ill-defined blackish spot near the apex of the first apical area. Abdomen black; hind margin of the segments very narrowly pale. Legs entirely pale yellow. Length, $3\frac{1}{2}$ mm.

On *Spiraea*, widely distributed but local.

Norwich district, Cotswold district. Morningside, Edinburgh (Douglas); Swithland Woods, Leicestershire, on birch (Marshall); Woking (Saunders); Barnet (Butler); Glanvilles Wootton (Dale); Paisley (Young).

10. **E. tenellus**, *Fall.*—Head yellow, sides and apex of the frons frequently black, two large round spots on the forehead, and a transversely suboval one on the base of the crown, black. Pronotum fuscous, broadly yellow in front. Scutellum yellow, with a large black spot on each side of the base. Elytra pale green, the suprabrachial area and the membrane fusco-hyaline; a stripe in the subcostal area, a rather wide regular one along the claval suture, and the scutellar margin narrowly, dark fuscous. Abdomen black, margins of the segments more or less widely yellow. Legs yellow; the extreme apex of the tarsi fuscous. Length, 3 mm.

Norwich district on *Achillaea millefolium*. Birdbrook, Essex (Power).

11. **E. abrotani**, *Dougl.*—Face yellow; upper fore parts

pale green without markings. Elytra pale greenish yellow, the veins of the disc generally margined with fuscous; membrane whitish hyaline, the pale green veins very broadly margined with fuscous. Abdomen black; hind margins of the segments sometimes very narrowly yellow. Legs yellow, claws fuscous. Length, 3 mm.

On *Artemisia abrotanum* and *maritima*, abundant where it occurs.

Norfolk. West Kilbride, Ayrshire, Lewisham (Douglas); Pitlochry, Forres, (Norman); Lastingham (Marshall); Woking (Saunders).

12. **E. flicum**, *Newm.*—Fore parts yellow; pronotum sometimes tinged with red in the male. Elytra yellow or golden yellow, a spot in the apex of the brachial, supra-brachial, and subcostal areas, and the membrane, fuscous; the latter with about three large whitish hyaline spots. Abdomen black; hind margins of the segments more or less widely yellow. Legs yellow, sometimes tinged with red. Length, $3\frac{1}{2}$ mm.

On ferns, local.

Cotswold district. Milford (Marshall); London district (Douglas); Glanvilles Wootton, Clovelly (Dale); Ilfracombe (Saunders).

13. **E. Germari**, *Zett.*—Upper side greenish grey; membrane whitish hyaline, fumose round the apex. Elytra subopaque, suprabrachial area and the apical half of the subcostal area whitish hyaline. Veins of the membrane fuscous from the apex forwards. Wings fumose, longitudinal veins black. Abdomen black; hind margins of the segments more or less narrowly yellow. Legs greenish grey. Length, $4-4\frac{1}{2}$ mm.

On Scotch firs, not uncommon.

Norwich district, Cotswold district. London district, on *Pinus abies* (Marshall); Woking (Saunders); Battle, Hurst

Green, Ewhurst, Shalford (Butler); Bournemouth, Parley (Dale.)

14. *E. pulchellus*, *Fall.*.—Crown, pronotum, and scutellum yellow, the two latter frequently suffused with brown. Elytra lighter or darker yellow, more or less suffused with brown towards the apex of the corium, sometimes with a rosy tinge; an oblique line on the middle of the costa reaching outwardly to the subcostal area, the vein at the apex of the costal area, and a conspicuous point on the vein which separates the first from the second apical area, black. Membrane fuscous, the apex very narrowly, a spot at the base of the first apical area, and another in the third apical area, white; the vein at the apex of the brachial area fuscous, and the space around it suffused with the same colour. Abdomen black above; hind margins of the segments more or less widely pale. Legs pale yellow. Length, 4–4½ mm.

Common on oaks.

Pale whitish examples are frequently met with, and may be mistaken for the next species.

Norwich district, Cotswold district. Glanvilles Wootton, Isle of Arran (Dale); Bexhill, Barnet, Guestling, Chingford (Butler); Paisley, Renfrewshire (Young); Woking (Saunders).

15. *E. concinna*, *Germ.*.—Exceedingly like a pale whitish example of the last species, but although there is sometimes the faintest possible indication of the black spot on the vein which divides the first from the second apical area, it is never developed; and in place of the ill-defined brown line which bounds the apex of the brachial area in *E. pulchellus* the apices of both the brachial and suprabrachial areas in the present species are bounded by a sharply-defined black line. Length, 4–4½ mm.

On oaks, sometimes with the last species, but much less common.

Norwich district. Paisley (Young); Perth district (McGregor); Chingford (Butler).

Typhlocyba, *Germ.* (Pl. II., fig. 23.)

Body small, cylindrical. Crown crescent-shaped, more or less pointed. Elytra much longer than the abdomen, the four apical areas well-defined, the second triangular; membrane wanting. Submarginal wing-vein incomplete; first and second wing-veins confluent before the apex, and running to the margin as one vein; third wing-vein simple, the straight transverse vein connecting it with the second wing-vein prolonged in a suboblique direction as far as the submarginal vein.

This genus is well represented in Britain, and the species, with the exception of the plain yellow or whitish species of the *rosæ* group, are easy to determine. For the exact determination of *rosæ* and its immediate allies account must be taken of the form of the appendages to the cedeagus. This may be accomplished either by ordinary dissection after soaking in alcohol and water, or the entire abdomen may be mounted as a microscopic slide in Canada balsam with or without pressure. A better knowledge of the actual form and direction of these appendages is obtainable from dissected specimens than from those mounted as microscopic slides; but having regard to the difficulty of dissecting these small objects, I have not in this work made use of any characters drawn from the cedeagus which may not be verified from specimens roughly mounted in balsam with sufficient pressure to separate the parts.

The cedeagus is a chitinous tube, from which the very fine and threadlike intromittent organ is protruded, and the forms assumed by the arms with which its apex is in most cases furnished afford practically constant differential characters in cases where the exact diagnosis of species would otherwise be impracticable. These appendages, however, are not func-

tionally essential, since they are entirely wanting in *T. Douglasi*, and in at least three species of *Zygina*.

There are probably in the *rosæ* group several more species to be defined by the form of the appendages to the cœdeagus.

Professor Giard has shown that the presence of parasites on species of *Typhlocyba* produces modifications in the form of the appendages of the cœdeagus, and in view of this fact it would be undesirable to found species on differential characters derived from these appendages in the case of specimens supporting parasites.

TABLE OF SPECIES.

1. (8) Pronotum with one or more black spots.
2. (5) Two or more black spots on the pronotum.
3. (4) Disc of pronotum with an oval black spot down the middle 1. *jucunda*.
4. (3) Disc of pronotum without any black marking in the middle 2. *secpunctata*.
5. (2) Pronotum with only one (punctiform) black spot.
6. (7) Veins of the membrane not black at the apex 3. *debilis*.
7. (6) Veins of the membrane black at the apex 4. *ulmi*.
8. (1) Pronotum not spotted with black.
9. (34) Elytra not striped or banded with dark brown.
10. (33) Elytra yellow, greenish yellow, or creamy white.
11. (20) Elytra yellow, membrane distinctly fuscous.
12. (17) Suture not fuscous.
13. (14) Veins of the membrane black at the apex 5. *tenerrima*.
14. (13) Veins of the membrane not black at the apex.
15. (16) Abdomen chiefly black 6. *aurovittata*.
16. (15) Abdomen pale 7. *Douglasi*.
17. (12) Suture more or less broadly fuscous.
18. (19) Entire clavus more or less distinctly fuscous 8. *gratiosa*.

