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yellow, spotted with black, and which Shaw and Denon have figured in the accounts of their voyages in Africa; they then reduce them to powder, which they use as flour, as I learn from M. Savigny. These two species, and some others, have a conical prominence upon the prothorax, and compose the genus Acrydium. Amongst those which do not present this character, and in which the antennae are equally filiform, some have the wing-covers and wings perfect in the two sexes, and belong to the genus which I have named *Edipoda*. In this number are *G. stridulus*, *G. caeruleus*, [*G. flavipes*, and a great number of smaller species found in this country, usually called Grasshoppers, but distinguished by their shorter antennae.]

Other Acrydia, similarly winged and with filiform antennae, have the upper part of the prothorax strongly elevated, very compressed, forming a sharp crest, rounded and prolonged into a point behind. Foreign countries possess numerous species, one only of which, and of smaller size, is found in the south of France (*A. armatus*, Fischer.)

In the others, one of the sexes, at least, has the wing-covers and wings very short, and in no wise fitted for flight. I have formed for these a new generic group, named *Podisna*.

The Acrydia which have the antennae thickened at the tips, either in both sexes or in only one of them, are formed also into a peculiar genus, *Gomphocerus*, by Thunberg. *G. sibiricus*, and other small British species.

In the second division of the genus Acrydium, the prosternum receives in a cavity a part of the under-side of the head; the tonguelet is quadrifid, and the tarsi have no pulvillus between the ungues; the antennae have only 13 or 14 joints; the thorax is prolonged behind like a large scutellum, which is sometimes longer than the entire body, and the wing-covers are very small. These Orthoptera form the genus *Tetrix*, Latr. (*Acrydium*, Fab., part of *Gryllus bulla*, Linn.), which is composed of very small species.

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**THE SEVENTH ORDER OF INSECTS,—**

**THE HEMIPTERA (RHYNgota, Fabr.),—**

Terminate in our system the numerous division of insects furnished with wing-covers, and being the only ones among them which have neither mandibles nor maxillae, properly so called, [that is, fitted for biting]. A tubular articulated tongue, cylindrical or conical in its form, curved downwards, or directed under the breast, having the appearance of a kind of rostrum; presenting throughout its whole upper face, when stretched forward, a gutter, or canal, out of which three scaly, stiff, slender, and pointed setæ may be withdrawn, and which are covered at the base by a tonguelet; these setæ form unitedly a sucker, resembling a sting, having for its sheath the tubular piece above described, and in which it is kept by means of the superior tonguelet [or labrum], situated at its base. The inferior seta is composed of two threads united into one at a short distance from their origin; thus the number of the pieces of the sucker is, in reality, four. M. Savigny considered that the two superior setæ, or those which are separate, represent the mandibles of the biting insects, and that the two threads of the inferior seta answer to the maxillae (or rather, as it appears to me, to their terminal lobes, which in the Bees and Butterflies are transformed into an elongated filament); hence the lower lip is replaced by the tubular sheath of the sucker, and the triangular piece at the base becomes the labrum. The tonguelet, properly so called, also exists, and under a form analogous to that of the preceding piece, but bifid at the tip (see *Cicada*); the palpi are the only organs which have entirely disappeared, and vestiges of them are perceived in Thrips, [which, however, are now proved to belong to an order distinct from the present; palpi, small and inarticulate, also exist in some of the Hydrocorisae].

The mouth of the Hemiptera is, therefore, fitted only for extracting by suction fluid matters: the delicate threads of which the sucker is formed pierce the vessels of plants and animals, and the
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nutritive fluid, successively compressed, is forced up the main canal, and arrives at the cesophagus; the sheath of the sucker is often elbowed, or forms an angle. Like other sucking insects, the Hemipectera possess salivary vessels.

In the majority of the insects of this order the wing-covers are carnosaceous, or crustacean, with the posterior extremity membranous, and forming, as it were, a kind of supplemental piece; they nearly always cross each other: those of other Hemipectera are merely thicker and larger than the hind wings, semi-membranous, like the wing-covers of the Orthoptera, and sometimes opaque and coloured, sometimes transparent and veined. The wings have several longitudinal folds.

The composition of the thorax begins to exhibit the modifications which we meet with in the following orders. Its anterior segment, hitherto known under the name of corselet (thorax, or more strictly, prothorax), is in many of much less extent, and is incorporated with the second, which is equally exposed.

Many possess ocelli, but their number is generally only two.

The Hemipectera [like the Orthoptera] exhibit to us, in their three states, the same forms and habits. The only change they undergo consists in the development of wings, and an increase in the size of the body.

I divide the order into two sections [Heteroptera and Homoptera, regarded as distinct orders by many English authors, under the names of Hemipectera and Homoptera].

In the first section, Heteroptera, the rostrum arises from the front of the head, the wing-cases are membranous at the extremity, and the first segment of the thorax is much longer than the others, and forms itself by itself the corselet.

The wing-covers and wings are always horizontal, or slightly inclined.

This section is composed of two families [Geocorisæ and Hydrocorisæ]. The first,

Geocorisæ (or Land-bugs),—

Have the antennæ exposed, longer than the head, and inserted between the eyes, near their inner margin; the tarsi have [generally] three joints, the first of which is often very short. They form the genus

Cimex, Linn.,—

Some of which, Longilabres, have the sheath of the sucker composed of four distinct and exposed joints; the upper lip is considerably prolonged beyond the head, like an awl, and transversely striated on the upper side; the tarsi have always three distinct joints, the first equal in length to, or longer than the second. These species emit, in general, a very disagreeable scent, and suck other insects. Sometimes the antennæ, always filiform, are composed of five joints; the body is generally short, oval, or rounded.

Scutellera, Linn.,—

In which the scutellum covers the abdomen. Cimex luscatus, Linn. [a reputed British insect].

