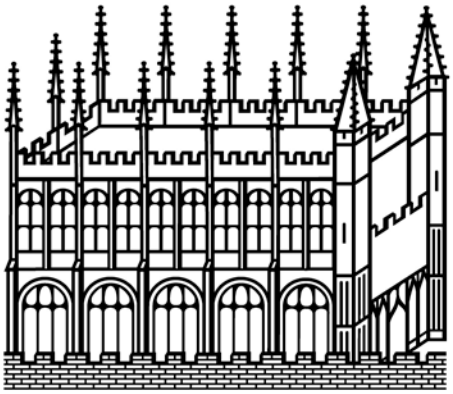

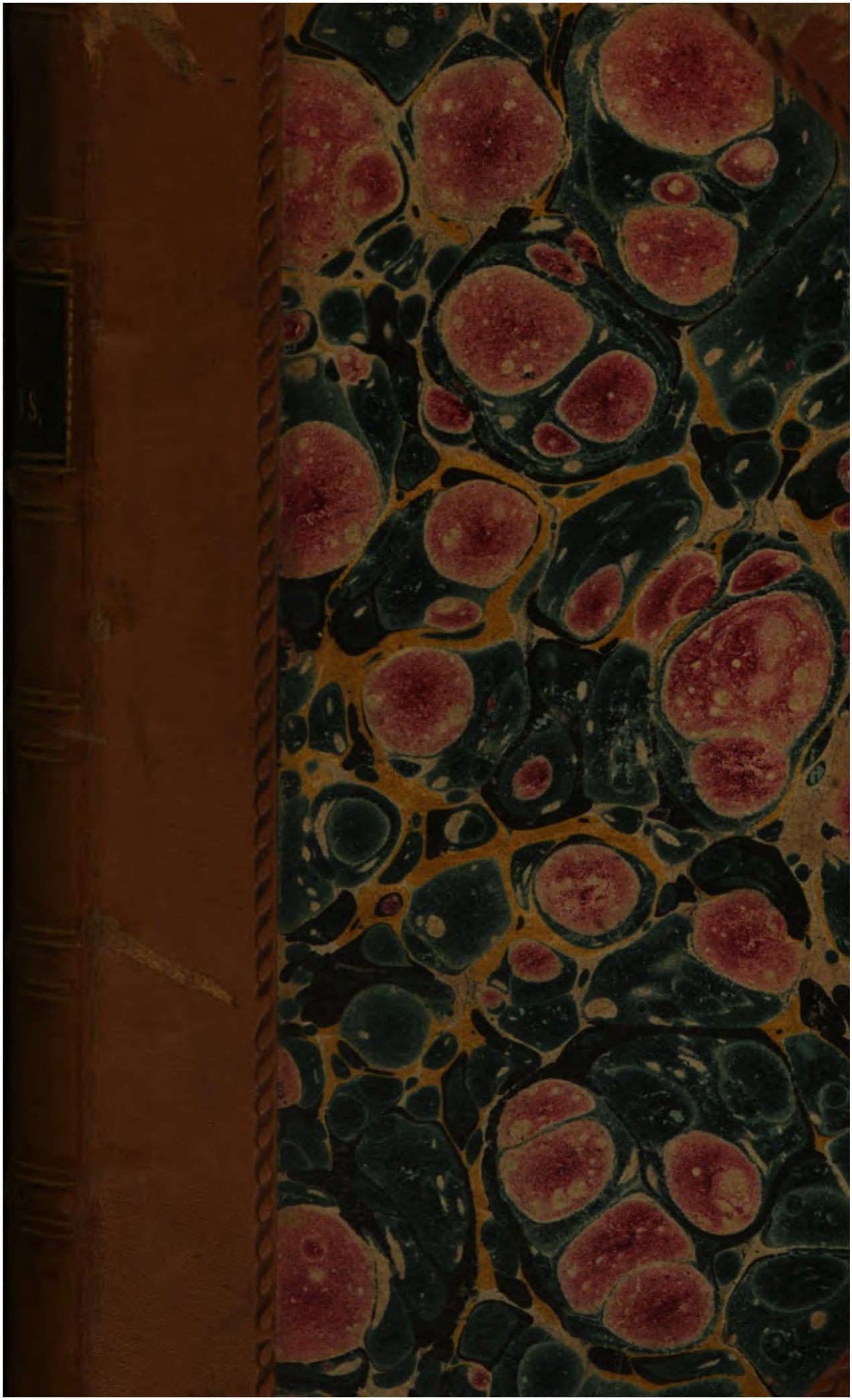

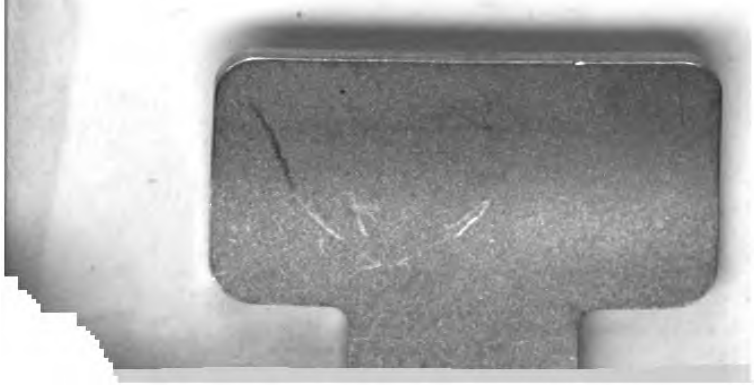

ILLUSTRATIONS

OF THE

LINNÆAN GENERA

OF

INSECTS.

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VOL. I.

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ADVERTISEMENT.

THE small work which is now offered to the Public, was undertaken at the suggestion of those who, feeling themselves inadequate to plunge immediately into the ocean of new Genera, were still desirous to enter by degrees upon the subject of Entomology. To the excellence of the popular and entertaining work by Kirby and Spence, the Public have borne ample testimony, and many have been induced by its pages to desire a more intimate acquaintance with its contents. To such, and many others, the Illustrations

of the Linnæan Genera may be very useful, since they will satisfy those who are willing to become easily acquainted with the subject; at the same time that the zealous Entomologist, who wishes to try how far he is able to improve a system, cannot have a better foundation to proceed upon.

The Method of catching and preserving Insects for Collections.*

I. INSECTS of the first Order (COLEOPTERA) are found in and under the dung (*Scarabæus, Dermestes, Hister, Staphylinus*) of animals, especially of cows, horses, and sheep. Many of them make holes under the dung three or four inches deep; it would therefore be necessary to have an iron spade to dig them out when in search of this tribe of insects.

Some (*Lucanus, Cerambyx, Dermestes*) are found in rotten and half-decayed wood, and under the decayed bark of trees. On the carcases (*Hister, Silpha, Staphylinus*) of animals that have been dead four or five days, on moist bones that have been gnawed by dogs or other animals, on flowers having a fetid smell, and on several kinds of fungous substances, particularly the rotten and most stinking: others (*Byrrhus,*

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* Ellis.

Curculio, Bruchus) may be found in a morning about the bottoms of perpendicular rocks and sand banks, and also upon the flowers of trees and herbaceous plants.

Many kinds (*Gyrinus, Dytiscus*) may be caught by a net at the end of a long pole, in rivers, lakes, and standing pools.

In the middle of the day when the sun shines hot, some (*Coccinella, Buprestis, Chrysomela, Cantharis, Elater, Necydalis*) are to be seen on plants and flowers, blighted trees and shrubs; others (*Lampyris*) in moist meadows, and are best discovered at night, by the shining light which they emit.

A great variety (*Cassida*) sit close on the leaves of plants, particularly of the burdock, elecampane, coltsfoot, dock, thistle, &c. or feed on different kinds of tender herbs (*Meloe*).

Numbers (*Tenebrio*) may be found in houses, dark cellars, damp pits, caves, and subterraneous passages, or on umbelliferous flowers (*Cerambyx, Ptinus*); on the trunks as well as the leaves of trees; in timber-yards, and in the holes of decayed wood.

Some (*Leptura, Cicindela*) inhabit wild commons, the margins of pools, marshes, and rivulets; and are likewise seen creeping on flags, reeds, and all kinds of water-plants.

Multitudes (*Carabus*) live under stones, moss, rubbish, and wrecks near the shores of lakes and rivers. These are found also in bogs, marshes, moist places, pits, and holes of the earth, on stems of trees; and in an evening they crawl plentifully along pathways after a shower of rain.

Some (*Forficula* or *Earwigs*) may be discovered in the hollow stems of decayed umbelliferous plants, and on many sorts of flowers and fruits.

II. Insects of the second Order (HEMIPTERA) are found about (*Blatta*) bake-houses, corn-mills, in ships, and in all places where meal is kept; on grass (*Mantis, Gryllus, Fulgora, Cicada, Cimex*), and all kinds of field herbage. Some (*Notonecta, Nepa*) of these frequent rivers, lakes, and standing pools.

III. The third Order (LEPIDOPTERA) includes Butterflies and Moths. In the day,

when the sun is warm, Butterflies (*Papilio*) are seen on all sorts of trees, shrubs, plants, and flowers. Moths (*Phalæna*) may be found in the day-time, sitting on walls, pales, trunks of trees, in shades, out-houses, dry holes, and crevices; on fine evenings they fly plentifully about the places they inhabit in the day-time: Some (*Sphinx*) are seen flying in the day-time over the flowers of honey-suckles and other plants with tubular flowers. Insects of this species seldom sit to feed, but continue vibrating on the wing, while they thrust the tongue or proboscis into the flower, and in that action are most easily caught.

IV. Insects of the fourth Order (NEUROPTERA) are found in woods (*Myrmeleon, Hemerobius, Raphidia*), hedges, meadows, sand-banks, walls, pales, fruits, and umbelliferous flowers; some (*Libellula, Ephemera, Phryganea*) fly about lakes and rivers in the day.

V. The fifth Order (HYMENOPTERA), including Wasps (*Vespa*), Bees (*Apis*), &c. may be seen about hedges (*Tenthredo, Sirex, Ichneumon, Sphex, Vespa, Apis*), shrubs, flowers,

and fruits. Wasps and Bees are the only winged insects that have any great degree of poison in them; they should therefore be taken with a pair of forceps, and handled cautiously on account of their stings. Some (*Mutilla*) of this division have stings but no poison, and are to be found on the flowers of umbelliferous plants, when the sun shines hot in the middle of the day, at which time others (*Chrysis*) are seen on sand-banks, walls, and pales.

VI. Insects of the sixth Order (DIPTERA) fly about the tops of trees (*Oestrus* or *Gad-fly*, *Musca*, *Tabanus*, *Hippobosca*), little hills, horses, cows, sheep, ditches, dung-hills, and every offensive object. Some (*Tipula*, *Conops*, *Asilus*) are found on all sorts of flowers, particularly those of a fetid smell. Many (*Bombylius*) of these are most easily taken when they begin to feed; for in the middle of the day they are so quick and active, that it is almost impossible to catch them.

VII. The seventh and last Order (APTERA) contains Scorpions, Spiders, Crabs, Lobsters,

&c. It is necessary only to observe here, that all kinds of insects having no wings may be preserved in spirits, brandy or rum, except Crabs and Lobsters, which may very conveniently be preserved dry.

The first order of insects, consisting of Beetles (COLEOPTERA), are hard-winged. Many kinds fly about in the day, others in the evening, some at night only. They may be caught with a gauze net, or a pair of forceps covered with gauze. When they are taken, stick a pin through the middle of one of the hard wings, and pass it through the body. They may be killed instantly, by immersion in hot water, as well as in spirit of wine; then stick them on a piece of cork, and afterwards carefully place their legs in a creeping position, and let them continue exposed to the air until all the moisture is evaporated from their bodies. Beetles may also be preserved in spirit of wine, brandy, or rum, closely corked up.

Insects of the second Order (HEMIPTERA) may be killed in the same manner as beetles,

and likewise by means of a drop of the ethereal oil of turpentine applied to the head.

The division of butterflies and moths (LEPIDOPTERA), as well as all flies with thin membranaceous wings, should be caught with a gauze net, or a pair of gauze forceps. When taken in the forceps, run a pin through the thorax or shoulders, between the fore-wings. After this is done, take the pin by the head, and remove the forceps, and with the other hand, pinch the breast of the insect, and it will immediately die. The wings of butterflies should be expanded, and kept so, by the pressure of small slips of paper, for a day or two. Moths expand their wings when at rest, and they will naturally take that position.

The best method of having the most perfect butterflies, is to find out, if possible, the larva or caterpillar of each, by examining the plants, shrubs, or trees they usually feed upon, or by beating these shrubs and trees with long poles, and by that means shaking off the caterpillars into a sheet, previously spread underneath the

shrubs, &c. for this purpose; put them into boxes covered with thin canvas, gauze, or catgut, and feed them with the fresh leaves of the tree or herb, on which they are found; when they are full grown, they will go into the pupa or chrysalis state, and require then no other care, till they come out a perfect butterfly, at which time they may be killed, as before directed. Sometimes these insects may be found hanging to walls, pales, and branches of trees, in the chrysalis state.

Moths might likewise be procured more perfect, by collecting the caterpillars, and breeding them in the same manner as butterflies. As the larvæ or caterpillars cannot easily be preserved dry, nor very well in spirit, it would be satisfactory if exact drawings could be made of them while they are alive and perfect. It may be necessary to observe, that in breeding these kind of insects, some earth should be put into the boxes, as likewise some rotten wood in the corners; because, when the caterpillars change into the chrysalis state, some go into

the earth, and continue under ground for many months before they become moths; and some cover themselves with a hard shell, made up of small pieces of rotten wood. Hence also, as many go into the earth, valuable insects may sometimes be found by digging after them a foot deep, about the roots of trees, shrubs and plants.

The fourth order of insects (NEUROPTERA) may be killed with spirit, or with a drop of ethereal oil of turpentine.

Insects of the next order (HYMENOPTERA) are best killed by oil of turpentine also. A pin may be run through the bodies of these, between the fore-wings.

Those of the sixth order (DIPTERA) may be killed with spirit of wine.

The last division (APTERA) in general are subjects which should be kept in spirit.

When in search of insects, we should have a box suitable to carry in the pocket, lined with cork at the bottom and top, to stick them upon until they are brought home. If this box be

strongly impregnated with camphor, the insects soon become stupefied, and are thus prevented from fluttering, and injuring their plumage.

In hot climates, insects of every kind, but particularly the larger, are liable to be eaten by ants and other small insects, especially before they are perfectly dry. To avoid this, the piece of cork on which the insects are stuck in order to be dried, should be suspended from the ceiling of a room, by means of a slender string or thread, covered with bird-lime, or some adhesive substance, to intercept vermin in their passage.

After the insects are properly dried, they may be placed in the cabinet or boxes where they are to remain. These boxes should be kept dry, and also made to shut very close, to prevent small insects from destroying them; the bottoms of the boxes should be covered with pitch, or green wax, over which paper may be laid, or, which is better, lined with cork, well impregnated with a solution of a quarter of an ounce of corrosive sublimate, in

half that quantity of ethereal oil of turpentine, and a pint of the camphorated spirit of wine.

The finest collections have been ruined by small insects, and it is impossible to have our cabinets too secure. Such insects as are thus attacked may be immersed in spirit of wine, without injuring their fine plumage, or colours; and afterwards let them be sprinkled about their bodies and insertions of the wings with the solution above mentioned. We may dissolve a much larger proportion of sublimate, by means of a saturated solution of crude sal-ammoniac in water: an ounce of the sal ammoniac solution will dissolve twenty scruples of the sublimate.

These observations and directions respecting insects, may, perhaps, be the means of exciting the curiosity of some, whose inquiries after this part of natural history will be amply compensated by the frequent opportunities of enlarging their knowledge, as there is scarce any part of the surface of this globe, scarce a tree, a shrub, or a plant; an animal either living

or dead, or even the excrements of animals, on which some kind of insect does not depend for its subsistence and propagation. An inquisitive traveller, as well as every other person, has it more or less in his power to add to the common stock of knowledge, with very little expense either of time or labour.

An Expla-

An Explanation of the principal Terms used in Entomology.

ABDOMEN, the hinder part of the body distinct from the thorax, and formed of segments or rings.

Achivi, a subdivision of the genus Papilio, containing those species of the section Equites which have no blood-red spots on them; but an ocellum, or eye, at the inner angle of the posterior wings.

Aculeated, armed with points.

Aculeus, the sting, a sharp dart seated in the extremity of the abdomen.

Adscitæ, a division of the genus Sphinx, containing such species as differ in habit from the true or legitimate Sphinges, and whose larvæ are likewise different.

Alæ, the wings.

Alucitæ, a division of the genus Phalæna, including those with digitated wings, that is, split to the base.

Angulated, wings, the posterior margin having prominent angles.

Antennæ, the horns, two slender bodies placed upon the head, for the most part articulated.

Apex, in the wings, the part opposite to the base terminating the anterior margin: in the Elytra, the part at the extremity of the abdomen.

Aptera, from ἀ, without, and πτερὸν, a wing, the name of the seventh order of insects; including those which have no wings, such as the spider, &c.

Apterous, where the insects of the order Coleoptera want the under wings, and have the elytra united, so as to form one case. This occurs in some species of the genera Curculio, Tenebrio, and Mordella.