19. (18) Suture narrowly fuscous 9. *crategi*.
20. (11) Elytra yellow or creamy white, membrane not or only very faintly tinged with fuscous.
21. (22) ♂ ; elytra deep yellow, costa narrowly reddish :
♀ ; elytra pale yellow, apical areas hyaline 10. *Lethierryi*.
22. (21) Elytra varying in colour from pale yellow to milk-white, apical areas sometimes faintly tinged with fuscous.
23. (32) Cedeagus with appendages.
24. (29) Appendages of cedeagus four.
25. (28) Appendages of cedeagus simple.
26. (27) Appendages of cedeagus lanceolate-acuminate, one pair a little shorter than the other. Species living on roses 11. *rosa*.
27. (26) Appendages of cedeagus narrow, falcate, the tips of each pair approaching those of the other pair. Species living on willows 12. *salicicola*.
28. (25) Appendages of cedeagus furcate; posterior pair Y-shaped, the posterior arm of the latter less than half as long as the anterior arm; anterior pair divided near the base into two long narrow curved unequal arms approaching at the tip, of which the posterior or upper arm is much the shorter. Species living on horse-chestnut 13. *hippocastani*.
29. (24) Appendages of cedeagus two.
30. (31) Appendages of cedeagus falcate, simple, scarcely so long as the width of the cedeagus at the base. Species living on hazel 14. *avellana*.
31. (30) Appendages of cedeagus very long, filiform, pointed, pendant along the anterior face of the cedeagus and curved upward and backward. Species living on wild plum. 15. *pruni*.

32. (23) *Œdeagus* without appendages. Upper side dull, membrane opaque. Species living on horse-chesnut 16. *opaca*.
33. (10) Elytra whitish, with large red spots 17. *quercus*.
34. (9) Elytra striped or banded with dark brown.
35. (36) Elytra yellow, with two broad dark brown bands 18. *nitidula*.
36. (35) Elytra yellow, with a narrow dark brown stripe along the claval suture 19. *geometrica*.

1. **T. jucunda**, *H.-S.*—Upper side yellow or greenish yellow, with black spots; elytra with fuscous stripes. Crown with two roundish black spots in front. Pronotum with an oval spot down the middle, a large round spot on each side, a point near each hind angle, and two others on the front margin, black. Scutellum black, with two V-shaped lines across the base, and the apex yellow. Elytra with two stripes in the clavus, a cuneate spot in the apex of the brachial area, the entire suprabrachial area, a stripe in the apical half of the subcostal area, and the membrane, fuscous; veins of the latter yellow. Wings fumose, principal veins black. Abdomen black; hind margins of the segments very narrowly yellow. Legs yellow, claws black. Length, 4 mm.

On alder, widely distributed but not common.

Norwich district. Hurst Green (Butler); Glanvilles Wootton (Dale).

2. **T. sexpunctata**, *Fall.* (**10-punctata**, *Fall.*)—Upper side very pale greenish yellow or rosy, with small black spots; elytra with fuscous markings, which form two irregular curved bands. Frons fuscous in the male, generally yellow in the female; forehead in both sexes with two small roundish black spots. Pronotum with a roundish black spot on each side behind, and two or four others near the front margin. Scutellum with a black triangle on each side at the

base, their apices often confluent. Elytra with an ill-defined oblique half-band running backwards from the costa near the base, another ill-defined oblique half-band running forwards from the apex of the clavus, and a spot on the base of the clavus next its suture, fuscous; on the middle of the inner margin of the clavus a roundish black spot. Membrane hyaline, with a fuscous tinge, except in the fourth apical area; vein at the apex of the costal area black, its immediate neighbourhood dark fuscous; veins bounding the second and third apical areas blackish from the apex forward. Abdomen black; hind margin of the segments yellow. Legs yellow; hind tibiæ sometimes fuscous on the apical half in the male. Length, $3\frac{1}{2}$ mm.

On sallows, not uncommon.

Norwich district, Cotswold district. Perth district (McGregor); Battle, Fairlight (Butler); Glanvilles Wootton (Dale); Leicestershire (Marshall).

3. *T. debilis*, *Dougl.*—♀. Upper side yellowish white, elytra tinged with yellow on the inner half, a spot in the apex of each of the areas of the corium and the membrane entirely fuscous; veins of the latter pale. Two points on the forehead, one in the middle of the front margin of the pronotum and one on the apex of the scutellum, black. Abdomen black; hind margins of the segments narrowly white. Legs yellowish white, claws fuscous. Length, 3 mm.

Rare. The food-plant of this species in this country does not appear to be well ascertained; in France it occurs on apple-trees.

Norwich, on beech. Darent Wood, October 2nd, on oak, Addington Hills, October 14th, on beech, females only (Douglas).

4. *T. ulmi*, *Lin.*—Upper side greenish yellow; forehead with a pair of black points in the female only; a minute black point in the middle of the front margin of the pronotum in both sexes; scutellum frequently black or blackish

in the male. Elytra with a fuscous band across the apex of the corium; membrane faintly fumose, darker round the edge, its veins black for a short distance forward from the apex. Abdomen black; hind margins of the segments narrowly yellow. Legs yellow, claws fuscous. Length, $3\frac{1}{4}$ –4 mm.

Very abundant on elm.

Norwich district, Cotswold district. Dublin (Halbert); Ireland (Haliday); Renfrewshire (Young); Highgate (Butler); Glanvilles Wootton (Dale).

5. **T. tenerrima**, *H.-S.*—Fore parts and legs yellowish white. Elytra whitish hyaline, with three broad yellow stripes, one along the costa, one just above the claval suture, and the other on the inner margin of the clavus; an ill-defined broad fuscous band, on which the whitish veins are conspicuous, crosses the apex of the corium and the base of the membrane; the latter faintly fumose, darker round the edge, its veins black for a very short distance forward from the apex. Abdomen black; hind margins of the segments narrowly yellow. Claws fuscous. Length, 3 mm.

Common on brambles.

Norwich district, Cotswold district. Dublin district (Halbert); Hastings (Butler); Glanvilles Wootton (Dale).

One or more of the yellow stripes on the elytra are sometimes wanting.

6. **T. aurovittata**, *Dougl.*—Head yellow or whitish yellow. Pronotum white, with a broad yellow stripe on each side of the disc. Scutellum yellow, sometimes with two reddish triangles on the base. Elytra yellow, with two rather broad whitish hyaline stripes, one along the costa and the other along the claval suture; a subquadrate spot in the apex of the brachial area and the membrane fuscous; veins of the latter entirely pale. Abdomen black; hind margins of the segments narrowly whitish. Legs pale yellow, claws fuscous. Length, $3\frac{1}{2}$ mm.

Occurs sparingly on oak bushes in hedges in November.

Norwich district. Glanvilles Wootton (Dale); Woking (Saunders).

7. **T. Douglassi**, *Edw.*—Head, pronotum, and scutellum pale yellow; elytra deep yellow, inclining to orange in the male, pale yellow or whitish in the female; a subcuneate spot in the apex of the brachial, suprabrachial, and subcostal areas, and the membrane, fuscous. Abdomen entirely yellow. Legs pale yellow, claws fuscous. Length, $3\frac{1}{2}$ mm.

Common on beech.

Norwich district, Cotswold district. Glanvilles Wootton, Clovelly (Dale); Morayshire (Norman).

8. **T. gratio***sa*, *Boh.*—♂. Head, pronotum, and scutellum yellowish white. Elytra yellow, a streak in the apex of the subcostal, suprabrachial, and brachial areas, and the membrane, fuscous; clavus tinged with fuscous, especially on the claval suture and the inner margin. Abdomen and legs yellow, claws fuscous. ♀ yellowish white; the entire clavus, a streak in the apex of the subcostal, suprabrachial, and brachial areas, and the membrane, fuscous. Claws fuscous. Length, $3\frac{1}{2}$ mm.

On beech, also lime, not very common.

Norwich district, Cotswold district. Battle, Ewhurst, Highgate, Barnet (Butler); Glanvilles Wootton (Dale).