Pentatoma, Oliv., in which the scutellum covers only a portion of the upper-side of the abdomen. This genus, as proposed by Olivier, comprises five others in the Systema Regniotarum of Fabricius; but his groups are imperfectly characterized and badly arranged. His genera Atlis and Halis are Pentatoma, which have the head more prolonged, and advanced in front like a snout, more or less triangular. The type of the former is Atlis accuminata [a rare British species], which differs from the rest in having the antennæ covered at the base by the anterior and detached margin of the under-side of the thorax, and by the scutellum of much larger size, whereby this species more nearly approaches Scutellera. His genus Cythana has the head seen from above, broad, semicircular; the thorax transversely square, scarcely narrower in front than behind, and the tibiae are often spinose. These species are found on the ground; some other species may also be united, which have the sternum neither keeled nor spined: such are Cimex ornatus and oratus, [handsome rare British species, forming Hahn’s genus Eurydema].

Other Pentatoma, having the mesosternum elevated in the manner of a keel, or exhibiting a point like a spine, are generally distinguished under the name of Edepes, employed by Fabricius. Many of the species which he introduces into this genus possess this character, which is also found in some of his species of Cimex, as P. hemorrhoioidalis, Linn. [the type of Curtis’s genus Acanthosoma, and P. griseus, the type of Laporte’s genus Raphigaster].

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The female of the last-named species protects her young with great care, leading them about as a hen does her chickens.

*Heterosexia*, Latr., is formed for the reception of a species from Cayenne, having the head cylindrical, the anterior tibiae broad and palette-like. *Canquius*, Fabr., as shown by the recent observations of M. Alexandre Lefèbvre, is composed of small South American insects, not yet arrived at their full development, having the body rather compressed, and very convex above, concave beneath, and the ocelli, as well as the wings, wanting.

The preceding insects form the family *Pentatomidae*, Leach; *Pentatomidae* and *Scutelleridae*, Laporte; and *Sentuli*, Burmeister. The number of genera into which they have been divided by these authors, as well as by Hahn, in his *Die Wanzenartigen Insecten*, is very greatly increased, and has probably been carried too far.*

Sometimes the antennae have only four joints, and the body is ordinarily oblong. In some of these the antennae are filiform or clavate. Some exotic species approach the preceding in the general form of the body, being rather ovate than oblong, and are distinguished from all the following by being either very flat, membranous, with the margins very strongly dilated and angular, or by having the prothorax posteriorly prolonged into a truncated lobe, and the sternum corneous. Such is *Texteratones*, Lep. and Serv. Type, *Edessa papillosa*, Fab.

*Disitor*, Latr., has similarly 4-jointed antennae, but the thorax is not posteriorly lobed. (*Edessa obscura*, maent., &c.)

*Phaen*, Lep. and Serv., is quite flat and membranous, with the sides of the body dilated and angular, the anterior extremity forming a flattened, truncated hood, hiding the antennae, which are very short, apparently 3-jointed, and elongated. [*P. corticata*, a singular Brazilian insect.]

All the others have the body generally oblong, and do not exhibit such characters as the last group. Some of these have the antennae inserted near the lateral and superior margin of the head; the ocelli are close together, or at the same distance apart as they are from the eyes.

*Coreus*, Fab., has the body oval; the last joint of the antennae ovoid or fusiform, often thicker and not longer than the preceding. *C. marginatus*, Geoff. [a common English species]. From the proportions of the joints of the antennae the species may be thus subdivided. *Gonocerus*, with the third joint of the antennae compressed and angular at the sides,—*C. sulcicornis*, insidiat., &c.; *Syronastes*, with the third joint of the antennae simple, and longer than the fourth,—*C. marginatus*, &c.; *Coreus*, with the last joint of the antennae much longer than the fourth, and compressed.—*C. hirticornis*, &c.

*Holygaster*, Lep. and Serv., has the second and third joints of the antennae plate-like. [Exotic species.]

*Paepalis*, Lep. and Serv., has the third joint alone of this form.

*Anisoscelis*, Latr., has the antennae filiform, without dilatation; some have the posterior tibiae with a broad membrane.— *L. membranaceus*, F., &c. The others, *L. valgus*, &c., have not, [but the hind femora are often grotesquely thickened. These are exotic species of large size.] Some of the species, with long slender antennae, form my genus *Nematopatus*.

*Aglyde*, Fab., has the body long and narrowed; the eyes prominent; the ocelli close together, and the thorax slightly broader behind. [*A. cecaturus*, a rare British species].

*Leptocorisa*, Latr. [part of *Gervis*, Fab.], has the body long and filiform; the antennae and legs are also greatly elongated, and the former straight.

*Nedcle*, Latr. (*Bercyus*, Fab.), has the antennae elbowed. [Small singular insects, three or four species of which occur, but rarely, in this country. *C. tipularius*, Linn.]

We now pass to the *Geocorinæ* which have the antennae similarly filiform, or thickened at the tips, and 4-jointed, but inserted lower than in the preceding; the ocelli are close to the eyes, and the apical membrane of the hemelytra has only four or five nerves. [These form the family *Lypocoridae*.]

*Lygus*, Fabr., has the head narrower than the thorax, which is narrowed in front,—*C. equestris*, Linn. *C. apterus*, Linn.; red, with the head, a spot on the thorax, and two on the hemelytra, black; the wings-covers without apical membrane, but occasionally this, as well as the wings, is fully developed. [The ocelli are wanting in this species, which forms the type of the genus *Pyrrhocoris*, Fall.; *Platynotus*, Schill.; or *Atemuma* of Lep. and Serv. It is occasionally found in this country.]

The species with the fore-legs thickened form the genus *Pachymerus*, Lep. and Serv., but which name having been previously used, must be changed. [The species are very numerous, and form Hahn's genus *Raparocharxus*.]

[Geocoris, Fallen, *Opthalmicus*, Schill.] *Salda*, Fab., has the head as broad as the thorax, and often dilated behind, with large eyes, *S. atra*, *gryllodes*, &c., Fabr.

*Hydesia*, Latr., has the hind part of the head elongated into a neck.

We now arrive at those *Geocorinæ tentillares* with four-jointed antennae, slender, and often capillary at the tips. *Antenna*, Latr. has the second joint of the antennae of equal thickness, the thorax scarcely broader behind than in front, transverse, quadrate, or cylindrical. *Salda pallicornis*, &c.

*Miria*, Fab., resembles *Atemuma* in the antennae, but has the thorax narrowed in front.