Aristated, terminating in a beard or bristle.

Articulated, with distinct joints.

Attaci, a division of the genus Phalæna, with spreading wings, inclining downwards.

Attenuated, narrowing towards the end.

Aurelia, a term formerly applied to that sort of chrysalis, or pupa, which is of a golden colour.

B.

Bearded, tufted with hair.

Bicaudated, swallow-tailed, having two projecting processes from the hinder wings.

Bivalve, beak consisting of two concave valves united so as to form a tube.

Bombyx, a division of the genus Phalæna, including those with incumbent wings and pectinated antennæ.

C.

Canaliculated, channelled, having a longitudinal hollow or groove.

Capitated, antennæ ending in a club or knob.

Carinated, the thorax, or elytra, raised into a straight longitudinal ridge like a keel.

Caudated, tailed, having a projection from the end of the abdomen, or wing, &c.

Cheliform, the palpi, antennæ, feet, &c. ending like the claw of a crab.

Chrysalis, synonymous with Pupa, Nympha, Aurelia.

Cicatrix, a raised spot.

Ciliated, fringed with hairs.

Clavated, club-shaped, referring to the antennæ, palpi, &c. when they gradually thicken towards the apex.

Clypeus, a horny horizontal part of the head covering the mouth.

Coleoptera, derived from κολεὸς, a sheath, and πτερὸν, a wing. The name of the first order of insects, including such as have crustaceous elytra, which in

most cover the abdomen entirely, in some but partially, as in the Earwig, &c.

Compressed, the body flattened at the sides.

Connated, elytra united at the suture.

Convex, thorax raised towards the centre like the segment of a sphere.

Convoluted, when the wings are wrapped round the abdomen.

Cordated, heart-shaped.

Coriaceous, of a substance like leather.

Cornuted, some part of the insect ending in a horn.

Costa, the margin of the wings in the Butterfly between the base and the apex.

Crenated, the margin of the thorax, or wings, notched.

Cristated, the thorax with an arched keeled ridge, toothed and compressed.

Cruciated, the inner margins of the wings lying over each other, or folded together crosswise.

Crustaceous, elytra, hard, elastic, resisting the impression of the finger.

Cutaceous, integument, soft, yielding to the finger.

Cylindrical, beak, &c. linear and round.

D.

Danai, a division of the genus Papilio, containing those with very entire wings, which are either white or variegated.

Deflected, wings incumbent, with the outer edges declining towards the sides.

Dentated, the margins set with short points like teeth.

Denticulated, wings, marked with minute distinct dents.

Denudated, wings, bare or destitute of scales.

Depressed, head, &c pressed downwards.

Digitated, divided nearly to the base, like fingers.

Diptera, derived from δύο, two, and πτερὸν, a wing.

The sixth order of insects, including those with two wings only, such as the House Fly, &c.

Discus, the middle of the elytra between the base, the apex, the margin, and the suture; also the middle of the thorax.

Divaricated, wings, incumbent but diverging behind.

E.

Elytra, the two crustaceous or coriaceous wing-cases of beetles, &c. which are expanded in flight, but which, when at rest, cover the abdomen, and hide the membranous wings.

Equites. Those Papilios whose upper wings are longer from the posterior angle to the apex, than from the same angle to the base.

Eruca, the old word for Larva.

F.

Falcated, shaped like a sickle.

Fascia, a broad transverse line.

Fasciculus, a tuft on the back of the caterpillar, &c.

Femora, the thighs, that part of the limbs nearest the trunk.

Filiform, antennæ, of the same thickness through their whole length.

Fissiles, the knob of club-shaped antennæ split longitudinally into several parallel parts or laminæ.

Flexuose, irregularly waving.

Foliaceous, spread out like a membrane.

Furcated, forked, divided into two parts at the ends.

Fusiform, antennæ, growing gradually thicker towards the middle.

G.

Gemmati, a subdivision of the section Nymphales, in the genus Papilio, containing such as have ocelli, or eyes, in their wings.

Geniculated, bent, making an angle at the flexure.
Geometræ, a division of the genus Phalæna, with wings spreading horizontally when at rest.
Gibbous, thorax, the disc raised but not spherical.
Gregarious, living in society.
Guttated, dotted.

H.

Halteres, poisers, two globular bodies placed on slender stalks behind the wings, and seated on the thorax. Confined to the insects of the order Diptera.
Hastated, javelin-shaped.
Haustellum, a sort of trunk at the mouth of the insect, consisting of bristles, inclosed generally in a bivalve sheath.
Heliconii, a division of the genus Papilio, including those with narrow, oblong, entire primary wings, sometimes appearing deprived of scales; the posterior wings very short.
Hemelytra, wings, either wholly or in part formed of a substance intermediate between leather and membrane.
Hemiptera, derived from ἥμισυ, half, and πτερὸν, a wing. The second order of insects, including those which have their upper wings for the most part half crustaceous and half membranaceous, not divided, as in the order Coleoptera, by a longitudinal suture, but incumbent on each other, as in the Water-scorpion and Grasshopper.
Hemispherical, body convex above, flat below, like the segment of a globe.
Hispid, elytra, antennæ, &c. thickly covered with short hairs.
Hymenoptera, derived from ὑμὴν, a membrane or pellicle, and πτερὸν, a wing. The fifth order of in-

sects, including those which have four membranous wings, and a tail furnished with a sting.

I.

Imago, the perfect insect after having gone through the states of Larva and Chrysalis.

Imbricated, set with scales lying over one another, like the tiles of a house.

Incumbent, wings, which when at rest cover the back of the abdomen horizontally.

Incurvated, wings, the anterior margin bent like an arch.

Incurved, palpi, &c. turning straight upwards at the ends, as if lying over the mouth.

Inflexed, rostrum, or beak, not projecting, but bent and going towards the belly by the breast.

Interrupted, bands, &c. broken, but continued either above or below.

L.

Labia, prominent parts including the mouth.

Lanceolate, antennæ, wings, &c. oblong, attenuated at both ends.

Larva, caterpillar, grub, maggot, the animal as it comes from the egg.

Lepidoptera, from λεπὶς, a scale, and πτερὸν, a wing. The third order of insects, including those with wings covered with fine scales, like powder or meal, as in the Butterfly, &c.

Lineare, body, &c. oblong, equal in breadth throughout.

Lineated, elytra, marked with depressed lines.

Lingua, the tongue, a membranaceous or fleshy organ lying hid among the palpi, and rolled up.

Lobated, thorax, divided into distinct parts.

Lunated, resembling a crescent or new moon.

Lunulated, maxillæ, thick in the middle and smaller towards the base and the apex.

M.

Macula, a spot, of an indeterminate figure, and of a different colour from the ground.

Maculated, marked with spots.

Marginated, thorax, elytra, &c. with a free elevated margin.

Maxillæ, jaws, the organs of the mouth, mostly two in number. The inner edge in some insects is serrated, or furnished with little teeth.

Moniliform, antennæ, with distinct bead-like articulations.

Mucronated, antennæ, &c. terminating in a sharp projecting point.

Muricated, elytra, rough with rigid spines.

Mutilated, elytra, which do not completely cover the back, whether with respect to length or breadth.

N.

Nebulous, wings, marked with many scattered abrupt lines, of various breadth.

Neuroptera, from νευρον, a nerve, and πτερὸν, a wing. The fourth order of insects, including such as have four membranaceous, transparent wings, generally reticulated with veins or nerves, as in the Libellula or Dragon Fly. Tail without a sting.

Noctuæ, a division of the genus Phalæna, comprehending those which have incumbent wings, with setaceous, not pectinated antennæ.

Nympha, the same with Chrysalis and Pupa.

Nymphales, a division of the genus Papilio, containing those with dentated wings.

O.

Obcordated, thorax, heart-shaped, with the apex towards the abdomen.

Obovate, thorax, &c. inversely ovate, the narrow end downwards.

Obsolete, indistinct, as if obliterated.

Obtuse, body, thorax, &c. blunt, rounded at the apex.

Ocellated, with one or more eyes.

Ocelli, the same with Stemmata.

Ocellus, an eye, with a round spot of a different colour in the middle, which is called the pupil.

Orbiculated, body, the transverse diameter equal to the longitudinal.

P.

Palate, the interior part of the transverse lip.

Palpi, organs placed at the mouth, often articulated, and generally shorter than the antennæ, sometimes two only, frequently four, seldom six.

Pectinated, antennæ, sending out from both sides parallel bristles.

Pectines, in the genus Scorpio, two bodies situated between the abdomen and breast, dentated, or pectinated, on one side. See Plate 81. a.

Pectinicornis, the antennæ pectinated.

Pectus, the under part of the thorax, to which the feet are attached.

Pedes, a word applied by Linnæus to the whole limbs of insects, including the femur, tibia, tarsus, and unguis.

Perfoliated, antennæ, knobbed, the knob horizontally split, the pieces connected in the middle.

Petiolated, abdomen, attached to the thorax by means of a slender elongated tube.

Phalerati, a subdivision of the section Nymphales, in the genus Papilio.

Pilose, set with distinct long hairs.

Plane, wings, extended horizontal, which cannot be folded up.

Plebeii, a division of the genus Papilio, containing the smaller species.

Plicated, wings, which when at rest are folded up, but expanded in flight.

Plumatæ, a section in the division of the genus Musca, containing those species which have the antennæ bristled, but the bristle feathered.

Plumose, antennæ like a plume of feathers.

Porcated, elytra, with longitudinal ridges.

Porrected, stretched straight forward.

Proboscis, a hollow tube at the mouth, often fleshy, enlarging at the point.

Pubescent, covered with hair.

Punctated, marked with very small dots.

Punctum, a small dot of a different colour from the rest of the wing.

Pupa, synonymous with Nympha, Aurelia, and Chrysalis.

Pyralides, a division of the genus Phalæna, with connivent wings of a triangular shape.

R.

Radiated, wings, with nerves diverging like rays from a common centre.

Ramose, antennæ, with many lateral branches, as in the genus Monoculus.

Recurved, proboscis, palpi, &c. turned backwards.

Remote, antennæ, &c. distant from each other.

Reniform, kidney-shaped, nearly round, hollowed on one side.

Reticulated, wings, with nerves disposed like net-work, as in the Dragon-fly.

Retractile, head, capable of being drawn at pleasure within the thorax, and concealed there.

Reversed, wings, deflexed, and the margin of the secondary wings projecting from under the primary.

Rigid, antennæ, elytra, &c. not flexible.

Rostrated, standing out like a beak.

Rostrum, the mouth lengthened out into a snout.

Rotundated wings, the posterior margin devoid of angles.

Rugose, wrinkled, marked with waved and elevated lines, either longitudinally or transversely.

Rurales, a subdivision of the section Plebeii in the genus Papilio, composed of Butterflies with wings having obscure spots, that is, not transparent.

S.

Sagittated, arrow-shaped.

Saltatorii, insects having feet, with large thighs formed for leaping, as in the grasshopper.

Scutellati, Cimices, having a Scutellum as long as the abdomen, and covering it and the wings.

Scutellum, the hinder part of the thorax, often triangular: the side next the thorax divided from it by a suture.

Serrated, antennæ, &c. toothed like a saw.

Sessile, abdomen, attached to the thorax in its whole breadth; not distant and connected by a filament.

Seta, a bristle.

Setaceous, palpi, antennæ, &c. growing gradually thinner from the base to the point.

Setariæ, a section in the division of the genus Musca, containing such species as have a simple bristle on the side of the antennæ, in opposition to Plumatæ.

Sinus, a hollow, as if scooped out.

Spiracula, the respiratory organs, situated on the sides of the abdomen.

Spiriform, antennæ, tongue, rolled up in a spiral shape, as in the genus Papilio.

Stemmata, shining eyes generally placed together on the crown of the head.

Sternum, the breast bone.

Stigma, the spot in the upper wings, at the branching of the nerves near the anterior margin.

Stigmata, the apertures on the sides of insects, by which they breathe.

Striated, thorax, &c. slightly channelled with parallel lines.

Subcaudated, wings, the process in the posterior wings, hardly longer than the indenture.

Subcutaneous, larvæ, small caterpillars that feed within the substance of a leaf.

Submarginated, thorax, the margin having a distinct rim, but neither free nor elevated.

Subpetiolated, abdomen, attached to the thorax by a short tube, nearly equalling the thorax in breadth.

Subulated, awl-shaped.

Sulcated, with deep hollow furrows.

Suture, the part where the elytra meet and form a line in the middle of the back.

T.

Tarsi, those parts of the limbs between the tibiæ and ungues, generally articulated with three, four, or five joints.

Tessellated, wings, marked with spots chequerwise.

Thorax, the back of the trunk, or that part which is between the head and the body.

Tibiæ, the legs, that part of the limbs between the thighs and the tarsi.

Tineæ, a division of the genus Phalæna, with the wings convoluted or rolled up, so as to form a cylindrical figure.

Tomentose, covered with a soft down or wool.

Tortrices, a division of the genus Phalæna, with very obtuse wings, the exterior margins of which are curved.

Trochanters, oblong moveable bodies, affixed to the base of the thighs, as in the Carabi.

Troes, those Papilios of the section Equites, which have bloody spots on the breast.

Truncated, the apex shortened, or terminating abruptly in a transverse line.

Truncus, the trunk, that part of the body between the head and abdomen, in which the feet are inserted, consisting of the Thorax, Scutellum, Pectus, and Sternum.

Tuberculated, rough with prominent warts or tubercles.

Tumid, wings, with elevated membranes among the veins.

U. V.

Vagina, a bivalve sheath at the mouth of certain insects, sometimes articulated, and inclosing bristles.

Venter, the under part of the abdomen.

Verticillated, antennæ, with hairs arranged in whirls at the joints.

Villosus, covered with soft hairs.

Undulated, wings, marked with continuous and nearly parallel waving lines.

Ungues, hook-shaped spines at the apex of the Tarsi.

Unguiculated, wings, with a membranous tooth or claw at the exterior margin.

Urbicoli, a subdivision of the section Plebeii, in the genus Papilio, containing such as have for the most part transparent spots on their wings.

LINNÆAN GENERA

OF

INSECTS.

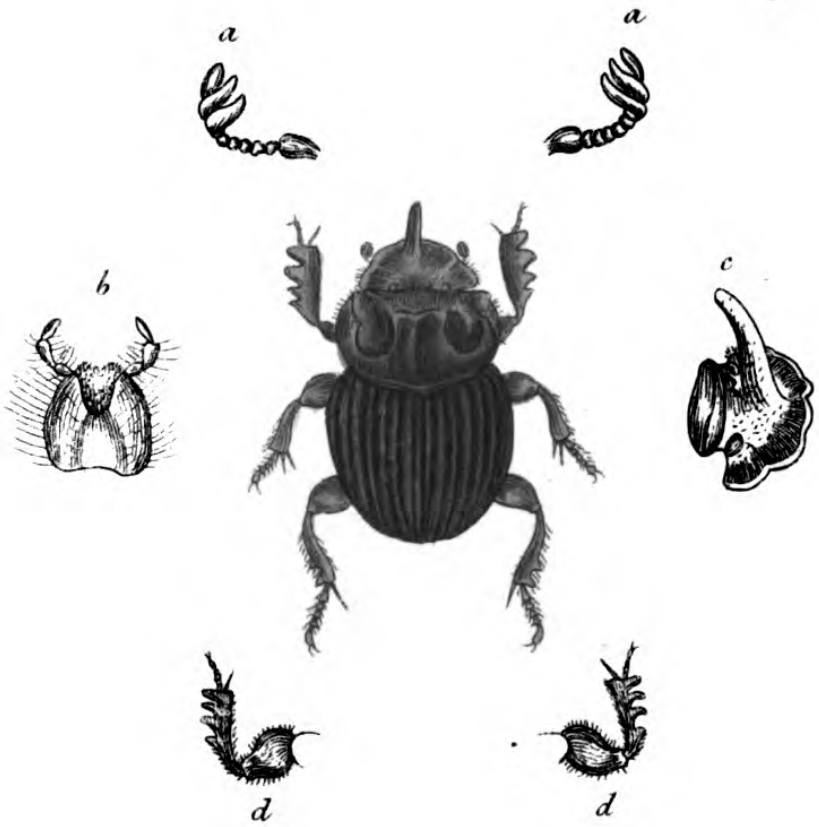
ORDER I.

COLEOPTERA.

LINNÆUS has given the name of *Coleoptera* to those insects which have two membranous wings, hidden under corresponding cases, called *Elytra*. These cases are convex, coriaceous, very hard, and joined to each other by a line or suture running from the base of the thorax, and dividing the abdomen into two equal parts. In some particular instances the under wings are wholly wanting. Where this happens, the elytra are united so as to form one case, the suture

being useless where the insect is denied the power of flight. This does not in the least interfere with the character of the order, which depends not upon the number of wings or wing-cases, but upon the real existence of the latter, which in no instance is absolutely wanting. A few of the *Coleoptera*, indeed, such as the *Necydalis*, the *Staphilini*, and some of the *Mordellæ*, have their elytra so short that they scarcely cover the wings. These elytra, nevertheless, however short they may be, most decidedly exist, and may be readily known by their form, their consistence, and their position.

SCARABÆUS.



S. lunaris.

GENUS I. *SCARABÆUS.*

GENERIC CHARACTER.