9. **T. cratægi**, *Dougl.*—Pale yellow; the membrane, a small spot in the apex of the subcostal and suprabrachial areas, and the inner margin of the elytra narrowly and evenly, fuscous. Costa narrowly reddish in the male. Abdomen entirely yellow. Legs pale yellow, claws fuscous. Length, 3 mm.

Not uncommon on whitethorn.

Norwich district, Cotswold district. Morayshire (Norman); Woking (Saunders); Barnet (Butler); Glanvilles Wootton (Dale).

10. **T. Lethierryi**, *Edw.*—♂. Deep yellow inclining to orange. Elytra with the costa generally and the inner margin sometimes narrowly reddish; membrane and generally a spot in the apex of the subcostal, suprabrachial, and brachial areas pale fusco-hyaline. Hind tibiae generally tinged with pink. Claws fuscous. Appendages of the cedeagus five, three in the posterior series, two short and one long, the pair in the anterior series like those of *hippocastani*. ♀ pale yellow. Membrane and three spots on the apex of the corium pale fusco-hyaline. Length, $3\frac{1}{2}$ mm.

Occurs on various trees, but more particularly elm.

Norwich district, Cotswold district. Glanvilles Wootton (Dale); Dublin (Halbert); Paisley (Young).

The head and pronotum in highly-coloured males are yellow, sometimes tinged or marked with red; but less highly-coloured examples of that sex have the head and pronotum white and the elytra nearly resembling those of *Douglasi* male, from which they may be distinguished by the paler membrane. The structure of the male genitalia is quite characteristic. The female is always much stouter and yellower than female *rosæ*, and has not the fuscous membrane which distinguishes that sex of *Douglasi*.

11. **T. rosæ**, *Lin.*—Head and pronotum white. Scutellum yellowish white. Elytra very pale yellow, dull white more or less tinged with yellow from the suture outwards, or entirely dull white; a spot in the apex of the brachial, supra-brachial, and subcostal areas, and the membrane, very faintly tinged with fuscous. Abdomen entirely yellow. Appendages of the cedeagus four, lanceolate-acuminate, one pair a little shorter than the other. Legs pale yellow, claws fuscous. Length, $3\frac{1}{2}$ – $3\frac{3}{4}$ mm.

Very common on roses.

Norwich district, Cotswold district. Hastings, Battle (Butler); Glanvilles Wootton (Dale); Dublin (Halbert).

12. **T. salicicola**, *Edw.*—Somewhat larger and decidedly

stouter than *T. rosæ*. Very pale yellowish white; scutellum tinged with pink, at least in fresh examples. Membrane very faintly fusco-hyaline. Appendages of the cedeagus four, narrow, falcate, the tips of each pair approaching those of the other pair. Length, $3\frac{1}{2}$ – $4\frac{1}{2}$ mm.

On salallows.

Norwich district, not uncommon in autumn.

13. **T. hippocastani**, *Edw.*—♂. Upper side shining. Crown, pronotum, and scutellum sordid yellow. Elytra whitish hyaline, the corium strongly tinged with yellow from the inner margin to the subcostal area; veins of the membrane whitish, the stalk of the second apical area of normal length. Abdomen entirely yellow. Face, underside and legs pale sordid yellow, claws black. Appendages of the cedeagus four, in two pairs, posterior pair Y-shaped, the posterior arm of the letter less than half as long as the anterior arm; anterior pair divided near the base into two long narrow curved pointed unequal arms approaching at the tips, of which the posterior or upper arm is much the shorter. Length, $3\frac{1}{2}$ – $3\frac{3}{4}$ mm.

Lewisham, on underside of horse-chesnut leaves in October (Douglas).

14. **T. avellanæ**, *Edw.*—Crown, scutellum, and pronotum dull whitish, the latter frequently tinged with yellow behind. Corium entirely yellow, the costa and inner margin, and generally the veins also, distinctly reddish in the male; the distribution of the yellow pigment is uniform in the female. Membrane hyaline, with a very faint fuscous tinge, veins yellow. Abdomen yellow. Face, underside, and legs whitish, apical half of all the tarsi black in the male and frequently in the female also; this character is best seen on the underside. Appendages of the cedeagus two, falcate, simple, scarcely so long as the width of the cedeagus at the base. Length, $3\frac{1}{2}$ – $3\frac{3}{4}$ mm.

Lewisham, on underside of hazel leaves in October (Douglas).

15. *T. pruni*, *Edw.*—♂. White. Corium whitish hyaline, membrane hyaline, with a very faint fuscous tinge. Legs white. Appendages of the cedeagus two, very long, filiform, pointed, pendant along the anterior face of the cedeagus and curving upward and backward. Length, $3\frac{1}{2}$ mm.

Arminghall, near Norwich, on wild plum, 23rd September 1888.

16. *T. opaca*, *Edw.*—Upper side dull. Crown, pronotum and scutellum white or yellowish white. Elytra opaque white, their basal two-thirds more or less strongly tinged with yellow from the inner margin almost to the costa; veins of membrane yellow, but difficult to see owing to its opacity, the second apical area not stalked in the male and but slightly so in the female. Face, underside and legs pale yellowish white, claws black. Abdomen entirely yellow. cedeagus simple, without appendages. Outline of the genital styles resembling the human leg from the knee downwards with a pointed toe and the heel drawn out into a spur, the calf of the leg well developed. This form of style occurs also in *T. Douglasi*, and appears to be correlated with the absence of appendages to the cedeagus. Length, $3\frac{1}{2}$ – $3\frac{3}{4}$ mm.

Lewisham, on underside of horse-chesnut leaves in October (Douglas).

17. *T. quercus*, *Fab.*—Upper side white; a line just within the front margin of the crown, a semicircular line on the front and a roundish spot on the disc of the pronotum, a triangle on each side of the base of the scutellum, three large spots on the clavus, and two on the corium, orange-red; the apical half of the subcostal area, the angular veins, and those on the basal half of the membrane, margined with fuscous. On the costa near the middle a short oblique black line. Abdomen yellowish white, the basal segments more or less widely black. Length, $3\frac{1}{2}$ mm.

This handsome little species is very common on oak.

Norwich district, Cotswold district. Ireland (Haliday); Renfrewshire (Young); Dallington Forest, Totteridge, Barnet (Butler); Glanvilles Wootton (Dale).

18. *T. nitidula*, *Fab.*—Pale yellow; the scutellum, a broad band across the base of the elytra, and another across the apex of the corium, blackish brown. Membrane whitish hyaline. Claws fuscous. Length, $3\frac{1}{2}$ – $3\frac{3}{4}$ mm.

Sometimes common on wych-elm, but very uncertain in its appearance. I once took it on Lombardy poplar.

Norwich district, Cotswold district. Leicester (Marshall); Ireland (Haliday); Glanvilles Wootton, Castle Eden (Dale).

The variety *Norgueti*, Leth., which has the space between the two bands on the elytra filled up with blackish brown, is rare.

19. *T. geometrica*, *Schr.*—Yellow; elytra with a narrow regular dark brown stripe along the claval suture. Scutellum with a dark brown stripe on each side, and the side margins of the apical half narrowly dark brown. Membrane fusco-hyaline, third and fourth apical areas fuscous. Claws fuscous. Length, $3\frac{1}{2}$ –4 mm.

On alder, not common.

Norwich district. Paisley, Renfrewshire (Young); Leicestershire, and London district (Marshall); Woking (Saunders); Gomshall (Butler); Glanvilles Wootton (Dale).

Zygina, *Fieb.* (Pl. II., fig. 24.)

Body generally very slender. Crown as in the preceding genus. Elytra much longer than the abdomen; first apical area very small, almost obsolete; the third oblong, parallel-sided; appendix wanting. Submarginal wing-vein incomplete; first and second wing-veins confluent before the apex, and running to the margin as one vein; third wing-vein simple, joined to the second by a straight transverse vein,

the vein connecting it with the sub-marginal vein very oblique.

A genus containing a few small and delicate species, readily separable from their allies by their venation.

TABLE OF SPECIES.