*Capua*, Fab., has the thorax trapezoidal, and the second joint of the antennae slender at the base, pilose and thick at the tip. [*C. ater*, and a great number of English species.]

* The Rev. F. W. Hope has published a catalogue of the species belonging to this tribe, with the description of a great number of new species.ORMAN has also added many new genera and species in the first part of his Zeitschrift fur die Entomologie, 1859.
Heterotoma, Latr., has the two basal joints of the antennae very thick and setose. The type of this curious genus is Cypinus spisscanus, Fab. [a common British species].

The other Hemiptera of this family have two or three joints in the sheath of the proboscis; the labrum is short, and not striated; the basal and often the second joint of the tarsi are very short; the legs inserted in the middle of the breast; the unguis apical. Some of these have the proboscis straight, and generally resting in a canal; the eyes of ordinary size, and the head not narrowed into a neck. The body is generally entirely or partly membranous, and often flattened. They compose the majority of the Fabrician genus Acanthia, from which the following have been separated.

Syrpis, Fab. (Macrocepalus, Swed., Phymata, Latr.), has the fore-legs very large and claw-like, serving to seize their prey. In Macrocephalus the scutellum is distinct, and covers nearly the whole abdomen. In Phymata (S. crassipes, F.), the [scutellum is minute], and only covers part of the upper side of the abdomen.

Tingis, Fab., has the body very flat, and the antenna terminated by a short knob, the third joint being elongated; the majority live upon plants, puncturing the leaves of flowers, and sometimes producing galls. The leaves of the pear are often gnawed by T. pect. [These are minute insects, many of which are English, having the body membranous, and covered with small cells; the thorax is extended behind, over the scutellum.]

Aradus, Fab., resembles Tingis in the form of the body, but has the antennae cylindrical, with the second joint as long as the third, or longer. They are found under the bark of trees, in crevices of old wood, &c. [Small insects, of which several are found in this country. A. depressus, Betuwe, &c.]

Cimex proper, Acanthia, Fab., has the body very flat, but the antennae terminate in a setaceous joint. The typical species, C. lectularius, Linn., the Bed-bug, is too well known to need description. It is said not to have existed in England before the great fire in 1666, and that it was imported in wood from America; Dioscorides, however, mentioned it. It has also been asserted that this species sometimes gains wings. It also infests young Pigeons, Swallows, &c.; but that which attacks the latter birds appears to me to form a distinct species. [The Rev. L. Jenyns has recently described it as distinct, C. Hirundinis; as well as one from Pigeons, C. columbarius; and one found on a Bat, C. Pipistrelli. (Annals of Nat. Hist., June, 1839.)]

Various plans have been proposed for their extirpation, but the best is extreme cleanliness.

The other Geocoris of this subdivision have the proboscis exposed, arched, or sometimes straight, with the labrum prominent and the head suddenly narrowed behind into a neck. The latter form the primitive genus

Reduvius, Fabricius,—

In which the proboscis is short, very acute, and capable of pricking strongly, the pain of which lasts for a long time. The antennae are very slender at the tips; many species produce a noise similar to that made by Crioceris and the Capricorn Beetles, which is more quickly repeated. This genus has been thus subdivided.

Holopeltis, Lep. and Serv., which have only three joints to the antennae, the last two furnished with very long hairs, arranged in two rows, and verticilliated in the last joint.

Reduvius proper, has the antennae 4-jointed, and smooth, or but slightly pubescent, and the body is oblong-oval, with the feet of moderate size. R. personatus, Linn., inhabits the interior of houses, where it lives upon flies and other insects, which it approaches stealthily, and then darts itself, immediately killing them by piercing them with its proboscis. In the preparatory states it looks like a Spider, covering itself with particles of dust and dirt.

Nabis, Latr., in which the thorax is but slightly divided transversely, and Petalochelirus, Pfl. Beauv., in which the fore tibia form a round plate, may be united therewith.

Zelus, Fab., has the body linear, with the legs very long, slender, and alike, [consisting of a great number of exotic species].

Ploiaris, Scop., differs from the last in having the two fore-legs [short] with elongated coxae, formed as in Mantis for seizing the prey. Gerris vugabunda, Fabr. [an insect of small size, not uncommon in England].

We are now arrived at Geocoris: remarkable for the large size of the eyes, and the head not formed into a neck, with the head transverse. They live at the sides of water, where they run with great agility, and often take short leaps.

Leptogonus, Latr., has the proboscis short and arched, and the antennae setaceous; [small species, several of which are found on the Continent].

Acanthia, Latr. (Saita proper, Fabr.), has the proboscis long and straight, and the antennae filiform. Salda vitralis, Fabr., &c. [several British species of small size].

Pelagomma, Latr., differs from Acanthia in having the antennae very short, and folded beneath the eyes. The species are small, and approach Naucoris, to which they conduct with the following.

Sometimes the four hind legs, very long and slender, are inserted upon the sides of the breast, and wide apart; the tarsal unguis are very small, indistinct, and fixed in a fissure at the side of the tarsi. These feet serve either for rowing or creeping on the water. They are peculiar to the genus

Hydrometra, Fabr.—

Which Latreille divides into three others.

Hydrometra proper, with setaceous antennae, and the head produced into a muzzle, with the rostrum received in a canal on the under side. [H. stagnorum, a small, very slender, and common species, found crawling on the surface of water.]

Gerris, Latr., has filiform antennae, with the sheath of the proboscis 3-jointed, and the second pair of legs wide
apart from the anterior, and twice as long as the body. [Common insects, often seen skimming along the surface of the water.]

Velia, Latr., with the antennae also filiform, but with the sheath of the sucker only 2-jointed; the legs moderately long, and placed at equal distances apart. V. curvus, [a common British insect, seen running on the surface of brooks.]

[The works of Laporte Comte de Castelnau, the Encyclopédie Méthodique, Burmeister’s Manual of Entomology, vol. ii., Spinola’s Essay on the Heteroptera Hemiptera, and Hahn’s work, Die Wenzennartenigen Insecten, must be consulted for many new genera established in this division of the order.]

THE SECOND FAMILY OF THE HEMIPTERA,—

THE HYDROCORIS, or Water-bugs—

Has the antennae inserted beneath the eyes, by which they are concealed, being shorter than the head, or scarcely longer than it.