Antennæ clavated, or club-shaped, the club laminated, or divided longitudinally into different plates, in some seven, in most three, in others two in number. *Palpi*, or feelers, four in number. *Tibiæ*, or second joint of the foremost pair of legs, generally armed with spines or teeth.

General Observations.

This extensive genus, which has been divided by authors subsequent to Linnæus into several different families, contains many insects of great beauty, and some of singular habits. It was from among the Scarabæi that the Egyptians took the symbol which we meet with so repeatedly upon their sculptured monuments; and it was also to these insects that we owe the fables in which the ancients indulged, respecting their origin, their habits, and their sex.

Scarabæi are generally met with in shady

places, upon the trunks, or near the roots of decayed trees, gates, and felled timber. The *larvæ*, or grubs, which are buried in the ground or in dung-hills, are fat, soft, and inactive. They have six feet, a ringed body, and a hard scaly head. They are destructive to vegetable roots, and do great mischief to the corn, as well as the grass. It is in search of the grub of the cock-chaffer, *S. Melolontha*, that the crows are so assiduous in their attendance on the plough. This insect, which from striking against persons and other objects in its flight in the dusk of the evening, has given rise to the saying "as blind as a beetle," digs a hole about six inches deep, and there deposits its eggs, from whence proceeds the disgusting grub, which remains under ground four years, changing its skin, at least, once a year.

The two largest species of this genus, are the *S. Hercules* and the *S. Goliah*, the former an inhabitant of South America, and the latter of Africa.

Many of this tribe are remarkable for their

size, and the projections in the shape of horns or tubercles, which, in the males, proceed from the head, the thorax, or both parts together. They feed, for the most part, on vegetable substances, but generally prefer those which are decomposed, such as dung, tan, &c. Beetles feeding on leaves, or the honey collected from flowers, are generally of agreeable and even shining colours, whilst those that attach themselves to tan and filth, are of a uniformly dark appearance and retired habits. They shun the light, are slow in their motions, and seldom quit their retreats till the evening, or during the night.

SPECIFICATION.

SCARABÆUS LUNARIS. Sc. exscutellatus, thorace bicorni; intermedio obtuso bifido, capitis cornu erecto, clypeo emarginato. *Linn. Syst. Nat. p.* 534. *Gmel. p.* 1535. *Fabr. Syst. Ent. p.* 22. *Spec. Insect.* 1. *p.* 24. *Mant. Ins.* 1. *p.* 13. *Ent. Syst.* 1. *p.* 46.

Degeer, 4. *p.* 149. *pl.* 10. *f.* 1.

Roesel. 2. *p.* 21. *pl.* B. *f.* 2.

Panzer, Faun. Ins. Germ. fasc. 49. *No.* 4.

Inhabits Europe, and is found in horsedung, &c.

Panzer mentions a variety with the wing-cases of a chesnut colour.

Plate 1. a. a. Antennæ magnified. b. Two of the feelers seated on the hairy lip. c. The erect horn. d. d. The fore legs strongly dentated.

LUCANUS.

L. Elaphus.

GENUS II. *LUCANUS.*

GENERIC CHARACTER.

Antennæ clavated; the club compressed, or flattened on one side and pectinated, or cleft like a comb. *Mandibulæ*, or pincers, in the males, are very strong, projecting before the head, and armed with teeth. In the females smaller. The anterior *palpi* have 4 articulations; the posterior 3.

General Observations.

The *larvæ*, or grubs, of the Lucani are large, fat, and white. Their mouth is armed with two strong horny jaws, with which they work their way into the substance of decayed wood. There with the saw-dust they form round their bodies a sort of shell, in which they remain till they pass from the state of a chrysalis to a perfect insect. During this intermediate state, this temporary death which the insect undergoes, all its future parts may be plainly traced. The head is bent and supported on the breast; the wings and wing-cases are short, and not as

yet developed; the feet are pressed against the body, and the rings of the abdomen may be easily counted.

The Lucani live but a short time in their perfect state. The last change is scarcely completed, before they seek to fulfil the purpose for which nature has designed them, by providing for a future progeny before they die. They are found in the neighbourhood of oak trees, (particularly the *L. Cervus*) being fond of the honied liquor which is so often seen spread upon the leaves.

SPECIFICATION.

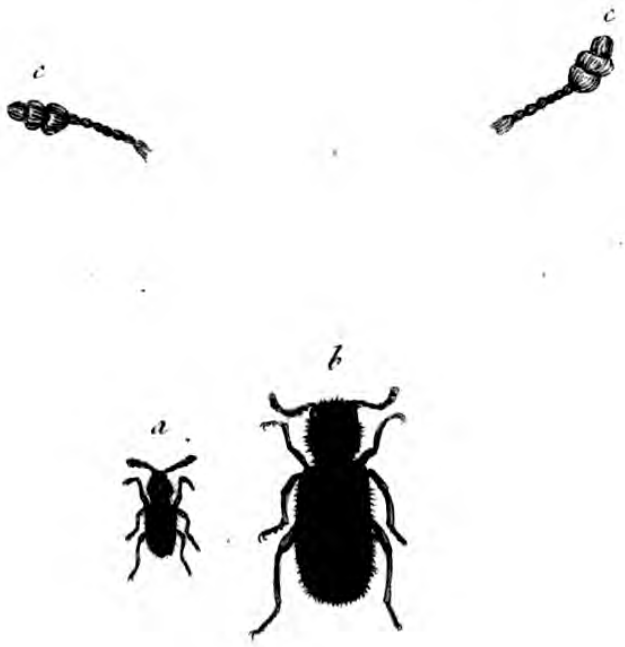
LUCANUS ELAPHUS. L. mandibulis exsertis unidentatis apice bifurcatis, labio deflexo conico. *Linn. Syst. Nat. cura Gmelin, p.* 1589. *Fabr. Syst. Ent. p.* 2. *No.* 3. *Sp. Insect.* 1. *p.* 2. *Mant. Ins.* 1. *p.* 1.

Olivier Entomol. 1. *p.* 12. *pl.* 3. *f.* 7.

A North American insect inhabiting Virginia and Maryland.

It greatly resembles the Stag-beetle, but is smaller and differs in colour. Degeer was acquainted with the insect, but thought it a variety only of the *L. Cervus.* Plate 2.

DERMESTES.



D. violaceus.

GENUS III. *DERMESTES.*

GENERIC CHARACTER.

Antennæ clavated, the club perfoliated, the three last articulations thicker or larger than the others, and forming an oblong mass somewhat compressed. *Thorax* convex and very slightly margined. *Head* bent in and nearly concealed under the thorax.

General Observations.

The Dermestes (the bane of collectors) is well known for the havoc it occasions in subjects of natural history susceptible of decay. It is not the perfect insect, but the larva that does the mischief; for after having passed through the usual stages of transformation, it is no longer to be dreaded, except as an agent for the provision of future depredators. The voracity of the larvæ is such that they will entirely destroy quadrupeds, birds, and insects prepared in cabinets for preservation. Among furs they are equally destructive, not only occasioning the hair to fall off, but consuming the very skin. In

the fields they attack the carcases of dead animals, and consuming the fleshy and tendinous parts, leave nothing but the skeleton behind. It is very difficult to guard against the ravages of these insects. By their minuteness they escape our sight, and by their perseverance our precautions.

The Dermestides, in their perfect state, constantly seek to hide themselves, and seem to shun the impression of light. Their habits are singular, and in a strong degree mark that instinctive faculty with which they are provided for the preservation of life. When they quit their retreats, which is rather from necessity than choice, their motion is timid and uncertain; they seem to fear the very air that breathes upon them, and on the slightest touch suspend their motion, draw in their antennæ and feet, and seem to feel a security from further molestation, in an obstinate and well feigned appearance of death.

The larva may be known when met with by the following description. Its body is composed of twelve very distinct rings: it has a scaly head

provided with two antennæ, and very hard and cutting mandibles. The legs are six in number, each terminated by a nail; the end of the body is remarkable for a tuft of very long hair.

As it must be desirable to find a certain remedy against such a persevering little pest as the Dermestes, it will not be improper to give the following receipt which Olivier found to be sufficiently efficacious, viz. Quick lime, half an ounce; salt of tartar, one dram and a half; camphor, five drams; white soap, four ounces; arsenic, four ounces. Dissolve the camphor in a sufficient quantity of spirit of wine, add the arsenic, the salt of tartar, and the quick lime, beat them together with the soap, and preserve the composition in a pot for use. Olivier was present, with several other Naturalists, at the trial of this receipt. Of several birds enclosed in a box, some were subjected to this preservation. At the end of a year the same persons examined the effect, and found that where the remedy had been used the birds were whole and perfect, while the others were reduced to powder.

SPECIFICATION.

DERMESTES VIOLACEUS. D. nigro cærulescens, thorace villoso, pedibus nigris. *Linn. Syst. Nat. p.* 563. *Gmel.* 1594. *Fabr. Syst. Ent. p.* 56.

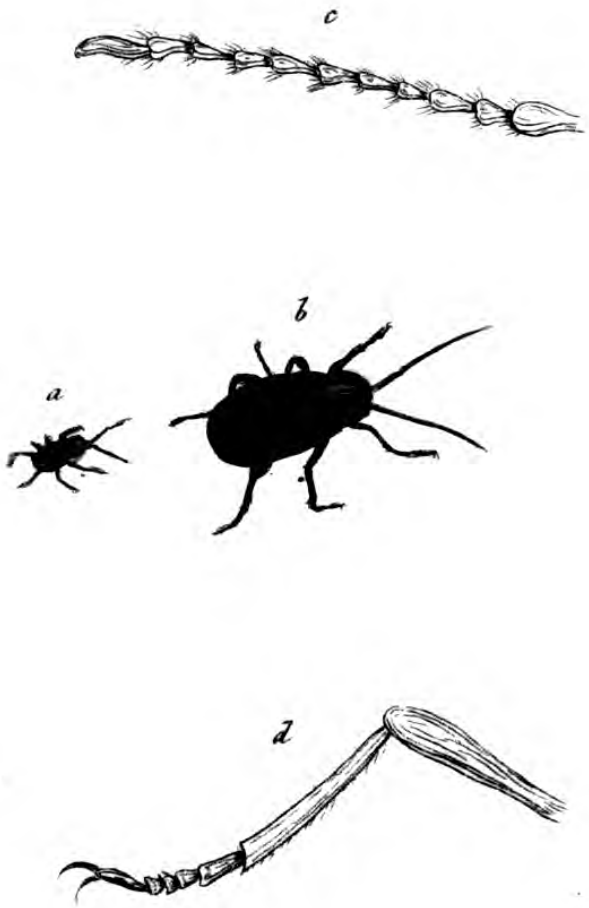
Schaeffer, Icon. pl. 166. *fig.* 4. *a. b.*

Panzer, Faun. Ins. Germ. fasc. 5. *No.* 6.

Inhabits Europe, and is sometimes found on flowers.

Pl. 3. a. The D. violaceus of the natural size. b. The same magnified. c. c. Antennæ.

PTINUS.



P. Fur

GENUS IV. *PTINUS.*

GENERIC CHARACTER.

Antennæ filiform, very long, of eleven articulations, of which the last are the longest. *Thorax* nearly round, not margined, receiving the head under it.

General Observations.

The Ptini, which are very small insects, are commonly found on walls and in houses; they infest granaries, but are seldom met with in the fields. In their habits they resemble the Dermestides. Like them, when touched they draw in their head, and pressing their antennæ and feet against their body, make a mockery of death, and thus endeavour to escape the danger to which they appear no longer sensible.

The larvæ are provided with six feet. The body, which is covered with wrinkles, is soft, cylindrical, and very lightly downy, the hinder part is curved inwards, giving the larva the appearance of an arch. The head is hard, scaly, and has two very strong little jaws. These in-

sects, like those of the foregoing genus, are very destructive to collections of dried substances, feeding on plants, animals, skins, and other objects which the naturalist is desirous of preserving.

SPECIFICATION.

PTINUS FUR. Pt. testaceus subapterus, thorace quatuordentato, elytris fasciis duabus albis. *Linn. Syst. Nat. p.* 566. *Gmel.* 1607. *Fabr. Syst. Ent. p.* 63. *Spec. Ins. p.* 73. *Mant. Ins. p.* 40.

Schaeff. Elem. pl. 30.

Frisch. Ins. 13. *pl.* 15.

Olivier Entomol. vol. 2. *No.* 17. 3. *pl.* 1. *f.* 1. *a. b. c.*

This insect inhabits the houses in most parts of Europe.

Pl. 4. a. The natural size. b. The same magnified. c. One of the antennæ. d. A leg.

HISTER.

H. unicolor.

Genus V. *HISTER.*

GENERIC CHARACTER.

Antennæ clavated, the club solid; the lowest articulation compressed and bent; the head drawn within the body, so that the jaws only appear. *Mouth* armed with jaws like forceps. *Elytra* shorter than the body; legs compressed, toothed, or spiny.

General Observations.

These insects are found in dung, in carcases and shambles; some species live under the bark of dead and rotten trees. They are met with in spring, summer, and indeed in most parts of the year. Sometimes they are found running on the sand by the road-sides. Like the Dermestides, &c. when touched they counterfeit death, till they think the danger past.

SPECIFICATION.

Hister unicolor. H. ater, elytris oblique striatis. *Linn. Syst. Nat. p.* 567. *Gmel. p.* 1609. *Fabr. Syst. Ent. p.* 52. *Spec. Ins.* 1. *p.* 60. *Mant. Ins.* 1. *p.* 32.

Degeer, Ins. 4. *p.* 342. *pl.* 12. *f.* 12.

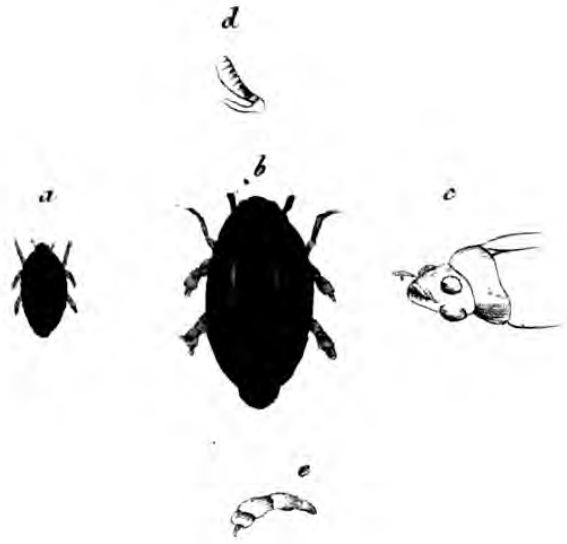
Schaeffer, Icon. pl. 208. *f.* 5.

Panzer, Faun. Insect. Germ. fasc. 4. *No.* 2.

Inhabits sand, earth, and dung, and varies considerably in size.

Pl. 5. a. Natural size. b. Underside magnified. c. The head. d. A horn. e. A leg.

GYRINUS.



G. Natator.

GENUS VI. *GYRINUS.*

GENERIC CHARACTER.

Antennæ cylindrical, club-shaped, stiff, and shorter than the head. *Maxilla* horny, arched and pointed. *Eyes* four in number, two on the upper, and two on the under side of the head.

General Observations.

On the surface of stagnant marsh waters, on lakes, and on ditches, we often see swimming, or as it were running, certain small, black, and shining insects, collected together in numbers, and describing circles with astonishing rapidity. These are Gyrini, which notwithstanding the small space in which so many of them move, and the celerity of their motion, are not often seen to strike against each other. The French, from their circular motion, call them *Tourniquet;* the English, from their lucid surface, *Glimmerchaffer*. This latter name is particularly applicable when the sun shines upon them; then they look like so many brilliant

pearls, moving about in different directions, and reflecting the light in a very pleasing manner. Sometimes they rest as if fatigued with their exertions, and remain without the slightest motion; but on being approached, they instantly strike off to a distance on the surface, or endeavour to save themselves by plunging with equal celerity to the bottom.

Sometimes they remain at the bottom grappling with an aquatic plant; for being lighter than the waters in which they live, it is necessary for them to cling to something while they stay there. When on the surface, the upper part of their body is entirely dry; but when they plunge, a small bubble of air, like a silver ball, remains attached to them, and has a very pretty effect. They have a very strong smell, which exhales from their body, particularly in hot weather, and which leaves a most disagreeable scent upon the fingers after touching them.

The females deposit their eggs on the leaves of aquatic plants. They are very small, long, of a cylindrical shape, and of a white colour. In about eight days the larvæ leave their eggs,

and take to the water; they are of a dirty white or rather greyish colour, have a long cylindric body, six legs, and at first sight resemble the Scolopendra. About the beginning of August, the larvæ leave the water, and climb up the large leaves of the reeds which grow on the banks; there they prepare for their transformation, by covering themselves with a matter like grey paper, which they spin from their bodies; and in this case they remain, in the chrysalis state, till near the end of the same month, when they issue from their temporary tomb, and instantly leap into the water. That principle of mutual destruction, which exists throughout all the branches of animated nature, leads the Ichneumon to lay its eggs near the chrysalis of the Glimmerchaffer, that its larvæ may not be in want of food as soon as they appear.

SPECIFICATION.