1. (4) Species yellow, without markings.
2. (3) Elytra in the male bright yellow. Species living on alder 1. *alneti*.
3. (2) Elytra in the male pale flavo-hyaline. Species living on hazel 2. *coryli*.
4. (1) Species not yellow, without markings.
5. (10) Elytra marked with red.
6. (9) Abdomen entirely pale, third apical area not more than half as wide as fourth.
7. (8) Hind tarsi in the male black on the apical half only 3. *flammigera*.
8. (7) Hind tarsi in the male entirely black 4. *tiliae*.
9. (6) Abdomen above black, sides yellow; third apical area about two-thirds as wide as fourth 5. *hyperici*.
10. (5) Elytra without red markings.
11. (2) Crown with two round black spots, apex of scutellum pale 6. *parvula*.
12. (11) Crown without black spots, apex of scutellum black. 7. *scutellaris*.

1. **Z. alneti**, *Dahl*.—Fore parts and legs pale yellow. Elytra bright yellow in the male, flavo-hyaline in the female. Claws fuscous. Length, $3\frac{3}{8}$ mm.

Common on alder.

Norwich district, Cotswold district. Ireland (Haliday) Hurst Green (Butler).

2. **Z. coryli**, *Tollin*.—Fore parts yellowish white.

Elytra very pale flavo-hyaline in both sexes. Claws fuscous. Length, $3\frac{3}{4}$ mm.

Common on hazel.

Norwich district, Cotswold district; undoubtedly overlooked elsewhere. This species is usually put as a synonym of the preceding, but as they are in life perfectly distinct in facies and habitat, I have kept them separate here. I have not detected any differential character in the male genitalia of the two forms.

3. *Z. flammigera*, (*Geoff. blandula*, *Auct.*).—Crown and pronotum whitish yellow, with a fuscous or carmine-red middle stripe, which gradually widens from the apex of the crown to the base of the pronotum, and is generally divided down the middle by a pale line. Elytra whitish hyaline, with a fuscous zigzag stripe more or less covered with carmine-red atoms, on the inner margin; second and fourth apical areas generally fumose. Abdomen pale yellow. Legs whitish; the entire third joint of the hind tarsi and the apex of the second black in the male. Length, $2\frac{3}{4}$ -3 mm.

Very common in autumn in mixed hedges and on various low plants.

Norwich district, Cotswold district. Woking (Saunders); Ireland (Haliday); Hastings, Chobham (Butler); Glanvilles Wootton, Charmouth (Dale).

Occasionally the carmine-red atoms extend to the veins of the corium, but they are sometimes almost entirely absent.

4. *Z. tilisæ*, *Fall.*.—Very similar to the preceding, but differs in the following particulars: the crown and pronotum are more decidedly yellow, and the stripe on them is almost obsolete, the carmine-red atoms on the elytra are much more sparingly distributed, and the hind tarsi of the male are black, except at the extreme base. Length, 3 mm.

I have never taken this species in summer or autumn, but

have beaten it from ivy and spruce fir in the spring in nearly equal numbers with *Z. flammigera*.

Norwich district. Glanvilles Wootton, Charmouth (Dale).

5. *Z. hyperica*, *H.-S.*—♂. Crown and pronotum yellow sometimes with a black line down the middle of the former and a dusky stripe down the middle of the latter. Scutellum yellow, its apex narrowly black. Elytra deep yellow, the membrane hyaline faintly tinged with fuscous. Abdomen yellow, dorsal segments blackish in the middle.

♀. Crown and pronotum whitish yellow, with a dark purple-brown middle stripe, which gradually widens from the apex of the crown to the hind margin of the pronotum. Scutellum purple-brown. Elytra very pale flavo-hyaline, the inner margin as far as the apex with a broad blood-red stripe. Abdomen above black, sides yellow. Legs yellow. Length, $2\frac{1}{2}$ mm.

On *Hypericum* in autumn, rare.

Norwich district, Cotswold district. Swithland Woods, Leicestershire (Marshall); Darent Wood, October (Douglas).

6. *Z. parvula*, *Boh.*—Head yellow, sides and apex of the frons and two round spots on the crown black. Pronotum fuscous, with three oblong oval yellow spots on the front margin; hind margin broadly whitish. Scutellum yellow with a large black triangle on each side of the base. Elytra whitish hyaline, a broad stripe in the clavus and another in the brachial area fuscous; second and fourth apical areas fumose. Abdomen black; hind margins of the segments very narrowly whitish. Legs whitish, claws fuscous, Length, 3 mm.

Amongst low plants in damp places, moderately common.

Norwich district, Cotswold district. Epping Forest, Birch wood (Marshall); Chobham (Saunders); Glanvilles Wootton, Lulworth, Torquay (Dale); Shiere (Butler).

7. *Z. scutellaris*, *H.-S.*—Frons and forehead fuscous, the

former with a broad yellow middle stripe on the lower half, and some traces of transverse yellow side-lines, the latter with a yellow crescent-shaped spot on each side; cheeks and temples yellow; clypeus dark fuscous or black, except at the extreme base; crown yellow. Pronotum greenish yellow in front, whitish behind; across the middle a fuscous band, which is much dilated in the middle towards the front margin. Scutellum greenish yellow, with a black triangle on each side of the base; apex narrowly black. Elytra whitish hyaline, the clavus, the costal area, and the basal half of the subcostal area tinged with greenish yellow; veins greenish yellow. Abdomen black; hind margins of the segments very narrowly yellow. Legs greyish yellow, claws fuscous. Length, 3 mm.

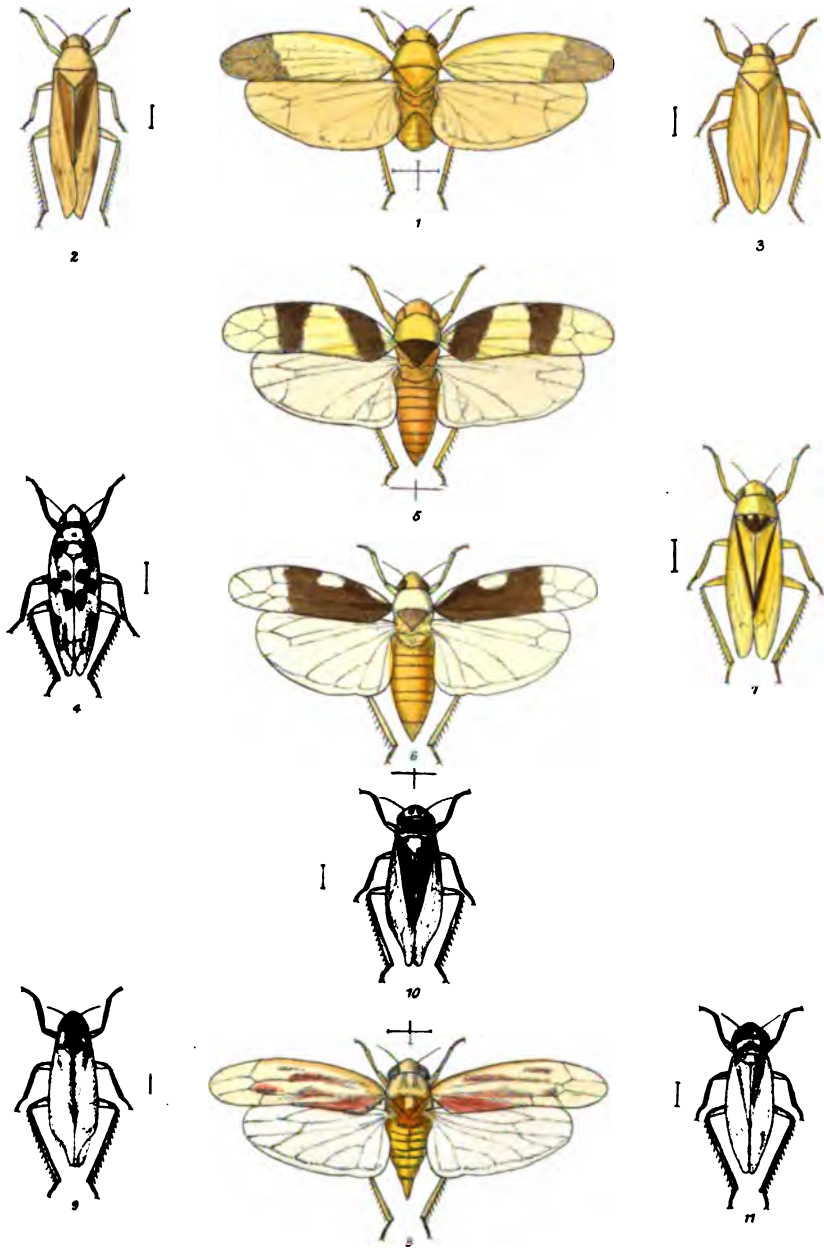
On fine grasses in dry places, usually local; very common in the Cotswold district. Norwich district. Ewhurst (Butler); Glanvilles Wootton, Lulworth (Dale); Swithland Woods, Leicestershire, Swanage (Marshall); Woking (Saunders).