All these Hemiptera are aquatic and carnivorous, seizing other insects with their fore-legs, which fold upon themselves, and serve them as claws. They prick very sharply [with the proboscis]. The tarsi have only one or two joints; the eyes are generally of a remarkable size.

Some of the Hydrocoris, forming the subfamily Nepides, have the two fore-legs formed into claws composed of a very thick or very long thigh, channelled on the under side to receive the under surface of the tibia and of the tarsus, which is very short, or is united with the tibia, forming with it a strong hook; the body is oval and very depressed in some, and of a linear form in others. These insects form the genus

Nepa, Linn.,—

Which may be thus divided:—

Galgulus, Latr., in which all the tarsi are alike cylindrical, with two distinct joints, the last of which is furnished with two hooks at the tip; the antennae appear to have only three joints, the last of which is large and ovoid.

(Naucoris ocellata, Fab.; North America.)

The antennae in the following genera are composed of four joints, and the anterior tarsi are terminated simply in a point, or by a hook.

Naucoris, Geoff., has the labrum exposed, large, and triangular; the body is nearly oval and subdepressed; the eyes flattened; the extremity of the body is not furnished with elongated processes; the four hind feet are ciliated with 2-jointed tarsi, and two uognes at the tip. N. dimidioidea, Linn., [a common British insect, half an inch long].

In the three following subgenera, the labrum is hidden in the canal, and the extremity of the abdomen furnished with two filaments.

Belostoma, Latr., has all the tarsi 2-jointed, and the antennae semi-pectinated. [Exotic species.]

Nepa, Latr., has the fore tarsi formed of a single joint, and the four hind tarsi 2-jointed; the antennae appear forked; the fore coxe are long, and the thighs thicker than the other parts. The abdomen is terminated by two long filaments, which are employed in respiration; the eggs resemble the seed of some plant, being oval, surmounted by a coronet of hairs. M. L. Dufour has published an elaborate memoir on their internal anatomy. N. cinerea, Linn., of a dirty ash-colour, with the upper surface of the abdomen bright red, [is a very common insect.]

Ranatra, Fabr., differs from Nepa in its linear form, and the more elongated form of the legs. N. linearia, Linn. [a common British species in certain localities]. The coronet at the top of its eggs is formed of only two threads.

The others, Notonectides, have the two fore-legs simply incurved, with the thighs of the ordinary size; the tarsi diminishing to a point, and very much ciliated or similar to the others; the body is nearly cylindric or ovoid, and rather thick, or not so much depressed as in the preceding; the hind legs are very much ciliated, in the form of oars, and terminated by two very minute claws: they swim or row with great quickness, and often on their backs, [whence their generic name]. They compose the genus

Notonecta, Linn.,—

Which may be thus divided:—

Corixa, Geoff., which has no scutellum, the elytra horizontal; the fore-legs very short, with the tarsi composed of a single compressed and ciliated joint; the other legs are elongate, and the two middle ones terminated by two very long uognes. N. striata, Linn. [and several other small British species].

Sigara, Leach, founded upon N. minutissima, Fabr., has the fore-tarsi 1-jointed, but possesses a distinct scutellum, and the body ovoid.

Notonecta, Linn., has a distinct scutellum; a rostrum elongate-conic; the wing-covers de-flexed at the sides, and all the tarsi 2-jointed; the fore tarsi are cylindrical, simple, and terminated by two uognes.
N. glauca, Linn., more than half an inch long, [is one of our commonest water insects]: it swims upon its back in order the better to seize its prey, and is able to prick sharply.

Pleà, Leach, is founded upon Notonecta minitissima, Linn., which has the ungues of the hind feet large, and the elytra entirely crustaceus.

The second section of the Hemiptera, that of the

HOMOPTERA, Latr.—

Is distinguished from the preceding by the following characters:—The proboscis arises from the lowest part of the head, near the breast, or even, as it appears, between the two fore-feet. The wing-covers (nearly always roof-like) are throughout of the same consistence and semi-membranous, sometimes even nearly like the wings. The three segments of the thorax are united into a mass, and the first is often shorter than the following. All the Hemiptera of this section feed only upon the fluids of vegetables; the females have a scaly ovipositor, generally composed of three denticulated plates, and lodged in a scabbard of two valves: they use this instrument as a saw to make notches in vegetables, in order to deposit their eggs. The terminal insects of this section undergo a kind of complete metamorphosis.

I divide it into three families, [Cicadariae, Aphidiis, and Gallinsecta.]

THE FIRST FAMILY OF THE HOMOPTEROUS HEMIPTERA,—

THE CICADARIES,—

Comprises those which have three joints in the tarsi, and the antennæ generally very small, conic, or awl-shaped, from 3- to 6-jointed, including a very slender seta, with which they are terminated. The females are provided with a denticulated, saw-like ovipositor. Messrs. Ramdohr, Marcel de Serres, Léon Dufour, and Strauss, have studied the anatomy of different insects of this family with great care; the latter has not yet however published his researches. Amongst the others, M. Léon Dufour is the author whose investigations are the most extended and complete, at least as regards the digestive and generative systems, as is easily proved on referring to his memoir intitlèd Recherches anatomiques sur les Cigales, inserted in the fifth volume of the Annales des Sciences naturelles.

Some of the Cicadariae are named Chanteuses, and have the antennæ composed of six joints and three ocelli. The mesothorax, seen from above, is much more spacious than the prothorax, and is narrowed towards its extremity, where it forms a kind of scutellum. It is nearly of the same form in the Fulgoræ and other genera separated therefrom. The mesothorax is often of a reversed triangular form, and the prothorax is generally very short and transverse. In Membrecis, Cicadella, &c., it is, on the contrary, much more extensive than the other thoracic segments, and very much developed in one or the other direction, and the mesothorax appears only in the form of an ordinary triangular scutellum. In the whole of the family, the mesothorax is very short and concealed. Considered in respect to other insects, the head of the Cicadariae, seen in front, exhibits immediately above the labrum a triangular space, answering to the epistome or clypeus, above which is another space, often swollen and striated; above this is the forehead, and which is succeeded by the vertex or superior part of the head.