GYRINUS NATATOR. Gy. substriatus. *Linn. Syst. Nat.* 1. *p.* 567. *Gmel. p.* 1611. *Fabr. Syst. Ent.* 1. *p.* 234. *Spec. Ins.* 1. *p.* 297. *Mant. Ins.* 1. *p.* 194. *Roesel. Ins.* 3. *pl.* 31. *f.* 1—6.

Schaeffer, Icon. Ins. pl. 134. *f.* 5. *a. b.*

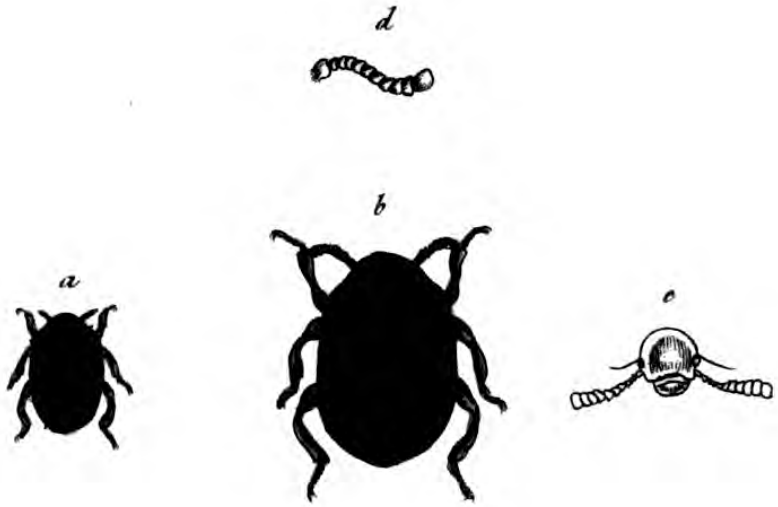
Schaeffer, Elem. t. 17.

Panzer, Faun. Ins. Germ. fasc. 3. *No.* 5.

Inhabits the still waters of Europe.

Pl. 5. a. Natural size. b. The same magnified. c. The head. d. A horn. e. A leg.

BYRRHUS.



B. Pilula.

Genus VII. *BYRRHUS.*

GENERIC CHARACTER.

Antennæ clavated; the club perfoliated. *Palpi* equal and a little clavated. *Maxilla* and lip bifid.

General Observations.

Linnæus at first placed these insects with the Dermestides, but afterwards separated them, and formed a distinct genus under the name of *Byrrhus.* Geoffroy had already established the genus by the name of *Cistela,* a name which Linnæus rejected, but which Fabricius has since given to insects very different from these.

The Byrrhi are oval insects, and some of the species are convex, or subglobular, and have the wing covered by a short pile or down; they are met with in fields, road-sides, and other similar places. Their wings, which are completely hid under the wing-cases, are rarely used. When touched they draw their head beneath the corselet, contract their antennæ and legs, and counterfeit death.

SPECIFICATION.

BYRRHUS PILULA. B. fuscus; elytris striis atris interruptis. *Linn. Syst. Nat. p.* 568. *Gmel.* 1612.

Degeer, Ins. 4. *p.* 213. *pl.* 7. *f.* 23, 24

Schaeffer, Elem. Ins. t. 45.

Schaeffer, Icon. Ins. t. 95. *f.* 5.

Inhabits Europe, and is found in sandy soils, and on various plants, about garden-grounds, &c. It takes its name from its resemblance to a pill, which it assumes when disturbed. The Antennæ in this species are longer than in others, and have not the same clubbed appearance.

Pl. 7. a. Natural size. b. Magnified. c. The head. *d*. A horn.

SILPHA.

S. germanica.

GENUS VIII. *SILPHA.*

GENERIC CHARACTER.

Antennæ clavated; the club perfoliated. *Elytra* margined; *Head* prominent. *Thorax* flattish and margined.

General Observations.

The Silphæ are insects whose strong and disagreeable smell indicates the places they inhabit, and the substances upon which they feed; they, as well as many other insects, are of use to absorb the putrid flesh and excrementitious substances, which might otherwise infect the air. Their instinctive faculty leads them eagerly to seek the dead bodies of small animals, and it is singular to see them, attracted from a considerable distance by the smell of a putrid body, associate in their enterprize, and combine their efforts, that they may peaceably enjoy the fruits of their labours. Corruption has scarcely commenced in a mole or a mouse, and the smell become offensive, before

numbers collect together, and gliding under the animal, work with great activity, removing the earth, till by degrees the body disappears, and is buried without our seeing the workmen, or observing how it is effected. Four or five of these insects will thus entomb a mole in less than twenty-four hours. When it is once completely under the surface, they enter the body and feed without fear.

The Larvæ, which are born in corruption, are of a greyish white colour, with a brown head. The body has twelve divisions with a rusty scale between each. They have six small scaly feet attached to the three first rings of the body. The larva in due time buries itself in the ground, forms an oval cell, turns to a yellowish chrysalis, from which in about there weeks proceeds the perfect insect.

SPECIFICATION.

SILPHA GERMANICA. S. oblonga atra, clypeo obrotundo inæquali marginato, elytris obtusissimis margine laterali ferrugineis. *Linn. Syst. Nat. p.* 569. *Gmel. p.* 1615.

Nicrophorus germanicus. *Olivier Entom. No.* 10. *pl.* 1. *f.* 2. *a. b.*

Panzer, Faun. Ins. Germ. fasc. 41. *t.* 1.

Is found in Germany and the North of Europe, inhabiting putrid substances.

Plate 8. a. One of the antennæ magnified.

Genus IX. *CASSIDA.*

GENERIC CHARACTER.

Antennæ moniliform, thickening towards the tip. *Head* concealed beneath the thorax. *Thorax* flat and margined. *Elytra* with a broad margin. *Tarsi* with 4 articulations.

General Observations.

The Cassida is called tortoise beetle, from a general resemblance which it bears to that reptile, when laid upon its back. The genus is numerous, and contains many species of great beauty. The Cassidæ are readily distinguished from any other of the Linnæan genera, by the singular manner in which the thorax and wing-cases cover the head and body. The Coccinellæ, perhaps, approach them nearest in appearance, but may be easily distinguished, inasmuch as the *Tarsus* of the latter has but three articulations instead of four.

The Cassidæ live on plants. They are seldom seen running, and still more rarely in flight. The fine golden, or silver colours, with which

CASSIDA.

C. viridis.

many of the exotic species are adorned, disappear, it is true, when the insects are dead and kept in cabinets, but which may be made to re-appear by soaking the insect in hot water, about a quarter of an hour. The larva is often found on the same plant by the side of the perfect insect. It eats the under side of the leaves, and is often, as it were, hid under a cover of its own excrement. This larva is of a very singular appearance, and has been described and figured by Reaumur, Goedard, Roesel, Geoffroy, Degeer, &c. It is soft, of an oval shape, and yellowish brown colour. It has six scaly feet, and the body is edged with spines, of which the two last are the longest. When it is at rest the head and feet are entirely concealed under the body; and when in motion the two terminal spines, or fibres, are carried in an upright position. Previous to the change, it fixes itself to a leaf by a glutinous exhalation, which exudes from its body for the purpose, and then becomes a chrysalis of a very unusual appearance. It is shorter than the larva, of a flat oval figure, with an ample fringed corselet, beneath which

is hidden the head. In fifteen days the perfect insect ruptures the anterior and upper part of the skin, which it leaves sticking to the leaf, and proceeds in the appointed time, to deposit a row of eggs to perpetuate a future progeny.

SPECIFICATION.

CASSIDA VIRIDIS. C. *Linn. Syst. Nat.* 1. *p.* 574. *Gmel.* 1635. C. equestris. *Fabr. Syst. Eleuth.* 1. *p.* 388. *Mant. Ins.* 1. *p.* 62. *Syst. Ent.* 1. *p.* 292.

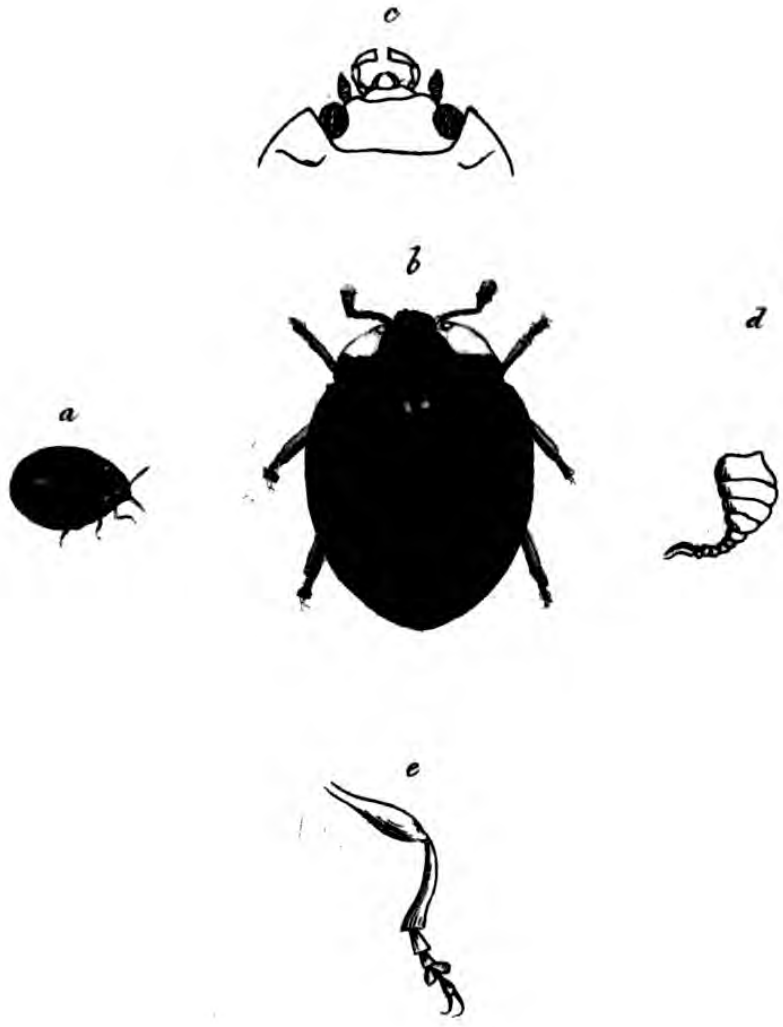
Schaeffer, Icon. t. 27. *f.* 5.

Panzer, Faun. Ins. Germ. fasc. 96. *No.* 5.

Inhabits Europe, and is frequently found on thistles and verticillated plants.

Pl. 9. fig. a. Natural size. b. Magnified. c. A horn. d. The leg.

COCCINELLA.



C. septempunctata.

Genus X. *COCCINELLA.*

GENERIC CHARACTER.

Antennæ subclavated, *i. e.* increase a little in thickness towards the end. *Palpi* club-shaped, and somewhat heart-shaped. *Body* hemispherical. *Thorax* and *elytra* margined. *Abdomen* flat.

General Observations.

The Coccinellæ, which are very pretty insects, have their brilliant wing-cases so closely applied to each other, that they appear like a shining vault of one piece. They do not vary much in colour, but they have for the most part an agreeable and regular arrangement of spots which serve to distinguish the species from each other. A principal character in the insects of this genus is their hemispherical figure, which is at no time more apparent than when they lower their head and draw in their legs on being touched. Upon these occasions they distil from the end of their thighs a drop of yellow mucilaginous liquor, of a very strong and stinking

smell, well known to children while playing with their favourite Lady Birds. The Coccinellæ feed on the *Aphides*, and are found on all sorts of plants and trees infested with their food. They survive the winter, and are the first insects that appear in the spring.

The larva is of a long oval shape, divided into twelve rings, and terminating in a sharpened tail. The surface is hairy. The feet are scaly and six in number. It has a small head with two short antennæ. These larvæ are very voracious, and destroy vast numbers of *Aphides*. They also prey upon each other, so that it is rather dangerous for the small and feeble, to associate with those of their brethren of a proper size and strength.

The chrysalis is prettily spotted with black and other colours. It moves its head from time to time, particularly when touched, and occasionally raises itself on end, and remains some moments in that position. The Coccinella when first it bursts its sheath, to assume the perfect insect, is entirely of a dirty or yellowish white colour, and of a soft and flexible consistence;

but in proportion as it hardens by the action of the air, the spots begin by degrees to appear. The under part of the body also, is at first of the same yellowish white, till in the course of a few hours it changes to black, yellow, or red, according to the species it is designed to represent.

SPECIFICATION.

COCCINELLA SEPTEM PUNCTATA. Coc. coleoptris rubris, punctis nigris septem. *Linn. Syst. Nat.* 1. *p.* 581. *Gmel. p.* 1649. *Fabr. Entom. Syst.* 1. *p.* 274. *Spec. Ins.* 1. *p.* 96. *Mant. Ins.* 1. *p.* 57.

Geoff. Ins. 1. *p.* 321. *t.* 6. *f.* 1.

Roesel. Ins. 3. *t.* 31. *f.* 18.

Panzer, Faun. Ins. Germ. fasc. 79. *pl.* 5.

Inhabits all Europe, and is found on trees and plants, also in the windows of houses in particular years. This is the well-known Lady Bird, the common amusement of children.

Pl. 10. a. Natural size. b. Magnified. c. The head. d. A horn. e. A leg.

Genus XI. *CHRYSOMELA*.

GENERIC CHARACTER.

Antennæ moniliform, or composed of little globular articulations, which grow larger towards the end, and somewhat resemble a necklace of beads. *Palpi* six, thickest at the extremity. *Thorax* margined, but not the elytra. *Body* more or less oval and very convex.

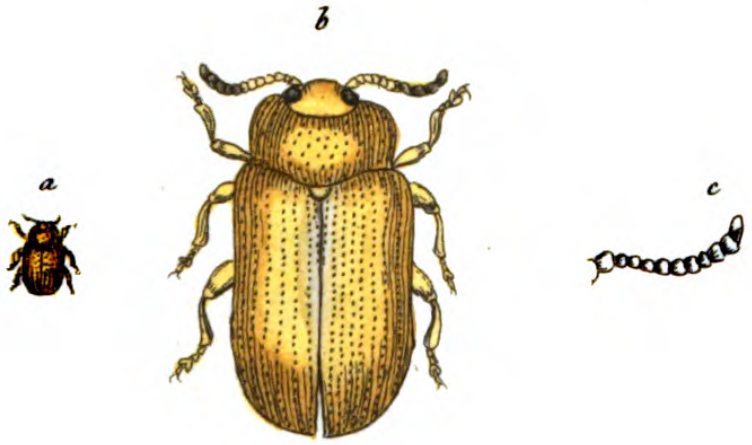
General Observations.

Linnæus found this genus so extensive, that he has divided it into five families, viz.:—

1. With bodies of an oval form.
2. With hinder legs thicker than the others, and made for leaping.
3. With bodies of a cylindrical shape.
4. Of an oblong form, with the thorax broader or wider than the abdomen.
5. Of a long and slender shape, with the thorax the same length as the abdomen.

Many of these insects bear a very strong af-

CHRYSOMELA.



C. pallida.

finity to the Cassidæ and Coccinellæ; but the thorax and large elytra of the former, and the antennæ, increasing in size towards the end of the latter, sufficiently distinguish them from the species of this genus. The Chrysomelæ in general are very small insects; the largest not exceeding half an inch in length. Many of them are enriched with the most beautiful colours, such as scarlet, azure, blue, golden green, &c. One of them, the *Chrysomela Populi*, very much resembles our Lady Bird. It is about twice the size, and is of a bright red colour, with the tips of the wing-cases black, and the thorax of a greenish black. The Chrysomelæ live on trees and plants, feeding on their leaves, and there depositing their eggs. In some species the female is so prolific, and the abdomen so distended with eggs, that it is hardly covered by the elytra.

The larvæ have six long scaly feet, and an oblong oval body, divided into rings, and ending in a fleshy knob, which serves for a seventh leg; and not only assists them in their motion, but being commonly covered with a glutinous

matter, is also of use to fix the larva to the leaf. Several species of these larvæ occupy one and the same leaf, which they quietly gnaw together. When about to be transformed, which happens in the month of June, they fix themselves by their glutinous knob to a leaf, and the chrysalis, in about a fortnight, gives way for the perfect insect.

SPECIFICATION.

CHRYSOMELA PALLIDA. Ch. ovata, flavescens, oculis nigris. *Linn. Syst. Nat.* 1. *p.* 589. *Gmel.* 1. *p.* 1676. *Fabr. Syst. Ent. p.* 99. *Spec. Ins.* 1. *p.* 122. *Mant. Ins.* 1. *p.* 70.

Panzer, Faun. Ins. Germ. fasc. 78. *t.* 4.

Inhabits the willow, birch, ash, &c. Fabricius considered this species to be the same as the black-eyed *Crioceris* of Geoffroy, 1. p. 243, but Olivier and Panzer are of a different opinion.

Pl. 11. a. Natural size. b. The same magnified. c. A horn.

HISPA.

H. mutica.

Genus XII. *HISPA.*

GENERIC CHARACTER.

Antennæ spindle-shaped, *i. e.* gradually thickening from each extremity towards the middle; approximating at the base, and situated between the eyes. *Maxilla* bifid, the exterior division very small. *Palpi* four, short and filiform. *Thorax* and *Elytra* in general aculeated. *Tarsi* with four articulations, the third large and bilobate, the two first triangular.