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

PLATE XXV.

- FIG. 1. *Typhlocyba* Douglasi, Edw.
2. „ *gratiosa*, Boh.
3. „ *cratægi*, Dougl.
4. „ *quercus*, Fab.
5. „ *nitidula*, Fab.
6. „ „ var., Norgueti, Leth.
7. „ *geometrica*, Schr.
8. *Zygina* *tiliæ*, Geoffr.
9. „ *hyperici*, H-S.
10. „ *parvula*, Boh.
11. „ *scutellaris*, H-S.



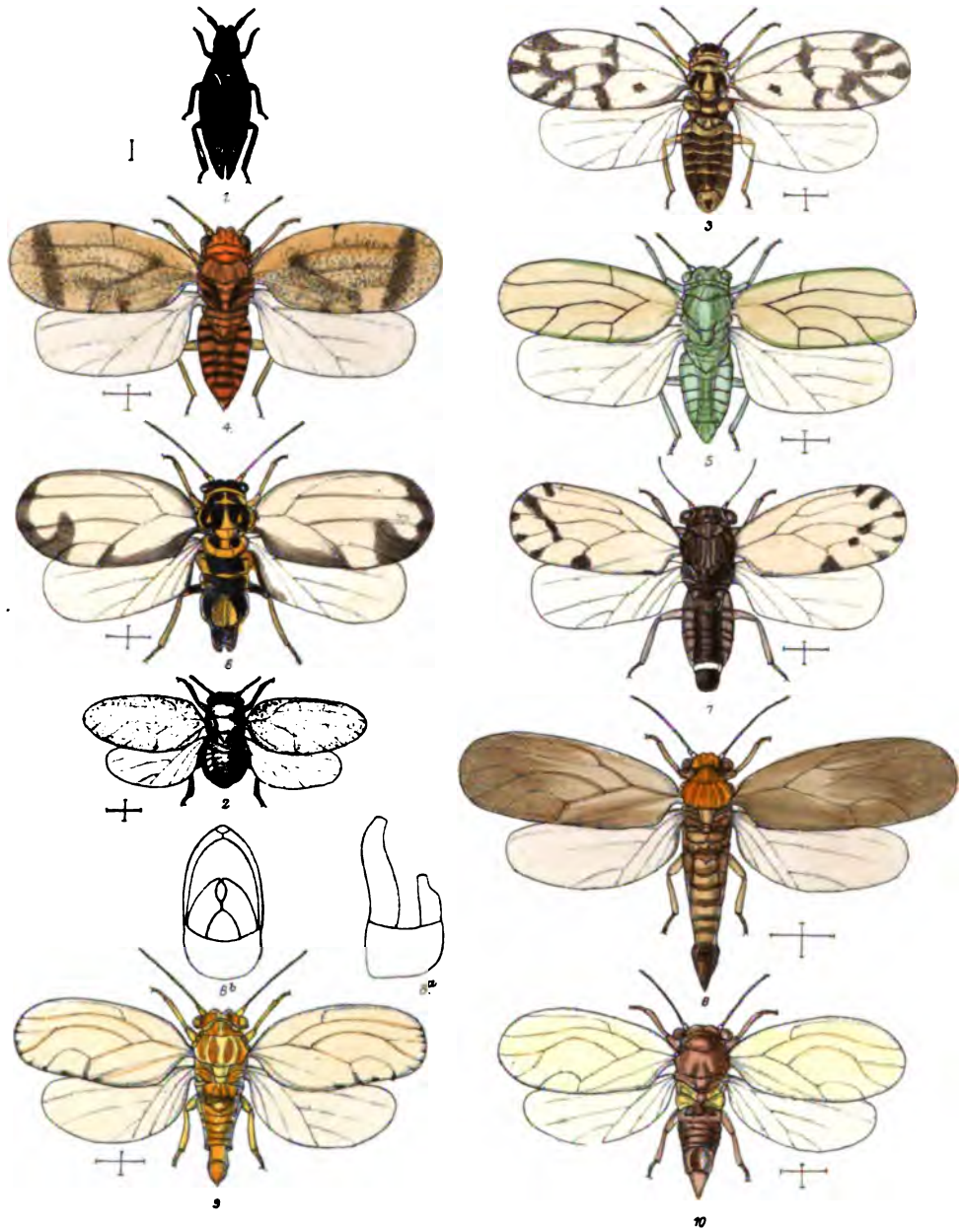
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PLATE XXVI.

- FIG. 1. *Livia juncorum*, Latr.
2. *Rhinocola aceris*, Lin.
3. *Aphalara nebulosa*, Zett.
4. „ *exilis*, Web. and Mohr.
5. „ *nervosa*, Först.
6. *Psyllopsis fraxini*, Lin.
7. *Psylla concinna*, n.s.
8. „ *brunneipennis*, n.s.
8a. „ „ (outline of male genitalia
viewed from the side).
8b. „ „ (do. viewed from behind).
9. „ *crataegi*, Schr.
10. „ *costalis*, Flor.