The Chanteuses comprise the Cicadæ moniferæ, Linn., or the genus Tettigonia, Fabr., and form with me the genus

CICADA, Oliv. (Tettigonia, Fabr.).

These insects, in which the wing-covers are almost always transparent and veined, differ from the following not only in the structure of their antenna, and the number of the ocelli, but also in not possessing the power of leaping; the males also produce in the hottest part of the day a kind of monotonous and noisy music, whence they have been termed by authors "chanteuses," or singers. The organs of sound are placed at each side of the base of the abdomen, internal, and covered by a cartilaginous plate like a shutter, and which is an appendage of the under side of the metathorax. The cavity which incloses these instruments is divided into two partitions by a scaly and triangular edge; seen from the under side of the body, each cell exhibits anteriorly a white and folded membrane, and in the hollow part, a stretched-out slender membrane, which Réamur calls the mirror: if this part of the body be opened from above on each side, there is seen another folded membrane, which is moved by a very powerful muscle, composed of a great number of straight and parallel fibres extending from the scaly ridge; this membrane is the timbale. The muscles, by contracting and relaxing with quickness, act upon the timbales, stretching them out, or bringing them into their natural state, whereby the sounds are produced, and which, even after the death of the animal, may be repeated by moving the parts over each other in the manner they act whilst alive.
The Cicades are found upon trees, or shrubs, of which they suck the sap. The female pierces the small twigs of dead branches of trees as far as the pith with its ovipositor, lodged in a semi-tubular sheath formed of two valves, and composed of three scaly pieces of a narrow and elongated form, two of which are terminated like a file, in order to deposit their eggs therein, the number of which being great, the female makes a succession of slits, the place of which is indicated by so many elevations on the exterior. The young larve quit their birth-place, however, in order to descend into the ground, where they increase in size and become pupae. Their fore-legs are short, the fore thighs being very strong, and armed with teeth, fitted for burrowing in the earth. The Greeks devoured the pupae, which they called Tettigométræ, as well as the perfect insect. Before coupling the males were preferred, but afterwards the females were selected, being filled with eggs. The Cicada unæ, by puncturing the elm, causes it to discharge the saccharine purgative fluid which has been termed manna.

[The genus is very numerous, and the species are found in all the warmer regions of the globe, some being of large size. In England, however, possess but a single species, which has been figured by Curtis under the name of C. anglica. It has only occurred in the New Forest, in Hampshire.]

Other Cicadæ, with the forehead advanced, but wanting ocelli, and having two slender appendages beneath each antenna, compose the genus Cixins, Guerin. [Small European insects, monographed by Kirby.]

Those in which the head is not remarkably produced in front are formed by Fabricius into several genera, to which others subsequently established, [especially by German, Guérin, and Burmeister,] must be added.

Sometimes the antennæ are shorter than the head, inserted at a distance from the eyes, in some of which the two ocelli are distinct.

Cixins, Latr., resembles Lystra, but the second joint of the antennæ is globular, and granular, as in the Fulgoræ. Cixins, Latr., resembles Lystra, but the second joint of the antennæ is cylindric and entire. The genus Achilus, K. [founded upon an Australian species, A. flammeus, K.] scarcely differs from Cixins.

I have separated, under the generic name of Tettigométræ, insects analogous to the preceding, but in which the antennæ are lodged between the posterior and lateral angles of the head and those of the anterior extremity of the thorax. The eyes are not prominent. [Small European insects.] Catilina, German, appears to be closely allied to Tettigométræ, of which they have the aspect, and are described as having the antennæ inserted beneath the eyes.

In the others the ocelli are wanting.

The species which have the wing-covers large, and the prothorax evidently shorter in the middle than the mesothorax, compose the subgenus Paceloptera, Latr., Plata, Fabr.

ʂan, Fab., is composed of those species in which the prothorax is at least as long as the mesothorax, and the wing-covers, shorter, or as long as the abdomen, are dilated at the base, and subsequently narrowed.
In others, the antennae are at least as long as the head, and often inserted in a notch below the eyes.

*Anotia*, Kirby, allied to Otiocerus, and which approaches the preceding in the mode of insertion of the antennae. [Small exotic insects.]

*Astraca*, Latr. (Delphax, Fab.), has the antennae inserted in a notch below the eyes, as long as the head and thorax, with the first joint generally longer than the second, compressed, and angulated; the ocelli are wanting. [A. elavicornis, Latr., a small, exceedingly active species, and several others, inhabitants of this country.]

*Delphax*, Fab., has the antennae similarly inserted, but not longer than the head, with the first joint much shorter than the second; the ocelli are present. [Numerous very small species, found by sweeping grass at the sides of roads, commons, &c. Some of the species occasionally have the wing-covers only partially developed. These constitute the genus Criomorpus, Curtis.]

*Derbe*, Fabr., are unknown to me, but I presume they come near the preceding insects, and especially to Anotia.

In the terminal Cicadaria the antennae are inserted between the eyes. These compose the genus

*Cicadella* (or the Cicada Ranatre, Linn.),—

Which may be thus divided:

We commence with the species which, with the exception of a small number, (Ledra,) formerly composed the genus *Membracis* of Fabricius. The head is very much deflexed, or low in front, and prolonged into an obtuse point under the form of a clypeus, more or less semicircular. The antennae are always very small, terminated by an inarticulate seta, and inserted in a cavity under the margins of the head; the prothorax is sometimes dilated, and horned on each side, and prolonged behind into a simple or composite horn, and sometimes it is elevated longitudinally down the back, compressed like a crest, sometimes porrected and pointed in front; the legs are seldom spined.

[This genus comprises three principal groups,—the *Membracides*, Cercopides, and Cicadellae.]

Some [the *Membracides*] have no scutellum, properly so called, exposed. *Membracis*, Fab. (having the prothorax elevated, compressed, and leaf-like along the middle of the back), and *Trogopa*, Latr. (where this part of the body is horned, or pointed on each side, without any intermediate elevation, and posteriorly produced into a point as long as the abdomen), have the tibiae, especially of the fore-feet, foliaceous.

In the following the tibiae are of the ordinary form, and not foliaceous.