General Observations.

The insects belonging to this genus have an oblong body, in some species covered with little spines; in others, striated, rough, or shining. Of their habits and manners but little is known. They live on different plants, and some species are found on the upper stems of grasses, from whence they fall voluntarily the moment you attempt to seize them. Olivier found one species in the South of France on a Cistus. Nothing is known at present of the larva.

SPECIFICATION.

HISPA MUTICA. H. inermis, antennis pilosis. *Linn. Syst. Nat. p.* 604. *Gmel.* 1732.

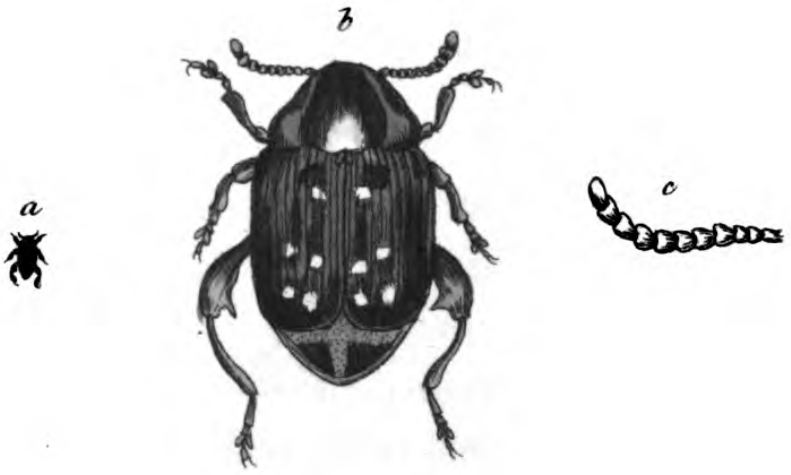
Tenebrio hirticornis. *Degeer*, 5. *p.* 47. *t.* 3. *f.* 1.

Ptilinus muticus. *Fabr. Ent. Syst.* 4. *App. p.* 445. *Panzer, Faun. Ins. Germ. fasc.* 1. *t.* 8.

Inhabits Europe, in sand and on grass. The antennæ are black, with eight articulations, and very hairy.

Pl. 12. a. Natural size, b. Magnified. c. A horn.

BRUCHUS.



B. Pisi

GENUS XIII. *BRUCHUS.*

GENERIC CHARACTER.

Antennæ filiform, with eleven articulations, growing somewhat thicker towards the extremity. *Mandibulæ* simple. *Maxillæ* bifid. *Palpi* four, filiform; the two anterior with four articulations, the posterior with three. *Tarsi* with four articulations; the two first triangular, the third bilobate.

General Observations.

It was not till after the tenth edition of the *Systema Naturæ*, that Linnæus separated these insects from among the Dermestides and Curculiones, and established them as a separate genus, under the name of Bruchus. Geoffroy has given them the name of Milabris, which has not, however, been adopted by succeeding entomologists.

The larvæ have a short, thick, arched body, with a small scaly head, and two hard, cutting mandibles; they have nine *stigmata*, or air vents, on each side.

These larvæ are very destructive to the seeds of leguminous plants, and often do great mischief to the fields of peas. The larva passes the winter in the seed, and the perfect insect appears in the spring. In this state their habits are quite altered, they have no longer any taste for peas, the food which formerly supported them is wholly disregarded, and they now derive their nourishment from the flowers of different plants. As soon as that propensity, which leads all animals to seek each other, is satisfied, the Bruchi return to the young pods, just as they are ready to be formed, and generally deposit an egg in the embryo of each pea.

SPECIFICATION.

BRUCHUS PISI. Br. elytris griseis albo punctatis, podice albo maculis binis nigris. *Linn. Syst. Nat.* 1. *p.* 604. *Gmel. p.* 1734. *Fabr. Syst. Ent. p.* 64. *Spec. Ins.* 1. *p.* 74. *Mant. Ins.* 1. *p.* 41. *Geoffroy, Ins.* 1. *p.* 267. *t.* 4. *f.* 9. *Degeer*, 5. *t.* 16. *f.* 3, 4. *Panzer, Faun. Ins. Germ. fasc.* 66. *t.* 11.

Inhabits Europe, and is destructive, in the larva state, to beans and peas.

Pl. 13. a. Natural size. b. Magnified. c. A horn.

CURCULIO.

C. Bacchus.

GENUS XIV. *CURCULIO.*

GENERIC CHARACTER.

Antennæ bent, first articulation long; the three last subclavated. *Head* more or less lengthened into the form of a trunk. *Palpi* four, short, setaceous; the anterior composed of four, and the posterior of three articulations. *Tarsi* with four articulations; the two first short, triangular; the third bilobate.

General Observations.

Linnæus has divided the Curculiones into the following sections:

1. With the rostrum longer than the thorax, and the thighs simple, without teeth or spines.
2. With the rostrum longer than the thorax, and the thighs dentated.
3. With dentated thighs and the rostrum shorter than the thorax.
4. With the thighs simple, and the rostrum shorter than the thorax.

Of this genus, which is very numerous, there is one species more particularly injurious to man; it is the *Curculio granarius* or Weevil, the female of which deposits an egg while they last in each grain of wheat, to the utter destruction of the seed. The egg, which is very minute, in about a week produces a little white maggot, that fattens in its farinaceous dwelling, till it is ready to become a chrysalis. In about eight or ten days after this, the insect appears in its perfect form, of a dull reddish brown colour, and scarcely one sixth of an inch long.

Another kind infests the hazel nut, and to our great disappointment, often leaves us little but the shell. The insect, which is the *Curculio nucum*, may be found in August, creeping about the hazel-trees, and choosing such nuts as suit her purpose. Into these she first bores a hole with her proboscis, and then turning round deposits an egg in the cavity. Thus she passes on from nut to nut, performing the same operation, till she has emptied her ovarium. The nut, without being injured by the wound, increases to maturity, while the mag-

got within is living on its contents. Some time after the fall of the nut, the larva creeps out at a hole which it gnaws for the purpose, buries itself in the ground, and remains dormant during the long winter months: it then becomes a chrysalis, and finally, in the beginning of August, issues from the earth to make the most of that short space of time generally allotted to the insect tribe in their perfect state.

The *Curculio imperialis*, or Diamond Beetle, is the most beautiful of the tribe, and well known for the rows of brilliant spots with which the wing-cases are covered.

SPECIFICATION.

CURCULIO BACCHUS. Cur. longirostris aureus, rostro plantisque nigris. *Linn. Syst. Nat. p.* 611. *Gmel.* 1. *p.* 1752.

Fabr. Ent. Syst. 2. *p.* 387.

Attelabus Bacchus.

Schaeff. Icon. Ins. pl. 37. *f.* 13.

Panzer, Faun. Ins. Germ. fasc. 20. *t.* 5.

Inhabits Europe.

Pl. 14. a. Natural size. b. Magnified.

GENUS XV. *ATTELABUS.*

GENERIC CHARACTER.

Antennæ thickening towards the tip. *Head* broader before than behind, or tapering gradually from the prominent eyes towards the thorax. *Palpi* four, short. *Tarsi* with four articulations; the third bilobate.

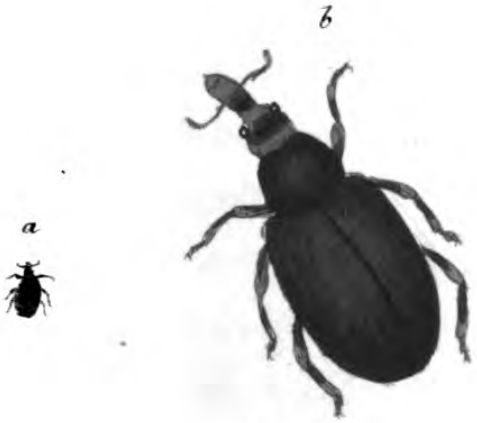
General Observations.

The larvæ of the Attelabi are white, soft, and without feet. They live entirely on vegetable substances, attacking the leaves, flowers, fruits, and stems of plants. They change their skin several times, and when full grown, spin a strong silken case, in which they become a chrysalis, and at the appointed time a perfect insect. When these larvæ are numerous, they make great havoc among the vegetables, either eating the leaves, attacking the young shoots, or gnawing the flowers and fruits.

SPECIFICATION.

ATTELABUS BETULA. At. pedibus saltatoriis, corpore toto atro. *Linn. Syst. Nat.* 1. *p.* 610. *Gmel.*

ATTELABUS.



A. Betulæ

1810. *Fabr. Ent. Syst.* 2. *p.* 392. *Spec. Ins.* 1. *p.* 201.

Degeer, Ins. 5. *p.* 259.

Panzer, Faun. Ins. Germ. fasc. 20. *t.* 15.

Inhabits the birch, and gnaws the edges of the leaves.

Pl. 15. a. Natural size. b. Magnified.

GENUS XVI. *CERAMBYX.*

GENERIC CHARACTER.

Antennæ slender, setaceous. *Thorax* either spiny or gibbous. *Elytra* narrow, sublinear. *Tarsi* with four articulations; the third bilobate.

General Observations.

Linnæus has divided this genus into the following sections:

1. Thorax armed on each-side with moveable spines.
2. Thorax margined, and sides spiny.
3. Thorax round, armed with fixed spines.
4. Thorax subcylindrical and without spines.
5. Thorax roundish, without spines, and of a depressed globular shape.

The insects of this genus, which are very numerous, are easily known by the figure and position of their antennæ, and the number of articulations of which the tarsi are composed. Many of them are particularly distinguished

CERAMBYX.

C. bispidus.

for the beauty and variety of their colours. Their body is elongated, and the antennæ differ in length in the same species, the males having generally the longest. When taken they try to defend themselves, and make a sharp noise by rubbing the thorax briskly against the scutellum. Cerambyces are generally found in woods, and on the trunks of trees; rarely on flowers.

The female has a slit at the end of the body, through which she can exert a long black cylindrical trunk, which in general is concealed; but which, upon pressing the abdomen, may be forced out. This trunk, which appears to be composed of two pieces sliding within each other, is terminated by two long and very delicate cartilaginous filaments. It is by this channel that the insect deposits her eggs, after having made a hole in the wood for that purpose.

The larvæ have a soft, long body, with thirteen rings, and a hard scaly head. They change their skin several times; and at the end of two or three years change into a chrysalis, from which proceeds the perfect insect.

SPECIFICATION.

CERAMBYX HISPIDUS. Cer. thorace spinoso, elytris subpræmorsis, punctisque tribus hispidis, antennis hirtis longioribus. *Linn. Syst. Nat. p.* 627. *Gmel. p.* 1821. *Fabr. Syst. Ent. p.* 169. *Spec. Ins.* 1. *p.* 215. *Mant. Ins.* 1. *p.* 134.

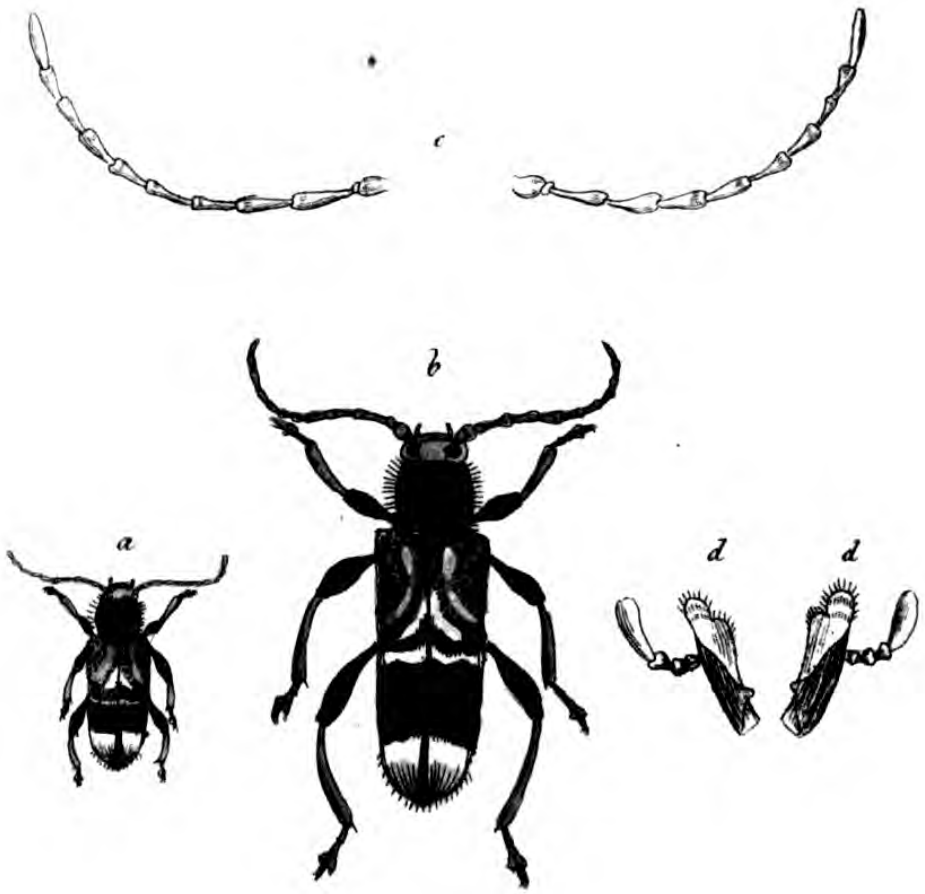
Geoff. Ins. 1. *p.* 206.

Schaeff. Icon. t. 176. *f.* 5. *a.* 5, *b.*

Panzer, Faun. Ins. Germ. fasc. 14. *t.* 16.

Inhabits Europe, and is found in orchards and pastures.

LEPTURA.



L. mystica.

Genus XVII. *LEPTURA.*

GENERIC CHARACTER.

Antennæ setaceous, tapering towards the end. *Palpi* four, filiform. *Elytra* diminishing in breadth towards the apex. *Thorax* somewhat cylindrical. *Tarsi* with four articulations.

General Observations.

The insects of this genus greatly resemble those of the preceding. Their habits and manners are much the same. They are found in the woods, on the trunks of trees, and on flowers. Their larvæ feed on decayed wood. Many of the species can boast of great beauty in the decorations of their wing-cases; some are banded, and some are spotted with very decided and brilliant colours.

SPECIFICATION.

Leptura mystica. L. thorace globoso tomentoso, elytris fusco-cinereis, antice rufis: fasciis line-

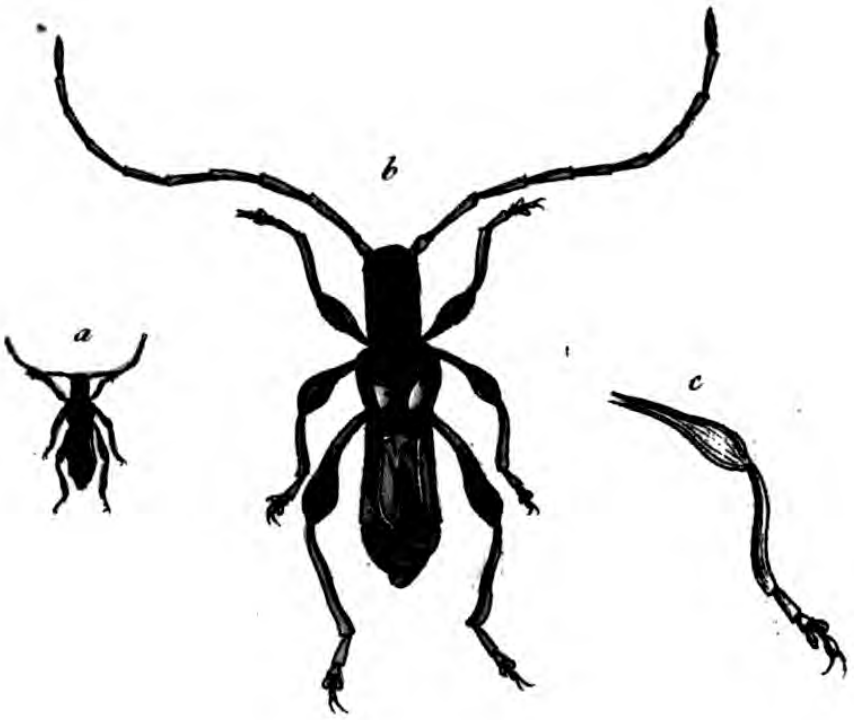
aribus arcuatis lataque canis. *Linn. Syst. Nat. p.* 369. *Gmel. p.* 1855.

Callidium mysticum. *Fabr. Entom. Syst. vol.* 2. *p.* 237. *Spec. Ins.* 1. *p.* 244. *Mant.* 1. *p.* 156. *Schaeff. Icon. t.* 2. *f.* 9.

Panzer, Faun. Ins. Germ. fasc. 82. *t.* 9.

Inhabits Europe, and is found in gardens and pastures.

NECYDALIS.



N. minor.

GENUS XVIII. *NECYDALIS.*

GENERIC CHARACTER.

Antennæ setaceous. *Palpi* four, filiform. *Elytra* smaller or shorter than the wings. *Tarsi* with four articulations; the third large and bilobate.

General Observations.