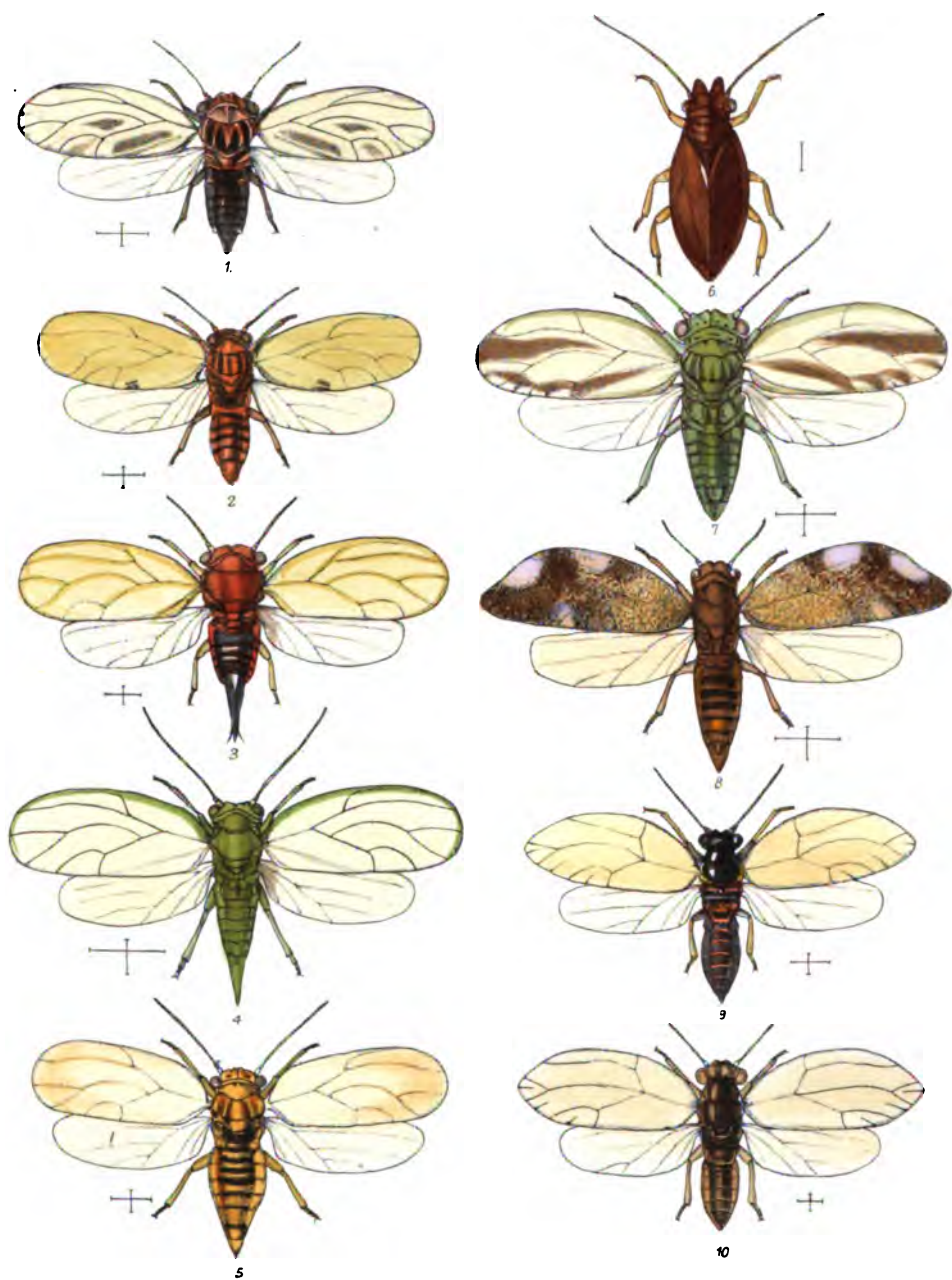
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PLATE XXVII.

- FIG. 1. *Psylla simulans*, Först.
2. „ *pyricola*, Först.
3. „ *venata*, n.s.
4. „ *alni*, Lin.
5. „ *spartii*, Guér.
6. *Livilla ulicis*, Curt.
7. *Arytoena genistæ*, Latr.
8. *Trichopsylla Walkeri*, Först.
9. *Trioza galii*, Först.
10. „ *rhamni*, Schr.



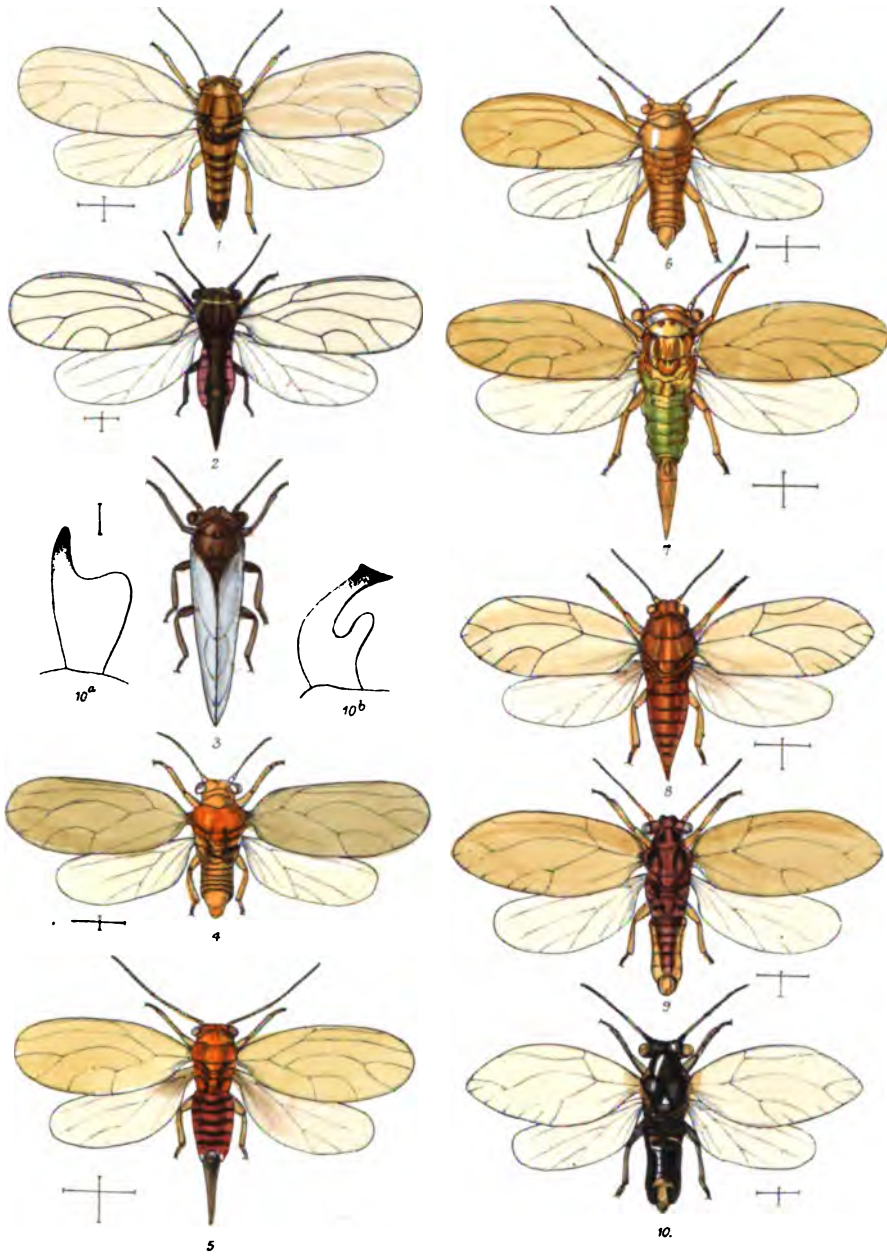
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PLATE XXVIII.

- FIG. 1. *Psylla visci*, Curt. (dark form).
2. „ *melanoneura*, Först.
3. „ *rhamnicola*, Scott.
4. „ *Hartigii*, Flor.
5. „ *betulæ*, Lin.
6. „ *Försteri*, Flor.
7. „ *buxi*, Lin.
8. *Trioza remota*, Först.
9. „ *albiventris*, Först.
10. „ *centranthi*, Vall.
10a. „ „ (male forceps seen from the
side).
10b. „ *munda*, Först (do.)



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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 tibiae 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

P

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 *aedeagus* 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, $2\frac{1}{4}$ – $2\frac{3}{8}$ 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.	. . .	<i>Rhinocola.</i>
Stigma wanting.	. . .	<i>Aphalara.</i>

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, 1-1½ 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, 2-2½ 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. <i>picta</i> . |
| 5. (4) Length 2– $2\frac{1}{4}$ mm. Head and thorax emerald green. | 6. <i>nervosa</i> . |
| 6. (3) Vein 2 ending in a black point. | |
| 7. (8) Subcostal not ending in a black point; elytra unbanded. | 4. <i>calthæ</i> . |
| 8. (7) Subcostal ending in a black point; elytra with a fuscous subapical band. | 3. <i>exilis</i> . |
| 9. (2) Elytra with a fuscous spot in the middle of cell 1. | 2. <i>nebulosa</i> . |
| 10. (1) Head and thorax pilose. | 5. <i>artemisiae</i> . |

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 fuscohyaline 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*, *Hypochaeris 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 $1\frac{1}{2}$ – $2\frac{1}{2}$ mm.