*Danis*, Fabr., in which the prolongation of the prothorax is in the shape of a long triangle, covering the wings and abdomen.

*Bocydium*, Latr., has the prolonged part narrowed so as to expose the wings and sides of the abdomen, and more or less lanceolate, or spear-shaped. [Such as Bocyd. globulare, and B. cruciatum, two extraordinary Brazilian insects, of small size, here figured. The majority of the species of Membracides are exotic, of small or but moderate size, and amongst them are to be found some of the most anomalous forms.]

In others the scutellum, although the prothorax is prolonged, is exposed, at least in part, the posterior extremity of the prothorax exhibiting a transverse suture, which distinguishes it from the scutellum. These form the subgenus *Centrotus* proper. Types, *C. cornuta* and *C. genista*. [Two small species, of rather common occurrence in woods in this country, the last of which is figured in the *Entomologist's Text Book*, pl. 3. f. 2.]

We now pass to the species in which the head is but little lower than, or on the same plane as, the prothorax; horizontal, or but little deflexed when seen from above, and in which the prothorax is neither elevated in the middle, nor posteriorly prolonged, offering only lateral dilatations, and in which the mesothorax assumes the form of a triangular scutellum, of the ordinary size; the wing-covers are always exposed; the posterior tibiae are more or less spined.

In many, such as the following [which compose the tribe *Cercopides*], the thorax has the form of an irregular hexagon, being prolonged and narrowed behind, and terminated by a truncature fitting to the base of the scutellum, and often receiving it; this truncature being concave, or emarginate.

*Stal lion*, Latr., has the crown of the head transverse, the forehead being suddenly deflexed in front, and the antennae are inserted above a line drawn between the eyes. [Brazilian insects.]

In the three following subgenera the vertex is triangular and bears the ocelli, and the antennae are inserted in a line drawn between the eyes.

*Ledra*, Fab., has the head very flat between the eyes, like a transverse clypeus; the sides of the prothorax are
dilated into short wing-like appendages, and the hind tibie are very compressed, and margined by a membrane. 

_Cicada, Linn.,_ [a species not uncommon in the woods in Kent].

_Cicada nigrata, Latr._, has the antennae terminated suddenly after the second joint in a seta composed of four distinct cylindrical and elongated joints; the anterior extremity of the head is generally advanced. [Exotic species.]

Mssrs. Serville and Saint Fargeau [as well as Drs. Germar and Burmeister] have established numerous additional genera in this group. The _Eurygema fenestrata_, Serv. and St. F., described by them as Brazilian, is a native of New South Wales, the description given of which by these authors being inexact, the insect possessing ocelli, although difficult to be detected. Hence this genus ought to be introduced at the genus _Issus_.

_Cercopis_, Fab., Germ. _(Aphrophora_, Germ.), has the third joint of the antennae conical, and terminated by an articulated seta.

_[C. vulgaris, Rossi, the only British species closely allied to C. sanguinolenta, Linn., is a common insect, and the handsomest in the family; being black, with blood-red spots.]_ C._ [Aphrophora] sanguinolenta, Linn., is an extremely abundant species, the larva of which is found upon leaves and twigs in the midst of a frothy secretion, of a white colour, which has been commonly called Cuckoo-spit.

In the other Cicadae, terminating this family, [and forming the tribe Cicadellines, and which in the earlier works of Fabricius formed his genus _Cicada_], the prothorax is not at all, or scarcely, prolonged posteriorly, and is terminated by a straight, or nearly straight, line, as long as the breadth of the body, the scutellum, at its base, occupying a great portion of this breadth.

_Eulopa_, Fallen, has the eyes very prominent, the head but little advanced beyond the eyes, but depressed, and forming a kind of ridge round the face; two ocelli placed on the posterior and superior part of the head, and legs destitute of spines or teeth. _C. Ericce_, a small species, [found on heaths].

_Eupelis_, Germar, has the head in the form of an elongated and very flat triangle, with the ocelli situated in front of the eyes, upon the edges of the head, which are prolonged, nearly cutting through the eyes. _C. cuspidata_, Fab. [a rare British species, found with the preceding].

_Penthimia_, Germ., has the antennæ inserted in a large channel, reducing the space between the eyes more than ordinary; the head, seen from above, appears semicircular, and gradually deflexed in front; it is rounded, and its edges are extended above these channels; the body is short. These insects have some resemblance to _Cercopis_, with which Fabricius united them. _C. sanguinolenta_, Fabr., [a very rare British species].

_Gypona_, Germar, appears to be closely allied to _Penthimia_, but I have seen no specimen of that subgenus.

_Iassus_, Fabr., has the superior surface of the head comprised between the eyes, very short, transverse, and linear, or arched, and very little advanced even in the middle beyond the eyes. The plates at the sides of the clypeus are large; the antennæ terminate in a long seta; the ocelli are situated near or below the anterior margin of the head. [Numerous small British species, divided by Curtis, Lewis, Burmeister, and Germar into various subgenera.]

_Cicadella_ proper, or _Tettigonia_, Fabr., Oliv.; _Cicada_, Linn., has the head, seen above, triangular, without being either very long or very flat, whereby it is distinguished from _Eupelis_; the eyes also are not cut into by the sides of the head; the ocelli are situated between these. These insects are, in other respects, very nearly related to _Iassus_, as well as in respect to the extent of the plates at the sides of the face, and the length of the seta of the antennæ, which appears to be articulated at its base. as in _Cicasis_, from which it chiefly differs in the form of the thorax. [This is also a very numerous group, which has been likewise much cut up by late writers. Some of the species, as _C. grisea, transversa, striata_, Fabr., appeared to Latreille to form a distinct subgenus, from the flattened form of the head, and the ocelli inserted near its edge.

### THE SECOND FAMILY OF THE HOMOPTEROUS HEMIPTERA.

#### THE APHIDII, commonly called Plant Lice,

Which are distinguished from the preceding by having only two joints in the tarsi, and the antennæ filiform, or like a thread, and longer than the head, composed of from six to eleven joints.

The winged individuals have always two wing-covers and two wings. These are very small insects, having the body generally soft, and the wing-covers very similar to wings, differing only in being larger and somewhat thicker. They multiply with exceeding rapidity.