The wing-cases being so much shorter than the wings in the Necydalis, forms a character which at once distinguishes this genus from the preceding.

No one has observed the metamorphosis of these insects, but it may be presumed from analogy, that the larvæ live in the substance of wood; since Degeer remarked a conical trunk at the end of the abdomen in one species, similar to that in the Cerambyx, and probably given to the insect for the same purpose.

SPECIFICATION.

NECYDALIS MINOR. N. elytris testaceis, apice lineola alba, antennis corpore longioribus. *Linn. Syst. Nat. p.* 641. *Gmel.* 1878.

Molorchus dimidiatus. *Fabr. Ent. Syst.* 1. *p.* 357.

Syst. Eleut. 2. *p.* 375.

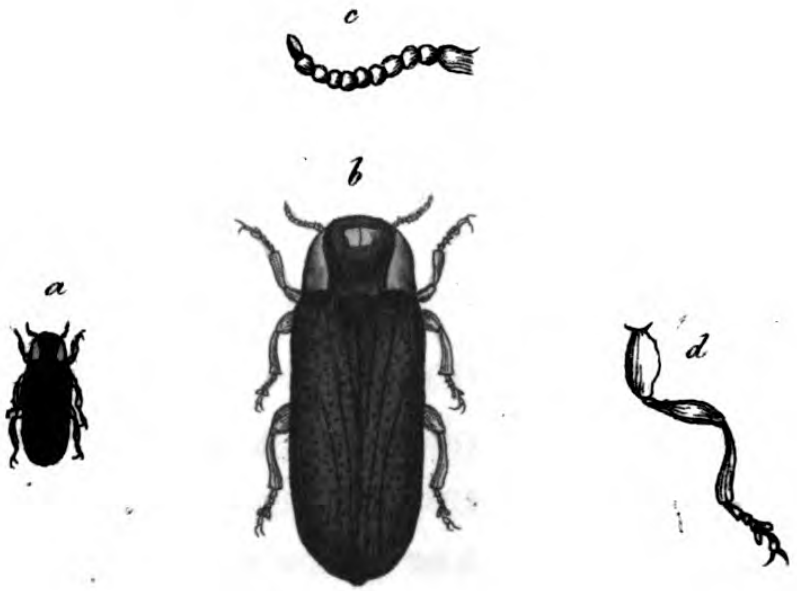
Schaeff. Icon. t. 95. *f.* 5.

Panzer, Faun. Ins. Germ. fasc. 41. *t.* 21.

Inhabits Europe, and is a common species in fields and about hedges, in the summer.

Pl. 18. a. Natural size. b. Magnified. c. A leg.

LAMPYRIS.



L. Noctiluca.

GENUS XIX. *LAMPYRIS.*

GENERIC CHARACTER.

Antennæ filiform. *Palpi* four, unequal; the anterior with four articulations; the posterior with three. *Elytra* weak and flexible. *Thorax* flat and semiorbicular, concealing the head. *Abdomen* with the side plaited into papillæ. Female (in most species) without wings.

General Observations.

This is a remarkable genus of insects, on account of the phosphoric light which the females of all the species emit during the night. On the under side of two or three rings of the abdomen may be seen certain yellow spots, from whence in the dusk of evening proceeds a light, which at a distance looks like a shining spark, or very brilliant little star. The quantity of light produced will be in proportion to the vigour of the insect; it diminishes with its strength, and is lost with its life.

In some species, the male as well as the fe-

male is luminous; and in Italy, the flying glow-worm, *Lampyris Italica*, is so common, that, according to Olivier, in a summer evening, soon after sunset, the air is filled with them; and, as the darkness increases, they look like so many falling stars. There is no walking in the meadows in a fine summer-night, without being surrounded by these sparks of fire, shooting in all directions; and appearing or disappearing, as the insect is on the wing or at rest. The first impression of such a scene is said to be beyond description.

The common glow-worm of this country is a very sluggish insect, seeming to drag itself along, rather than to walk. From the want of wings it is denied the power of flight, and doomed for ever to remain upon the earth. In the summer, till the end of August, these little lamps may be seen shining on dry banks, about woods, in the meadows, or along the bottoms of our hedges. There is but little difference in the appearance of the larva, chrysalis, and complete female insect; but the light is strongest in the latter. The eggs, which are as large as a rape-

seed, are round and of a straw colour. When first emitted they are covered with a glutinous secretion, which fixes them to the turf or grass, where they are destined to remain.

SPECIFICATION.

LAMPYRIS NOCTILUCA. L. oblonga fusca, clypeo cinereo. *Linn. Syst. Nat. p.* 643. *Gmel. p.* 1882. *Fabr. Syst. Ent.* 1. *p.* 200. *Spec. Ins.* 1. *p.* 251. *Mant.* 1. *p.* 161.

Degeer, Ins. 4. *p.* 31. *t.* 1. *f.* 19, 20.

Panzer, Faun. Ins. Germ. fasc. 41. *t.* 7.

Inhabits Europe, and is found in fields and woods. The female is wingless, and is the common glow-worm.

Pl. 19. a. Natural size. b. Magnified. c. A horn. d. A leg.

GENUS XX. *CANTHARIS.*

GENERIC CHARACTER.

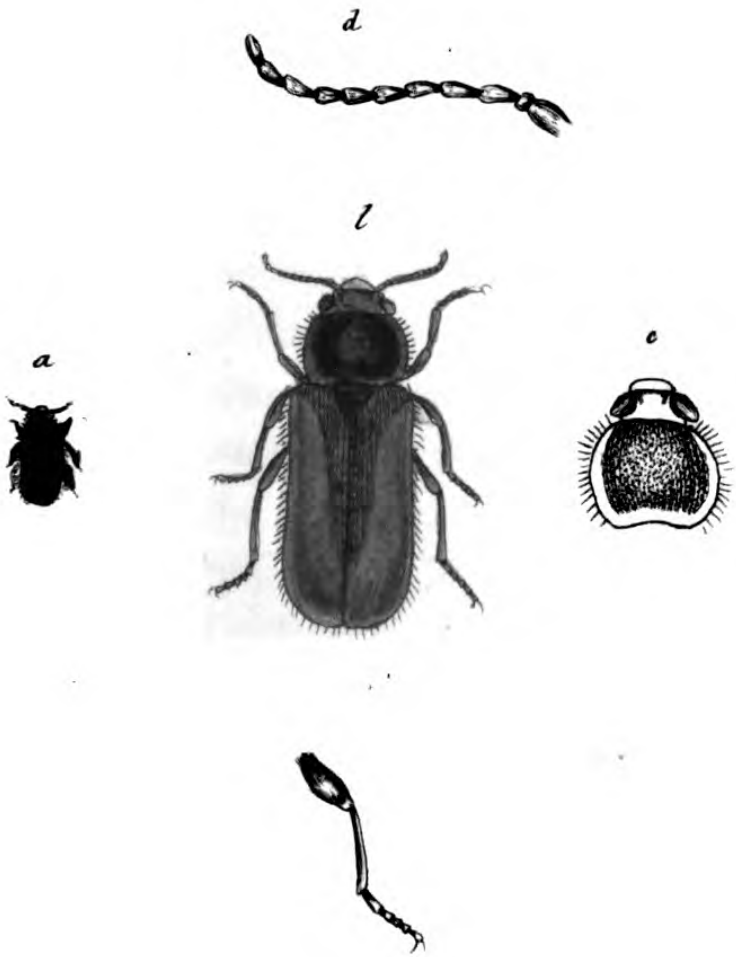
Antennæ setaceous. *Thorax* margined and shorter than the head. *Elytra* flexible. *Abdomen* plaited into papillæ on the sides.

General Observations.

Linnæus has divided the Cantharides into two sections. In the first the thorax is depressed, in the second it is rounded.

These insects are commonly found upon flowers, but they are said not to live entirely on the honey which the nectaries produce, being observed occasionally to attack and devour other insects of a smaller size than themselves. Some of them (such as Fabricius has classed under the genus *Malachius*), present a singularity in their formation, which must not be passed unnoticed. When they are taken up in the hand and examined, two red, inflated, soft, and irregular vesicles, composed of three lobes, will be seen to issue from each side the thorax and abdomen. These four vesicles, upon

CANTHERIS.



C. aenea.

setting the insect at liberty, collapse and disappear, leaving a red spot only to mark the place. It would be difficult to say for what purpose these vesicles are formed, since the deprivation of one or all of them, neither affects the life, nor makes any difference in the habits of the insect.

The larva of the Cantharis is but little known. It lives in decayed wood, and according to the late Mr. Curtis, resembles that of the Cerambyx.

SPECIFICATION.

CANTHARIS ÆNEA. C. corpore viridi aeneo, elytris extrorsum undique rubris. *Linn. Syst. Nat. p.* 648. *Gmel. p.* 1897.

Malachius æneus. *Fabr. Ent. Syst.* 1. *p.* 221. *Syst. Ent.* 1. *p.* 207. *Spec. Ins.* 1. *p.* 262. *Mant.* 1. *p.* 169.

Degeer, 4. *p.* 45. *t.* 2. *f.* 16, 17.

Schaeff. Icon. t. 18. *f.* 12, 13.

Panzer, Faun. Ins. Germ. fasc. 10. *t.* 2.

Inhabits Europe. Is found on flowers and thistles, in May; and is provided with lateral vesicles, which it raises and depresses alternately.

Pl. 20. a. Natural size. b. Magnified. c. The head and thorax. d. A horn. e. A leg.

GENUS XXI. *ELATER.*

GENERIC CHARACTER.

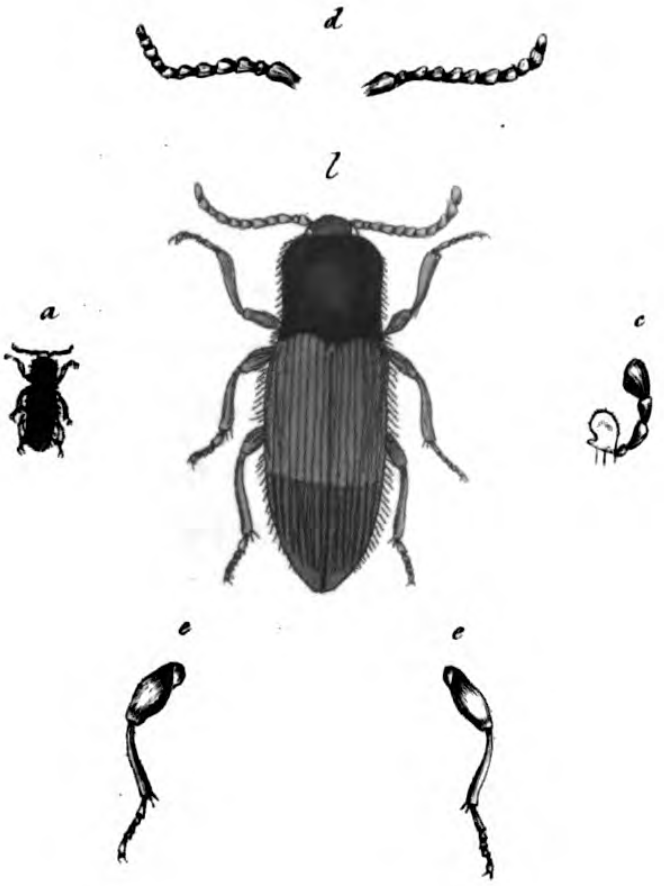
Antennæ setaceous. *Palpi* four, with the last articulation hatchet-shaped; an elastic spine projecting from the breast, or under side of the thorax. *Tarsi* with five articulations.

General Observations.

The spines at the end of the thorax strongly mark the species belonging to this genus, but not so the antennæ, as described by Linnæus; since, in some of the species they are filiform, in others pectinated, and in some serrated.

Many of the coleopterous insects find it very difficult to restore themselves when laid on the back. The singularly curious apparatus with which the insects of this genus are provided for that purpose, was well known to Geoffroy; and is thus described in the Elements of Natural History. An elastic spring or spine projects from the hinder extremity of the breast, and there is a groove or cavity in the anterior part of the abdomen. When laid on its back,

ELATER.



E. balteatus.

the insect raises and sustains itself on the anterior part of the head, and the extremity of the body, by which means the spine is removed from the groove where it is lodged, when in its natural position; then suddenly bending its body, the spine is struck with force across a small ridge or elevation, into the cavity from whence it was withdrawn, by which shock, the parts of the body before sustained in the air, are so forcibly beat against whatever the insect is laid on, as to cause it to spring or rebound to a considerable distance. A cavity, first observed by Geoffroy, is scooped out of the under side of the head and thorax, in which the antennæ are lodged, that they may not be injured by the fall when the insect makes its singular leap.

Among the Elateres there is one, the *Elater noctilucus*, which, like the *Lampyris*, is remarkable for a similar faculty. This insect, which is found in America, and particularly in Jamaica and St. Domingo, emits so bright a light from two yellow spots in the thorax, that when eight or ten of them are confined in

a glass vessel, they give collectively as much light as a candle. In the day time these insects remain dormant, but in the night they may be seen flying about on all sides. The women work by their light, and the Indians use them fastened to their sandals in their nocturnal excursions. Brown observes that the whole internal part of the insect is luminous, but that the light can escape only by the two spots in the thorax.

The larvæ are but little known. The wire-worm, so destructive to the roots of grass, is said to be the larva of the *Elater obscurus*.

SPECIFICATION.

ELATER BALTEATUS. E. thorace atro, elytris antice dimidiato rubris, corpore nigro. *Linn. Syst. Nat.* 1. *p.* 654. *Gmel. p.* 1906. *Fabr. Syst. Eleuth.* 2. *p.* 239. *Spec. Ins.* 1. *p.* 271. *Mant.* 1. *p.* 174. *Ent. Syst.* 2. *p.* 229.

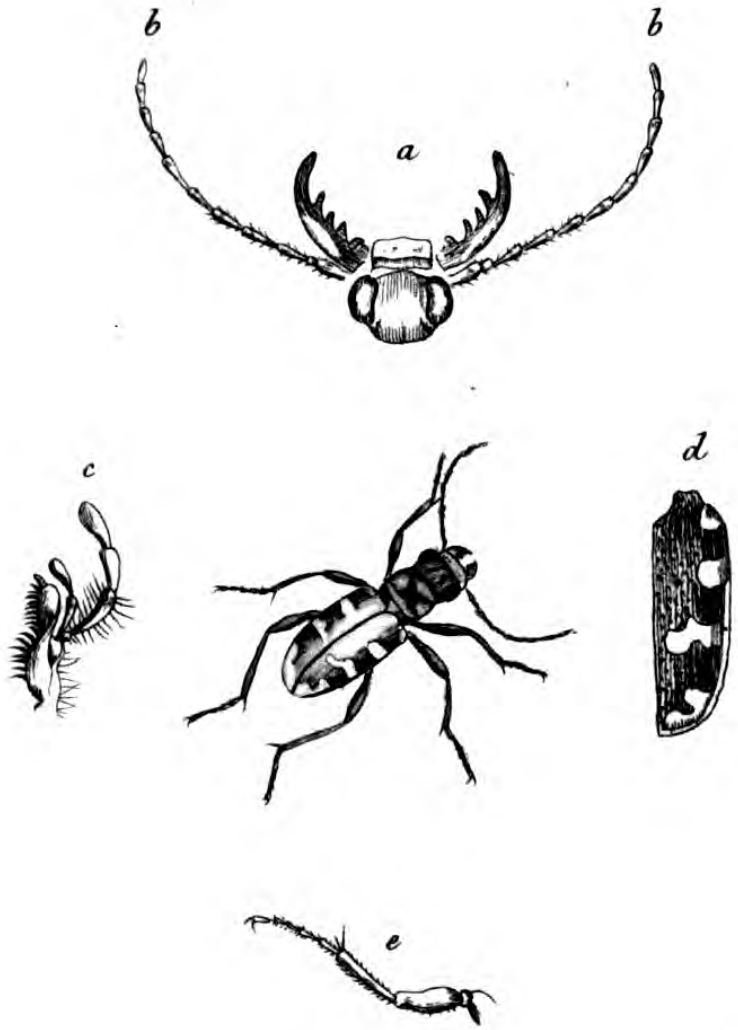
Schaeff. Icon. t. 77. *f.* 2.

Panzer, Faun. Ins. Germ. fasc. 93. *t.* 9.

Inhabits Europe, and is found in underwood.

Pl. 21. a. Natural size. b. Magnified. c. A feeler. d. Antennæ. e. e. The legs.

CICINDELA.



C. hybrida.

GENUS XXII. *CICINDELA.*

GENERIC CHARACTER.

Antennæ setaceous. *Palpi* six, filiform, and unequal. *Mandibulæ* projecting far before the head, and toothed. *Eyes* round and prominent. *Thorax* roundish and margined. *Tarsi* with five articulations.

General Observations.

The Cicindelæ greatly resemble the Carabi in the form of the antennæ, the number of the palpi, and the appendix at the base of the posterior thighs; but they may be distinguished by the prominent eyes, and the form of the thorax, which in the Carabi is heart-shaped and truncated at the end.