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

Food-plants; *Polygonum aviculare*, *P. amphibium*, *P. hydro-piper*, 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– $2\frac{1}{2}$ 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 2-2½ 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. | <i>Psyllopsis</i> . |
| 4. | (3) | Stalk of the cubitus much shorter than the basal piece of the subcostal. | <i>Psylla</i> . |
| 5. | (2) | Stigma wanting. | <i>Arytaina</i> . |
| 6. | (1) | Elytra coriaceous, strongly convex. | <i>Livilla</i> . |

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, with- | |
| out markings | 1. <i>fraxinicola</i> . |
| Upper fore-parts red-yellow, with | |
| black markings | 2. <i>fraxini</i> . |

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, $2\frac{1}{2}$ –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 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. <i>concinna</i> . |
| Elytra not as above. | 3. |

2. Length, 2 mm. Species lives on blackthorn. 2. *pruni*.
Length, $2\frac{1}{2}$ -3 mm. Species lives on willow. 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. *cratagi*.
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 $2\frac{1}{2}$ -3 mm. Species lives on willow. 7. *salicicola*.
Length 3-3 $\frac{1}{2}$ 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 willow. 11.
Species living on mistletoe. 11. *visci*.
Species living on sea-buckthorn. 12. *hippophaes*.
Species living on willow. 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 $2\frac{1}{2}$ -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 $3\frac{1}{2}$ mm. Species lives on box. 22. *buxi*.
 Length $2\frac{1}{2}$ 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*, *Först* (*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, $2\frac{1}{2}$ 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, $2\frac{1}{2}$ 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 $2\frac{1}{2}$ –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 $3-3\frac{1}{2}$ 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 lacteohyaline, 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 $2\frac{1}{2}$ 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, $2\frac{1}{2}$ 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, $3\frac{1}{2}$ –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 attenuate 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, $2\frac{3}{4}$ 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. *Tibiae* 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, $1\frac{1}{4}$ – $1\frac{1}{2}$ 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, $2\frac{1}{2}$ –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, *Schmëdbg.*—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, $3\frac{1}{2}$ 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, $2\frac{1}{2}$ 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. *Trioxa.*

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, $3\frac{1}{2}$ –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. *thamni*.
4. Hind margin of the genital plate in the male not pro-
duced 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, $2\frac{1}{2}$ –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, $2\frac{1}{4}$ –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, $2\frac{1}{2}$ 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, $2\frac{1}{4}$ –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.

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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, $2-2\frac{1}{2}$ 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, $2\frac{1}{2}$ 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 *Knaulia 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).

APPENDIX.

ADDENDA ET CORRIGENDA.

Page 97, delete the last two lines and after paragraph 8 (11) *add*—

8a. (10a) Both pale bands reaching the costa.

9. (10) The brown band across the middle of the elytra not reaching the costa. 4. *distinguendus*

10. (9) The brown band across the middle of the elytra reaching the costa. 5. *tremulae*

10a. (8a) Neither of the pale bands reaching the costa.

5a. *cupreus*

Page 102, *after* line 12 from the top *add*—

5a. **I. cupreus**, *Kbm.*—♀. Elytra red-brown with two white bands, one before and the other behind the middle, neither of them reaching the costa. Head yellow, with rust-brown markings, in the middle of the crown and forehead a large subquadrate fuscous spot, a black point on the crown near each eye. Pronotum yellow-brown becoming yellow on each side in front, a feeble trace of a pale middle line. Scutellum yellow with rust-brown markings, the discal impression Λ -shaped. Elytra: corium red-brown, an irregular white band before the middle commencing in a suboval spot which includes the apical fourth of the anal vein and passing in the form of two other contiguous suboval spots, of which the distal is the smaller, as far as the inner branch of the cubital vein, and another white band, narrower and more regular than the other, from the apex of the clavus as far as the lower edge

of the first subapical area, first apical area much longer than the second, first subapical area oblong; membrane fumose; veins white where they cross the pale bands, otherwise red-brown. Abdomen above blackish, the hind margins of the segments narrowly pale, hind margin of the last ventral segment a little convex. Legs red-yellow, claws blackish. Length (including elytra), 5 mm.

Described from a single female taken by Mr. Thouless off *Salix alba* at Brandon, Norfolk, on the 25th of May, 1896. The capture of this species does not appear to have been recorded since the time of Kirschbaum, who took one female at Wiesbaden in October.

Page 106, *after* the word eye in line 4 from the top, *add* :

In the mature insect white, with a broad black middle stripe.

Page 110, delete lines 13 and 14 from the top and *after* paragraph 1 (4) *add* :

1a (3) Pronotum not transversely striate.

2 (2a) Pronotum pale, with a black point near each
hinder angle 1a. *sinuata*

2a (2) Pronotum pale, with a middle stripe and a large
triangle on each side of the base brown

1. *puncticeps*

3 (1a) Pronotum transversely striate

2. *venosa*

After line 16 from the top *add* :

1a. ***A sinuata***, *Muls. R.* ♀. Bone-white, a black point near each hinder angle of the pronotum, veins of the elytra dark brown. Head bone-white, facial sutures black, frons with a pair of curved longitudinal brown lines connivent at the ends, an arcuate brown transverse line just below the ocelli giving off in the middle a linear projection to join a brown spot in the middle of the crown, a triangular brown spot near the inner edge of each eye, and a black point on each side of the crown. Pronotum very closely and finely punctured with a sprinkling of larger shallow punctures, bone-white with a black point near each hinder angle.

Scutellum bone-white with a black transverse impression. Elytra bone-white, veins of the corium narrowly, of the clavus broadly, brown. Abdomen above black, margins the segments narrowly pale. Legs sordid bone-white, claws blackish.

Length (including elytra), $3\frac{1}{2}$ mm.

Taken off Pellitory of the Wall somewhere in the Lizard District (C. W. Dale *in lit*).

Page 145, *after* paragraph 7 (6), line 11 from the bottom, *add*:

7a (7b) Elytra much shorter than the abdomen, leaving uncovered in the male the genital segment and in the female the genital segment and the preceding one. Genital plates reaching nearly three times as far as the valve; hind margin of the last ventral segment in the female nearly straight with two small notches one on each side of the middle and having between them a small rounded projection, each notch bounded outwardly by a black spot 2 a. *collinus*.

7b (7a) Elytra in both sexes as long or longer than the abdomen.

Page 150, *after* line 7 from the top *add*:

2a. **D. collinus**, *Dahl*.—Upper side greenish-yellow in the male, greyish yellow in the female, costa more or less broadly white. Crown in the male distinctly shorter than in the female, about equal in length to its width at the base, about one-third longer in the middle than at the sides, free sides distinctly arcuate, angle blunt, interocellar line obsolete or wanting. Frons very pale brownish yellow with a middle stripe and the side lines whitish, the sutures black. Pronotum very little shorter than the crown. Elytra much shorter than the abdomen, leaving uncovered in the male the genital segment and in the female the genital segment and the preceding one, their inner apical angle obliquely subtruncate, apical areas hyaline

wider than long, veins yellowish in the male, whitish in the female. Legs greyish yellow, hind tibiae with black points on the outer side. ♂; abdomen pale, dorsal segments with a transverse series of 4-6 dark points, ventral segments each with a large subquadrate black spot in the middle; genital plates yellow long triangular reaching nearly three times as far as the rounded triangular valve, separately rounded at the apex, their distal half with a feeble impressed line running parallel with the outer edge. ♀; abdomen pale, hind margin of the last dorsal segment narrowly blackish, basal ventral segments more or less blackish at the base; last ventral segment a little longer than the preceding, its hind margin feebly concave with two small notches one on each side of the middle, and having between them a small rounded projection, each notch bounded outwardly by a black spot. Length, $3\frac{1}{2}$ - $4\frac{1}{2}$ mm.

This interesting addition to our Fauna has been taken by Mr. Edward Saunders at St. Helens, Isle of Wight; it appears to be generally distributed in Central Europe.