Some have ten or eleven joints in the antennæ, the last of which is terminated by two setæ. They leap well, and form the genus

_Psylla_, Geoff. (_Chermes_, Linn.).

These Hemiptera, which are also termed by the French False Plant-llice, live upon trees and plants,
from which they obtain their nourishment; the two sexes are winged; the larvæ have the body generally very flat; the head broad, and the abdomen rounded behind. Their legs are terminated by a membranous vesicle, accompanied beneath by two unges. Four broad pieces, which are the sheaths of the wing-covers and wings, distinguish the pupae: many in this state, as in that of the larva, are covered by a white cottony secretion, arranged in flakes. Their excrements form threads or masses, of a gummy saccharine nature.

Some species, by puncturating vegetables to extract the sap, produce in various parts, especially in the flowers and buds, monstrosities, having the appearance of galls. In this number is Pegylla Buxi, figured by Réaumur, Mem. Ias., vol. iii. pl. 19, fig. 1—14, which is found on the box. The alder, fig, nettle, &c. produce other species.

Latreillé has formed with the species which lives in the flowers of Juncus articulatus, a genus, under the name of Livia. The antennae are much thickened at the base.

[Mr. Curtis has published the figure of another genus under the name of Livilla, founded upon a small, interesting British species.]

The other Aphidii have only six or eight joints in the antennæ, the last of which is not terminated by two setæ.

Sometimes the wing-covers and wings are linear, fringed with hairs, and carried horizontally upon the body, which has nearly a cylindrical form; the proboscis being small, or scarcely distinct. The tarsi are terminated by a vesicular joint without unges; and the antennae have eight somewhat moniliform joints. Such is the genus

**THRIPS, Linn.—**

The species of which are extremely active, and appear to leap rather than fly. When much irritated, they elevate and bend the extremity of their bodies into an arch in the same manner as the Staphylini. They live upon flowers and plants, and under the bark of trees. The largest species scarcely exceed a line in length.

Latreillé observes in a note that the structure of the mouth exhibited to him characters which appeared essentially to distinguish the species of Thrips from the other insects of this order. M. Strauss also, who had studied them with admirable precision, considered that they belonged to the order Orthoptera. [Subsequently, the genus has been raised to the rank of a distinct order by Mr. Haliday in a valuable memoir published in the Entomological Magazine, under the name of Thysanoptera, and I have illustrated the structure of the mouth in my Modern Classification of Insects, vol. ii. p. 1, with figures. Mr. Haliday has established a number of generic and subgeneric divisions.]

Sometimes the wing-covers and wings are oval or triangular, without a fringe of hairs, and are deflexed at the sides like a roof; the rostrum is very distinct; the tarsi are terminated by two unges; and the antennae have only six or seven joints: these form the genus

**APHIS, Linn.**

*Aphis, proper, has the antennæ longer than the thorax, 7-jointed, the third being elongated; the eyes are entire, and the posterior extremity of the abdomen is furnished with two horns or tubercles. They live mostly in society upon trees and plants, which they suck with their proboscis. They do not leap, and crawl but slowly. The two horns at the extremity of the body in many species are tubes, from which frequently exude small drops of a transparent saccharine fluid, termed honey-dew, of which the ants are very fond. Each society consists in spring and summer of plant-lice always aperous, and of pupæ [demi-nymphæs], of which the wings ought to be developed; all these individuals are females, which produce living young, which are ejected tail foremost, without any previous coupling. The males, amongst which some are winged and some wingless, appear only at the end of the summer or in autumn. They fecundate the last generation produced from the preceding individuals, consisting of wingless females which require impregnation, after which they deposit eggs upon the branches of trees, which remain in that state all through the winter, from which young plant-lice are produced in the spring, capable of multiplying without union with the males.

The influence of a single impregnation thus extends through several successive generations. Bonnet, to whom we are indebted for the majority of the facts observed upon this subject, obtained, by the isolation of females, nine generations in the space of three months. The punctures which the plant-lice make in the leaves and young twigs of vegetables, often cause these parts to assume different forms, as may be seen in the young buds of the lime, the leaves of the gooseberry, pear, and especially of the elm, poplar, &c., where they produce a kind of vesicles or excrescences, containing whole families of plant-lice, and often a saccharine fluid, in the interior. The
majority of these insects are covered with a mealy matter, or with cottony threads, sometimes arranged in rows.

The larvae of the Hemerobii, those of many Diptera, and Coccinelae, destroy a great number of plant-lice. M. Aug. Duvau has communicated to the Academy of Sciences the interesting result of his observations on these insects, and his memoir has been inserted in the collection of those of the Museum d'Hist. Nat.

The Aphis of the oak (A. Quercus, Linn., Réamur, 3, pl. 28, t. 5), is remarkable for having the proboscis at least three times as long as the entire body.

M. Blot has published, in the Memoirs of the Linnean Society of Caen, 1824, various curious observations upon a species found in the Département du Calvados, which is very injurious to the apples, destroying the young shoots. He considers it as the type of a new genus, which he calls Myzoxyle. [It is probable that this insect is identical with that so well known in England under the name of Apple-blight, which is covered entirely with a white cottony secretion, and which multiplies in vast numbers in the crevices of the bark of diseased apple-trees.]

De Geer also described a species of Aphis found upon the apple, but which differs materially from that described by M. Blot, which last has no horns on the abdomen, the antennae are shorter, and, according to M. Blot, only 5-jointed, the second joint being the longest. [The species of this family, Aphides, are extremely numerous, almost every plant possessing a distinct species. They however require a more minute investigation than has yet been given to them. The Senator Van Heyden has described several new genera recently in the Memoirs of the Museum Sckekenbergenanum.]

Aleyrodes, Lat. (Fusca, Linn.), has the antennae short, 6-jointed, and the eyes notched. Type, T. protetela, Linn.; Réamur, Mémoires, vol. ii. pl. 25, fig. 1—7, resembles a small white moth, having a small blackish spot on each wing-cover. It is found on the leaves of the Chelidonium, cabbage, oak, &c. Its larva is oval, very flattened, like a minute scale, and resembles that of Psylla. The pupa is fixed, and inclosed in an envelope, so that this insect undergoes a complete metamorphosis.