The Cicindelæ are carnivorous; and such is their voracity, that they are waging continual war with those unlucky insects, which have the misfortune to come within their reach, without the strength to contend with them. The provision which Nature has made to further their pursuits, and which strongly marks for what

they were designed, may be seen in the organization of their mandibles. They are large, arched, strongly toothed, and come together when the mouth is closed; but the moment the insect calls them into action, they fly open, separate to a considerable distance, and seize their prey with a pinch not to be resisted.

The Cicindelæ are very active, running along the ground with great celerity. They often use their wings in fine warm weather, but never fly far without settling. In general they are found in dry and sandy places.

The larvæ are cylindrical, soft and whitish; they have six legs, a sort of scale or plate on the top of the head, and a mouth armed with two strong jaws. Their appetite is the same as that of the perfect insect; they are equally voracious, but being less active, are obliged to use the following stratagem to secure their prey. The larva digs a deep cylindrical hole in the ground, making the opening perfectly round, which it exactly fills with the scaly plate on the top of its head, so that the surface of the ground appears perfect. In this state, the larva waits with the

utmost patience, till some unwary insect passing over its retreat, is seized on a sudden by its strong jaws, and forced to the bottom of the hole to be devoured at leisure.

SPECIFICATION.

CICINDELA HYBRIDA. C. subpurpurascens, elytris fascia lunulisque duabus albis. *Linn. Syst. Nat. p.* 657. *Gmel. p.* 1921. *Fabr. Syst. Ent. p.* 224. *Spec. Ins.* 1. *p.* 283. *Mant. Ins.* 1. *p.* 185.

Degeer, 4. *p.* 115. *t.* 4. *f.* 8.

Schaeff. Icon. t. 35. *f.* 10.

Inhabits Europe, and is found in dry sandy places.

Pl. 22. a. The mandibles. b. Antennæ. c. Palpi. d. Elytron. e. A leg.

GENUS XXIII. *BUPRESTIS.*

GENERIC CHARACTER:

Antennæ filiform, serrated, somewhat shorter than the thorax. *Palpi* four, filiform, with the last articulation truncated. *Mandibulæ* short, horny, with cutting edges. *Head* half buried beneath the thorax. *Tarsi* with five articulations; the four first heart-shaped; the last elongated.

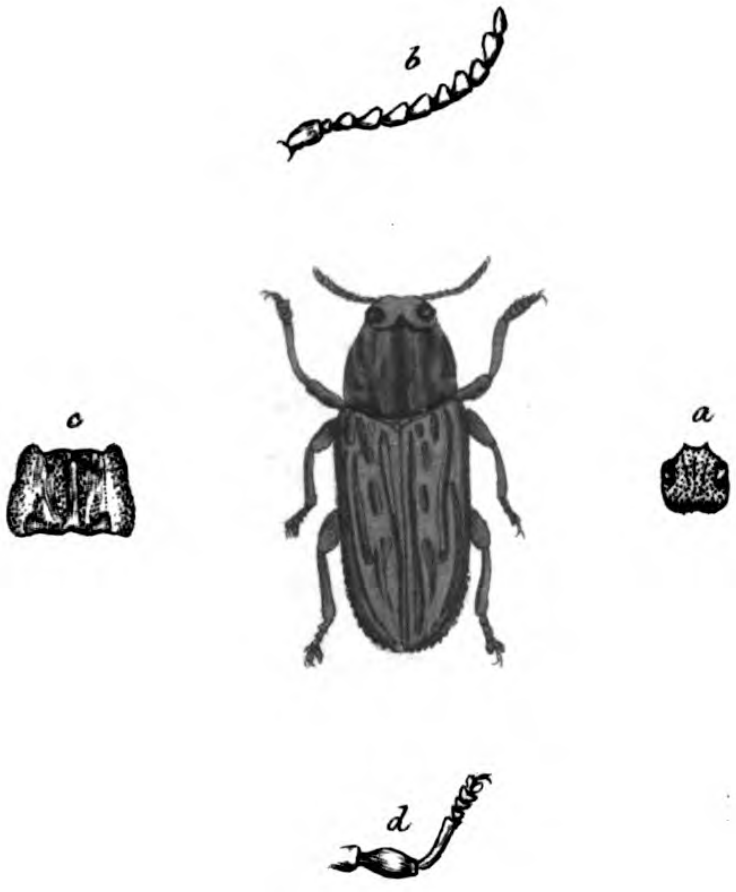
General Observations.

Linnæus has divided these insects into three families.

In the first, the elytra are raised at the suture.
In the second, they are serrated towards the apex; and
In the third they are entire.

There is no genus of the order Coleoptera that can boast of so many brilliant insects as this. The species are, for the most part, enriched with such glowing and beautiful colours, that in the same individual we may often meet with

BUPRESTIS.



B. mariana.

the pure tints of the rainbow shining with the brightest metallic lustre.

The Buprestides are not numerous in the North of Europe; but they are common in the southern provinces, and abound in the hot climates of both hemispheres. From Asia and South America, many beautiful species are obtained; among others, the largest of the genus, the *Buprestis gigantea*, which is two inches and a half long, and of a fine metallic bronze, like polished bell-metal.

The larva of the Buprestis is not known; but it may be reasonably supposed to live in wood, since Olivier found the *B. mariana* dead on the trunk of the *Pinus maritima*, and the *B. octoguttata* dead in a hole made in the *Pinus silvestris*.

The Buprestides are sluggish on the ground, but active on the wing, particularly when the weather is fine and warm. They are generally found on trees, bushes, plants, or flowers; and some will fall, as it were, dead to the ground, to avoid being taken.

SPECIFICATION.

BUPRESTIS MARIANA. Bu. elytris serratis longitudinaliter rugosis: maculis duabus impressis, thorace sulcato. *Linn. Syst. Nat. p.* 660. *Gmel. p.* 1929. *Fabr. Syst. Ent. p.* 210. *Spec. Ins.* 1. *p.* 276. *Mant.* 1. *p.* 178.

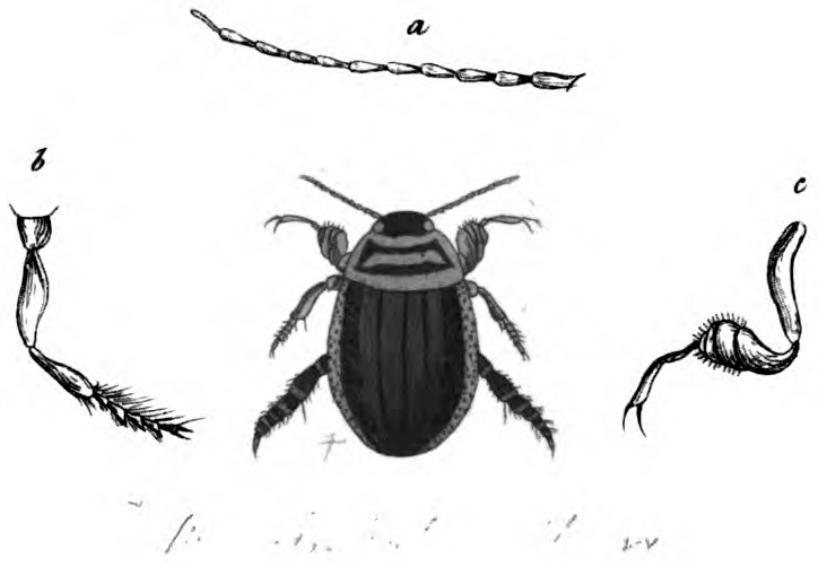
Degeer, 4. *p.* 128. *t.* 4. *f.* 18.

Schaeff. Icon. t. 49. *f.* 1.

Inhabits most parts of Europe, Siberia, and North America, and is found on the trunks of decayed and worm-eaten fir-trees, &c.

Pl. 23. a. The head. b. A horn. c. The thorax. d. A leg.

DYTISCUS.



D. cinereus.

GENUS XXIV. *DYTISCUS.*

GENERIC CHARACTER.

Antennæ setaceous. *Palpi* six, filiform. *Mandibulæ* thick, arched, terminating in two or three teeth. Hind feet hairy, made for swimming.

General Observations.

This is an amphibious genus, inhabiting the water in the day-time, but in the evening crawling to land and taking flight. They swim with great agility, and nothing can be better calculated than their hind legs for the purpose. They are two feathered oars, of due proportions, presenting a resistance to the stream, which by a muscular effort of the insect impels the body forward with great celerity. Although capable of living a long while under water, the Dytiscus is occasionally obliged to come to the surface for air. And here we cannot but notice one of those simple, but effective, contrivances, by which the insect accomplishes its end without being conscious of the means. The body

being specifically lighter than the water, rises when the animal is perfectly at rest, but rises tail foremost. In this situation, with the tail above the water, but the head beneath, the Dytiscus raises the end of its wing-cases, a vacuum is formed, a bubble of air rushes under and forward, the head becomes buoyant, and the insect breathes. The return to the bottom is easily managed; the wing-cases are pressed against the body, the air is expelled, and the legs are put in motion.

The Dytisci are carnivorous, and are perpetually chasing other insects, which they seize with their fore-feet, and devour with voracity.

The larva is very singular in its appearance, more resembling a shrimp than any thing else. It has a strong pair of forceps, and such a disposition to use them, that the larger sort not only attack other water-insects, but are said to destroy the young fry of fish, which it seizes with violence, and presently overcomes. The chrysalis, which is found in the soft earth on the banks of the water, changes in about three weeks, and is succeeded by the perfect insect.

SPECIFICATION.

DYTISCUS CINEREUS. Dy. elytrorum margine thoracisque medietate flavis. *Linn. Syst. Nat. p.* 666. *Gmel. p.* 1946. *Fabr. Syst. Ent. p.* 231. *Spec. Ins.* 1. *p.* 293. *Mant. Ins.* 1. *p.* 190.

Degeer, Ins. 4. *p.* 397. *No.* 4.

Roesel, Ins. 2. *Aquat. Class* 1. *t.* 3. *f.* 6.

Schaeff. Icon. Ins. t. 90. *f.* 7.

Inhabits Europe, and is very common in stagnant waters.

Pl. 24. a. A horn. b. A hind-leg. c. A fore-leg.

GENUS XXV. *CARABUS.*

GENERIC CHARACTER.

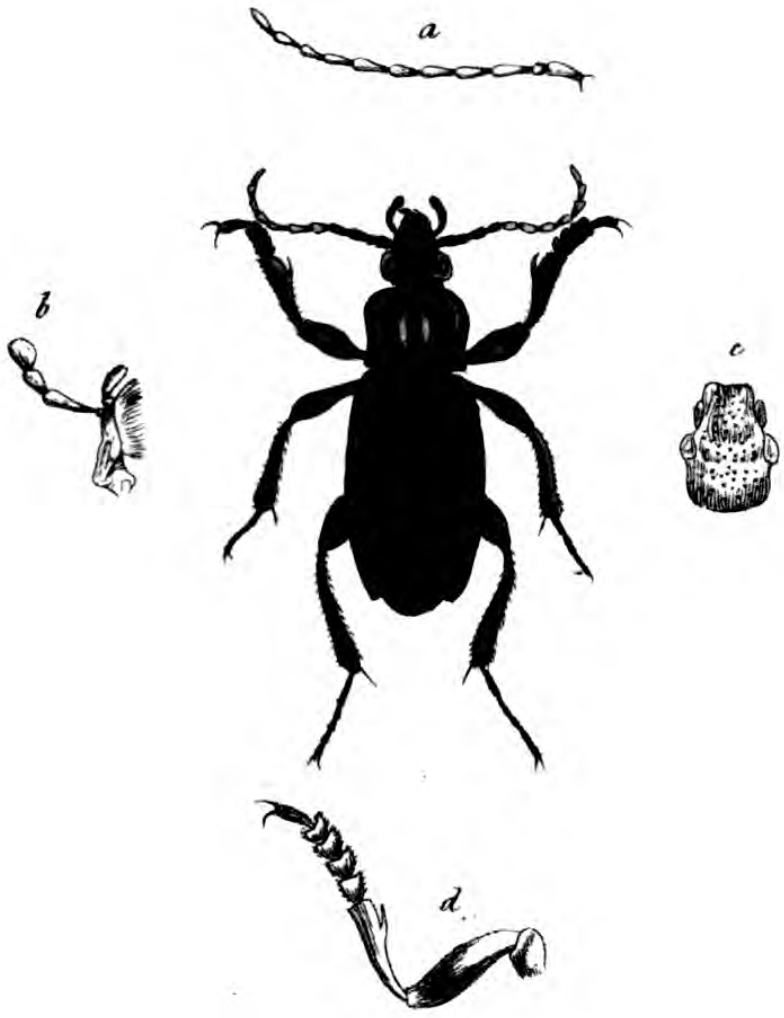
Antennæ filiform, about half as long as the body. *Palpi* six. *Thorax* somewhat heart-shaped, with the apex truncated, and margined. *Elytra* margined. *Tarsi* with five articulations.

General Observations.

This is a numerous genus, and most of the species are apterous. They have wing-cases, indeed, but when they are separated from the body, the rudiments only of the wings appear; that is to say, a little, thin, strait, membranous film, differing in length, but always too short for the purpose of flight. Such as have wings rarely make use of them.

The larvæ of the Carabi live in the ground, and in rotten wood. They are difficult to meet with, and consequently but little known. They have a long soft body, with six scaly feet, and a pair of strong jaws, with which they seize the larvæ of such insects as serve them for food.

CARABUS.



C. clathratus.

Their voracity is exemplified by Reaumur, in his account of the larva of the *Carabus Sycophanta*. That insect, with its scaly pincers, will attack a caterpillar by the belly, and burying its head in the body, notwithstanding the writhing of the sufferer, will persevere till the whole is devoured. The largest caterpillar is hardly sufficient for one day's nourishment; and it will eat several in the same day, when they are to be found. They are so gluttonous, that when they have an opportunity, they stuff themselves to such a degree, that the skin seems ready to crack with repletion. This inordinate appetite does not always go unpunished; for Reaumur says, that he has sometimes seen the largest of these worms, when from repletion they have been unable to move, attacked by the young and active of their own species, who in their turn have fattened on the bodies of their brethren. It seems these young barbarians were not driven to this act from necessity, since there were abundance of caterpillars to be had at the time.

The Carabi are very active insects, and are

frequently met with in fields and gardens running with great quickness, and hiding themselves in the ground, and under stones. They for the most part shun the light, and seek their food in the evening, preying with great voracity on other insects; and (as if they still retained the impression of their former barbarous habits) often on each other. They have a very strong and disagreeable smell; and, when taken, exude from the mouth and anus, a drop of a nasty, acrid, and very caustic liquor.

SPECIFICATION.

CARABUS CLATHRATUS. C. apterus nigricans, elytris porcatis: interjectis punctis excavatis longitudinalibus. *Linn. Syst. Nat. p.* 669. *Gmel. p.* 1962. *Fabr. Syst. Ent.* 1. *p.* 238. *Spec. Ins.* 1. *p.* 302. *Mant. Ins.* 1. *p.* 197.

Degeer, Ins. 4. *p.* 87. *t.* 3. *f.* 12.

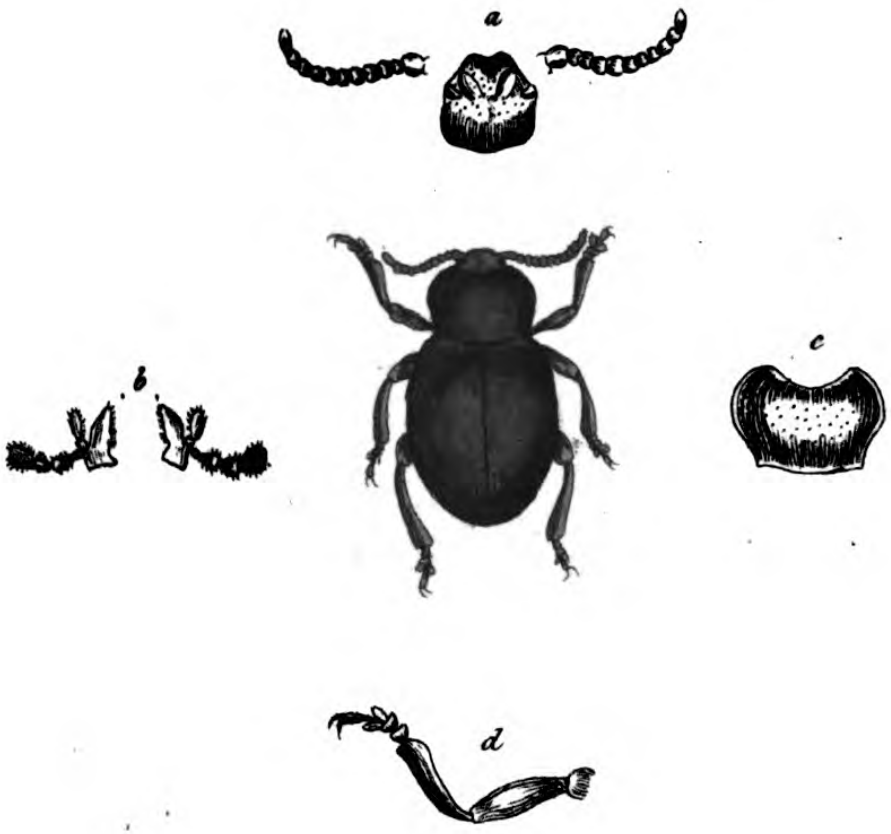
Voet. Coleopt. 2. *t.* 38. *f.* 40.