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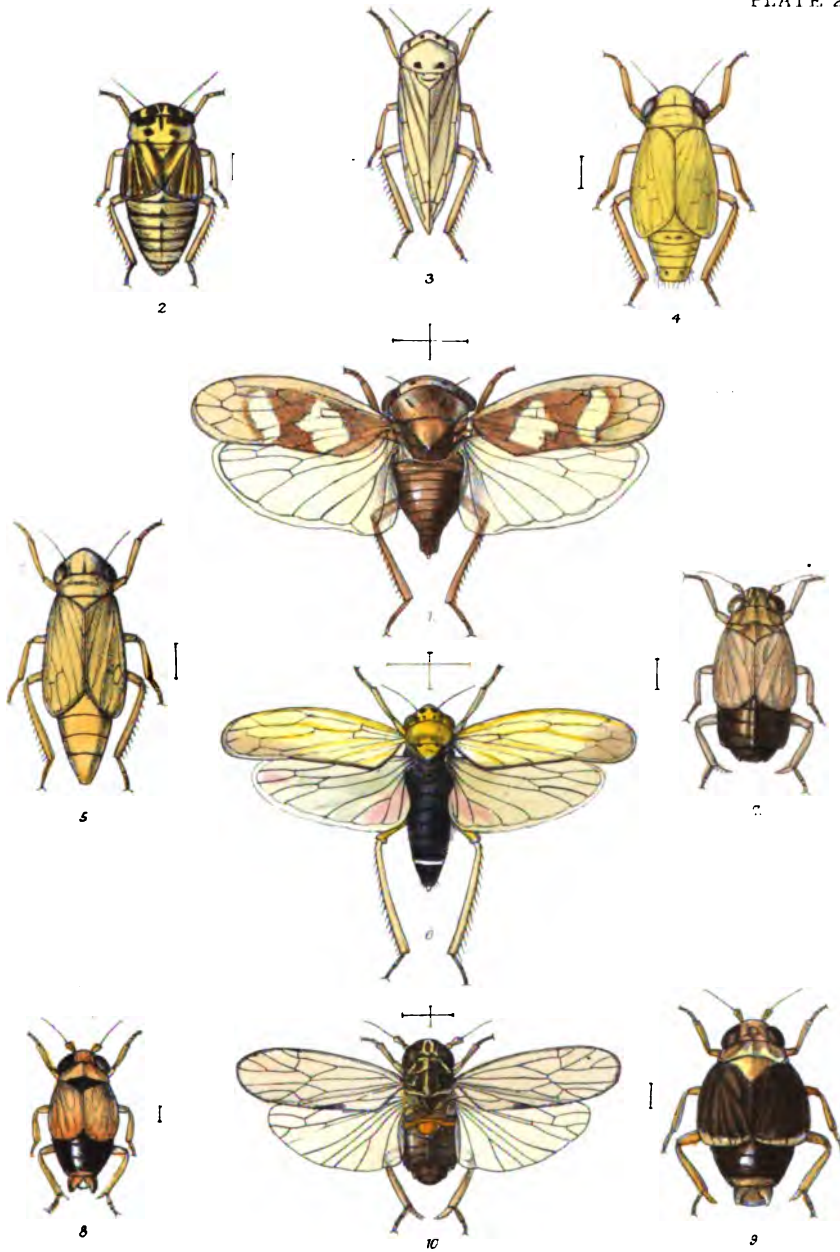
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PLATE XXIX.

- FIG. 1. *Idiocerus cupreus*, Kbm.
2. *Agallia brachyptera*, Boh.
3. „ *sinuata*, Muls. R.
4. *Deltocephalus collinus*, ♂ .
5. „ „ ♀ .
6. *Cicadula Dahlbomi*, Zett. ♀ .
7. *Liburnia Boldi*, Scott.
8. „ *Dalei*, Scott.
9. „ *niveimarginata*, Scott.
10. „ *striatella*, Fall. (macropterous form).



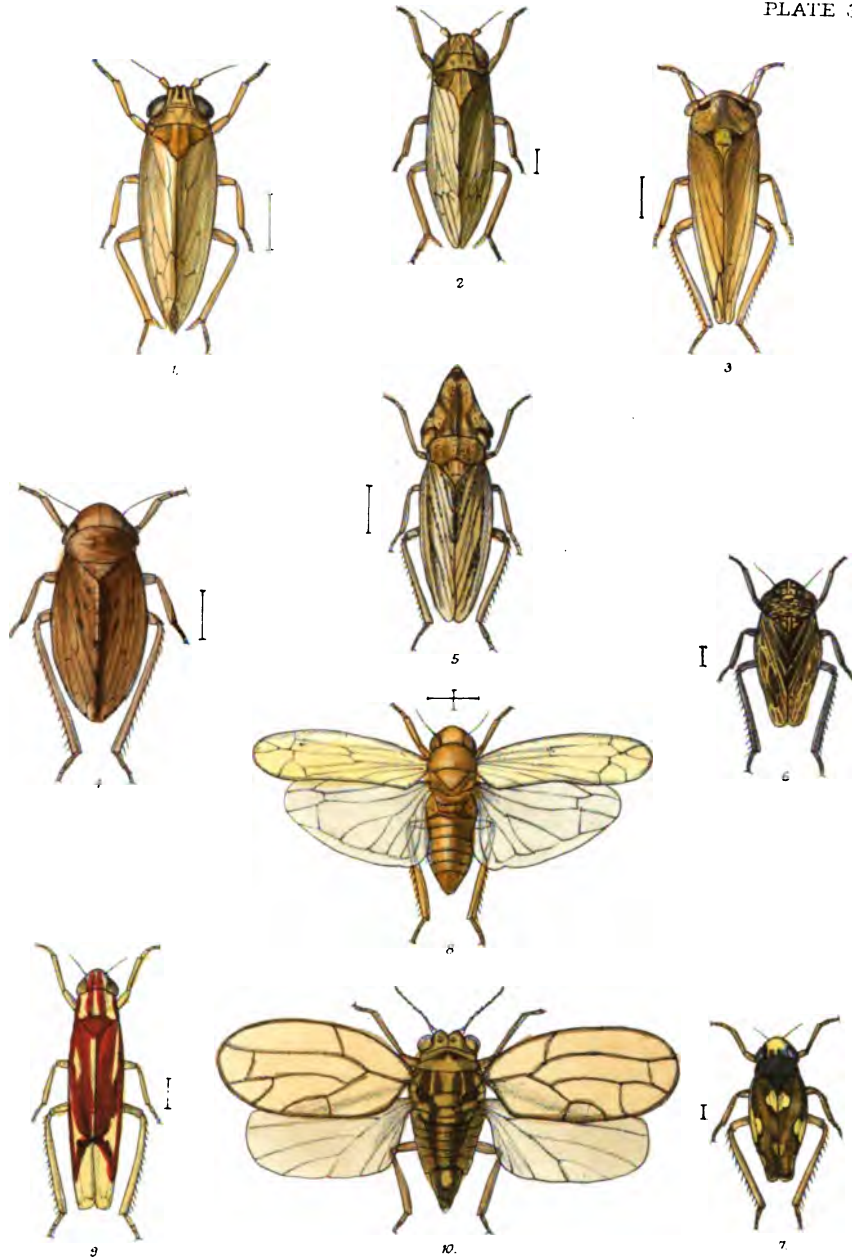
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PLATE XXX.

- FIG. 1. *Dicranotropis hamata*, Boh. (macropterous form).
2. *Liburnia scutellata*, Scott.
3. *Pediopsis nassatus*, Germ.
4. *Strongylocephalus Megerlei*, Scott.
5. *Eupelix cuspidata*, var. *spathulata*, Germ.
6. *Thamnotettix striatulella*, Edw.
7. *Eupteryx notatus*, Curt.
8. *Typhlocyba Lethierryi*, Edw.
9. *Zygina flammigera*, Geoffr.
10. *Aphalara picta*, Zett.



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