THE THIRD FAMILY OF THE HOMOPTEROUS HEMIPTERA,—

THE GALLINSECTA,—

Of which De Geer formed a distinct order, have only a single joint* in the tarsi, with a single hook at the tip. The male is destitute of a proboscis, has only two wings, which shut horizontally upon the body; the abdomen is terminated by two threads. The female is without wings, and furnished with a proboscis. The antennae are filiform, or thread-like, and often eleven-jointed (nine in the species described by Dalman in the memoir noticed below). These insects compose the genus Coccus, Linn. (or Scale-insects).

The bark of many of our trees appears often warty, by reason of a great number of small oval or rounded bodies, like a shield or a scale, which are fixed to them, and in which no external traces of the insect are to be observed. They nevertheless belong to this class of animals, and to the genus Coccus. Some of these are females; the others are young males, and which are similar to them in form. But a period arrives when all these individuals undergo singular changes. They fix themselves to the plant, the larva of the males for a determinate period necessary for their transformations, and the females permanently. If observed in spring, their bodies are noticed gradually to increase in size, ending in their acquiring the appearance of a gall, being either spherical, kidney-shaped, boat-shaped, &c. The skin in some is entire and very smooth; in others it is incised, or offers traces of segments. It is in this state that the females are impregnated, shortly after which they deposit their eggs, of which the number is very great; these they deposit between the ventral surface of their bodies and a layer of a cottony secretion, with which they had previously lined the spot on which they had stationed themselves. Their bodies subsequently dry up and become a solid cocoon, which covers the eggs. Other females envelope their eggs in a very abundant cottony secretion, which equally defends them. Those which are of a spherical form become a kind of box, inclosing the eggs. The young Scale-insects have the body oval, very flat, and furnished with the same organs as their mother. They disperse themselves over the leaves, and reach by the end of the autumn the branches, on which they affix themselves in order to pass the winter. Some, the females, prepare at the commencement of summer to become parents; and the others, or the larva of the males, are transformed into pupae beneath their own skin. These pupae have the two fore-feet directed forwards, and not backwards, like the four hind legs, and like all the legs of the other inactive pupae. Having acquired

* Dalman, in a memoir upon some species of Coccus, considers that the number of the joints in the tarsi is three.
wings, the males make their escape from the posterior extremity of their cocoons backwards, and then seek the females, which are much larger than them. Réaumur observed two small points like ocelli at that part of the head which corresponds with the mouth. I have discovered in the head of the male of the Coccus of the elm ten small similar points, as well as two balancers on the sides of the thorax. Geoffroy states that the females have at the extremity of the body four white filaments, which appear only on pressing the body of the insect.

Dorthez observed upon the Euphorbia Characias a species which appears to differ in several respects both of structure and habits from the other species, and which determined M. Bosc to form this insect into a distinct genus, named Dorthesia. The antennae have nine joints, much longer and slenderer in the male than in the female; the latter continues to live and to be active for some time after depositing her eggs; the male has the extremity of the body furnished with a thick brush of long white threads: hence this insect is nearer allied to the Aphides than to the Cocc.

The Cocc appear to injure the trees, by causing by their punctures a too abundant overflowing of the sap. Hence they require the attention of those persons who cultivate peaches, oranges, figs, and olives. Some species attack the roots of plants; some are precious on account of the splendid scarlet colour they furnish for the dyer. Further researches on these insects might detect others equally useful in this respect.

Geoffroy divided these insects, which are called by the French Galite insectes, or, by contraction, Gallinsectes, into two genera, Chevrones and Coccus; the latter was called by Réaumur, Progali-insecte.

The Mealy-bug, C. adovidum, is somewhat of a rosy hue, with the body covered with a white mealy powder; the wings and anal setae of the male are of the latter colour. The female has the sides of the body furnished with appendages, of which the two posterior are longer, and form a kind of tail. The female envelopes its eggs in a white cottony secretion, which serves them as a nest. It is naturalised in our hothouses, where it does much mischief.

The female of Coccus Cacti [the Cochineal insect of commerce], is of a dark brown colour, covered with a white down, flat beneath, convex above, margined, with the segments rather distinct, but becoming obliterated at the period of oviposition. The male is of a dark red, with white wings. It is cultivated in Mexico upon a species of Cactus or Opuntia, and is distinguished by the name of Mestegue, or fine cochineal, from another closely allied species, smaller and more cottony, called the wild cochineal. It is celebrated for the crimson dye that it produces; it also furnishes carmine. This production is one of the chief riches of Mexico.

*Coccus polonicus* [or the Scarlet Grain of Poland], was also employed in Poland as a considerable object of commerce, before the introduction of the Coccus Cacti as a dye. It lives upon the roots of Securantus perennis, and other plants. The colour produced from this species is almost equal to that of the Coccus Cacti.

*Coccus Ilicis*, Linn., which lives upon a small kind of oak in the south of Europe, and of which the female reaches the size of a pea, was employed before the introduction of cochineal. It is also still employed in medicine.

A species from the East Indies produces gum lac, and another is employed in China for the manufacture of wax tapers.

A male Coccus, from Java, remarkable for having the antennae composed of about 22 joints, moniliform, and very plicate, having two thick and nearly coriaceous wings, composes the genus Monaphleba of Leach.

[These insects have recently been divided into several other genera by Illiger, Bouché, Burmeister, &c.]

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**THE EIGHTH ORDER OF INSECTS,—**

**THE NEUROPTERA (Odonata, and the major part of Synistata, Fabr).—**

Is distinguished from the preceding orders by the fore-wings being membranous, generally naked, transparent, and similar to the two posterior in respect to their consistence and uses; from the 10th and following, by the number of these organs as well as by the structure of the mouth, which is fitted for mastication, or furnished with true mandibles and maxillae, that is, formed on the ordinary plan [for biting], a character which separates this order from the tenth, or that of the Lepidoptera, of which the fore-wings are, moreover, mealy. In the Neuroptera these wings have their surface furnished with a very fine net-work; the inferior being mostly as large as the superior, or sometimes larger, sometimes narrower, but longer. The maxillae and the inferior piece of the lower lip, or the mentum, has never a tubular