Panzer, Faun. Ins. Germ. fasc. 75. *t.* 1.

Inhabits Europe, and is found, though not common, in woods.

Pl. 25. a. A horn. b. A feeler. c. The thorax. d. A leg.

TENEBRIO.



T. cavigatus.

GENUS XXVI. *TENEBRIO.*

GENERIC CHARACTER.

Antennæ moniliform, with the last joint rounded. *Thorax* plano-convex, and margined. *Head* projecting. *Elytra* rather stiff. *Tarsi* with four articulations, the third heart-shaped.

General Observations.

This genus is divided by Linnæus into two sections: in the first, the insects want wings, and the wing-cases are united, forming but one piece. In the second, the wings are perfect and the cases divided.

The Tenebriones are smooth, dark-coloured insects, and for the most part emit a very disagreeable smell; for which reason they have been called *stinking beetles*. They run quickly, and fly well; but prefer the evening or the night for their excursions. They are found in houses, particularly in granaries; they are also met with in gardens and sandy places.

The larvæ are of a yellowish white colour, with a body formed of twelve scaly rings, and

an oval flattish head furnished wlth mandibles, antennæ, and feelers. Six scaly legs proceed from the first three rings. When the larva is in motion, a fleshy mass proceeds from the tail, which the insect uses as an additional foot. These larvæ feed on flour, bread, sugar, and even dead and rotten wood. The *meal-worm*, which is the larva of the *Tenebrio molitor*, and is so frequently found in bake-houses, is about an inch long, with a slender polished body. It is said to be a favourite food of the nightingale.

SPECIFICATION.

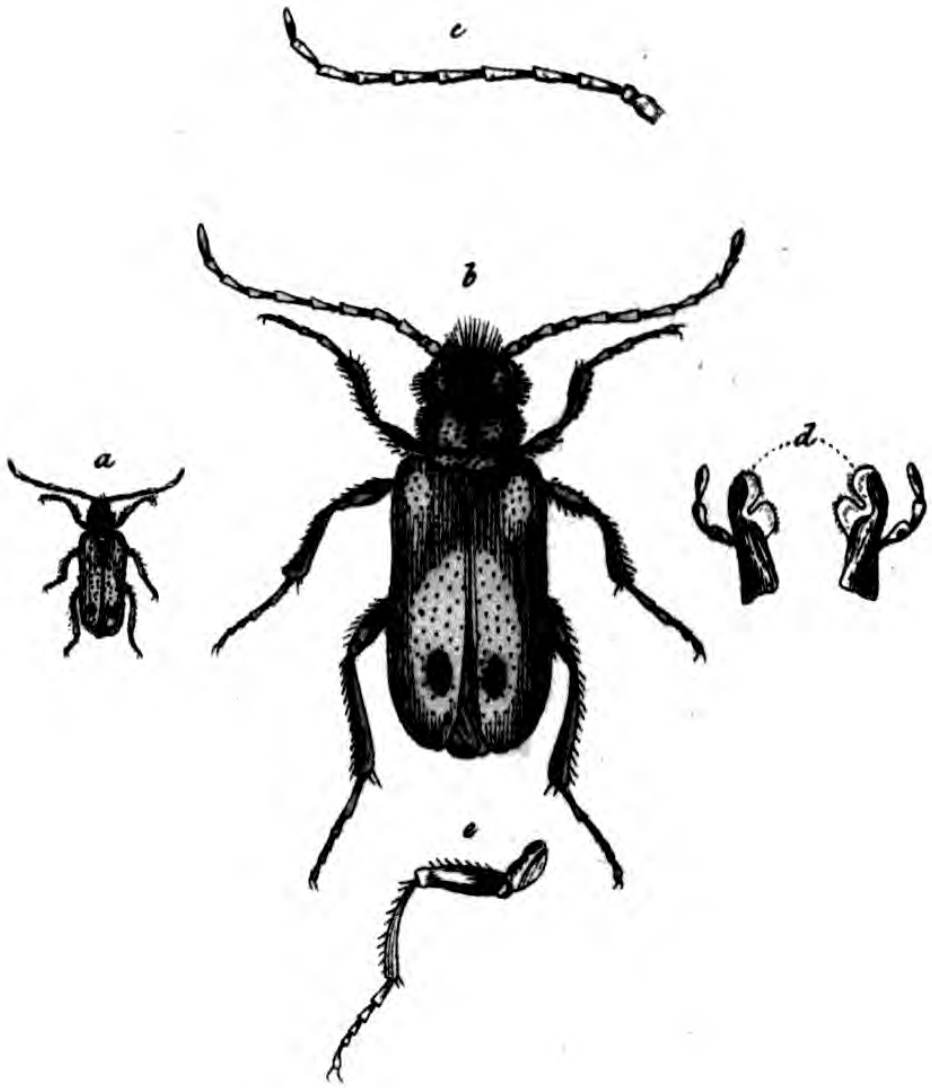
TENEBRIO LÆVIGATUS. T. apterus niger lævis, elytris lævibus, thoracе lunato subtus cæruleus. *Linn. Syst. Nat. p.* 678. *Gmel.* 1. *p.* 1997. *Fabr. Ent. Syst.* 1. *p.* 111. *Spec. Ins.* 1. *p.* 323. *Mant. Ins.* 1. *p.* 211.

Panzer, Ent. Germ. pl. 8.

Inhabits Africa.

Pl. 26. a. The head and antennæ magnified. b. *Palpi.* c. The thorax. d. A leg.

MELOE.



M. bimaculatus.

GENUS XXVII. *MELOE.*

GENERIC CHARACTER.

Antennæ moniliform, with the last articulation oblong. *Palpi* four, unequal. *Thorax* roundish. *Elytra* soft and flexible. *Head* inflected and gibbous.

General Observations.

The insects of this genus are frequently found in the spring, in the fields and cultivated grounds. They feed on the leaves of plants, and when taken up, exude a little drop of a yellow viscous liquor from the articulation of each leg. In the month of May the females increase prodigiously; the abdomen becomes so distended, as in some degree to impede their motion; and towards the end of the month they are relieved, by depositing their orange-coloured eggs in the ground.

The larvæ are very small, and of a yellow colour, with black eyes. They live, says Dr. Shaw, by attaching themselves to other insects, and absorbing their juices. Degeer having put

some flies in a box with these larvæ, observed that they collected in great numbers under the thorax of the fly, so that in a short time they sucked it to death.

The celebrated Blister fly is classed by Linnæus in this genus.

SPECIFICATION.

MELOE BIMACULATUS. M. alatus niger, elytris luteis macula nigra postica. *Linn. Syst. Nat. p.* 680. *Gmel. p.* 1738.

Apalus bimaculatus. *Fabr. Syst. Ent.* 1. *p.* 127. *Spec. Ins.* 1. *p.* 161. *Ent. Syst.* 1. *p.* 50.

Degeer, Ins. 5. *t.* 1. *f.* 18.

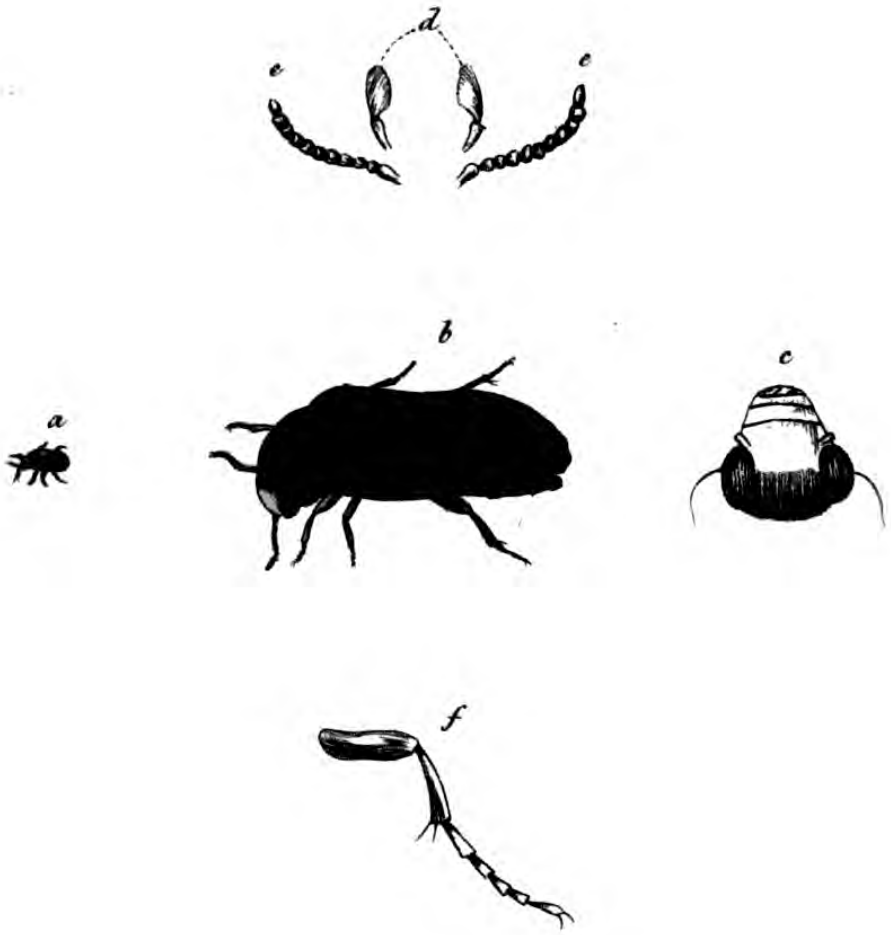
Panzer, Faun. Ins. Germ. fasc. 104. *t.* 4.

Inhabits Europe, and frequents sandy places.

Pl. 27. a. The natural size. b. Magnified. c. A horn. d. Lips with two of the palpi. e. A leg.

Pl. 28.

MORDELLA.



M. frontalis.

GENUS XXVIII. *MORDELLA.*

GENERIC CHARACTER.

Antennæ filiform, sometimes serrated, sometimes pectinated. *Palpi* four; the anterior ones the longest and clavated; the posterior filiform. *Thorax* convex. *Head* bent down when disturbed. *Elytra* curved downwards towards the tip. A broad lamina at the base of the abdomen, before the thighs. *Abdomen,* in the females, pointed.

General Observations.

Very little is known of the habits of this genus of insects. They are few in number, small in size, and are generally found on flowers. The larva of the Mordellæ has not been described.

SPECIFICATION.

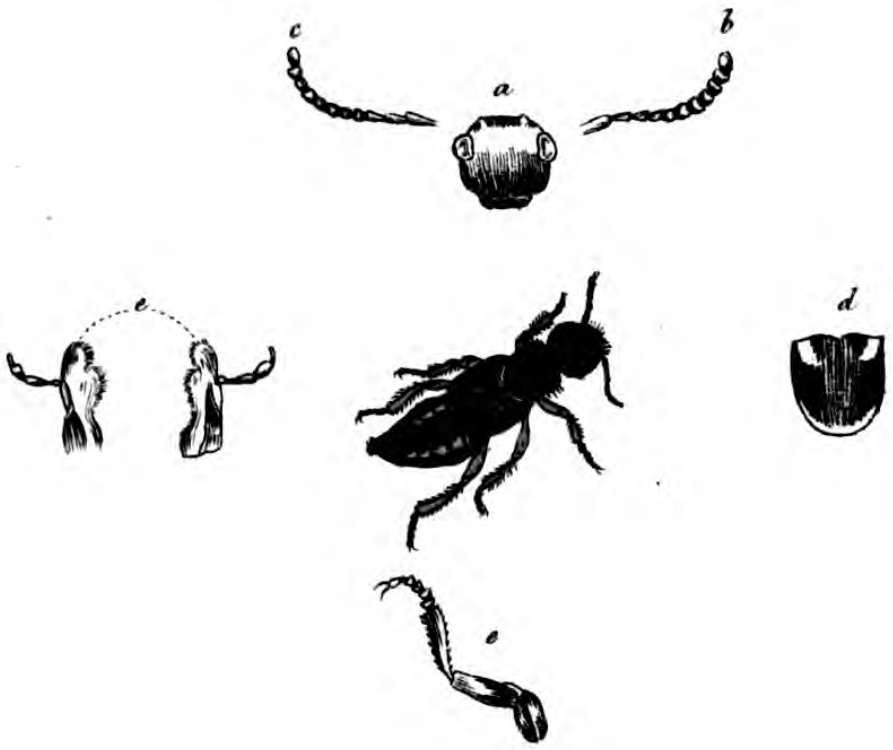
MORDELLA FRONTALIS. M. atra, fronte pedibusque flavescentibus. *Linn. Syst. Nat. p.* 682. *Gmel. p.* 2024. *Fabr. Spec. Ins.* 1. *p.* 333. *Mant. Ins.* 1. *p.* 219. *Ent. Syst.* 1. *pt.* 2. *p.* 114.

Panzer, Faun. Ins. Germ. fasc. 13. *t.* 13.

Inhabits Europe, and is found on flowers.

Pl. 28. a. Natural size. b. Magnified. c. The head. d. The anterior palpi. e. Antennæ. f. A leg.

STAPHYLINUS.



S. erytropterus.

GENUS XXIX. *STAPHYLINUS.*

GENERIC CHARACTER.

Antennæ moniliform. *Palpi* four. *Elytra* half the length of the abdomen, and covering the wings. *Tail* simple, with two oblong vesicles, which the insect can protrude or contract at pleasure. *Tarsi* with five articulations in each foot.

General Observations.

This genus, which bears some resemblance to the following, may be easily distinguished by the want of pincers at the end of the abdomen, with which the earwig is always provided. The Staphylini have a long body and short wing-cases, which in some species are so small, that without particular attention they may be overlooked. They are very voracious, devouring without mercy every weaker insect, not excepting their own species. When irritated they erect their tail in a menacing manner, and protrude from it the two vesicles mention-

ed in the generic character, which are doubtless intended for weapons of defence.

Their larvæ so greatly resemble the perfect insect, that it is difficult to distinguish one from the other. They live in moist places under ground.

SPECIFICATION.

STAPHYLINUS ERYTHROPTERUS. S. ater, elytris pedibusque rufis. *Linn. Syst. Nat.* 1. *p.* 683. *Gmel.* 1. *p.* 2027. *Fabr. Spec. Ins.* 1. *p.* 335. *Mant. Ins.* 1. *p.* 220.

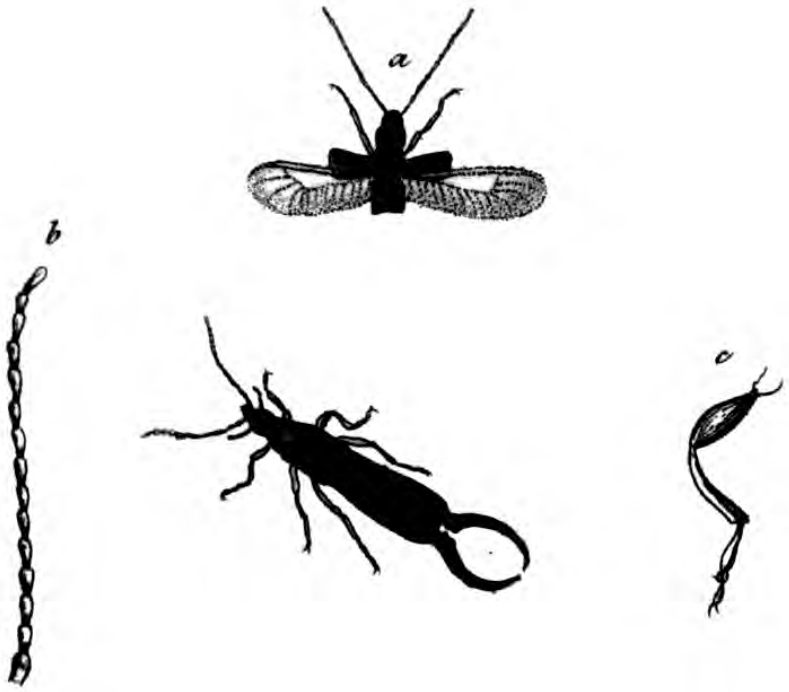
Schaeff. Elem. t. 117.

——— *Icon. t.* 2. *f.* 2.

Inhabits Europe, and is found in dung.

Pl. 29. a. The head magnified. b. Antennæ. c. Palpi. d. The thorax. e. A leg.

FORFICULA.



F. auricularia.

GENUS XXX. *FORFICULA.*

GENERIC CHARACTER.

Antennæ setaceous. *Palpi* four, unequal, and filiform. *Elytra* very short and covering the folded wings. *Abdomen* terminating in a kind of forceps. *Tarsi* with three articulations.

General Observations.

The insects of this genus are found in the ground and in moist places; under stones, and under the bark of old half-decayed trees. They feed on different substances, but are particularly fond of fruits. Degeer observes, that about the beginning of April, the females may be found under stones with a collection of eggs, which they watch with the greatest care, never going far from their charge; and if they should be scattered abroad, collecting them again one by one, till they are all restored to the same place. Previous to laying the eggs, their body is greatly inflated, and the beating of the heart, or principal artery which runs along the back, may be plainly distinguished through the transparent skin. The young insects resemble the

mother, except that they have neither wings nor wing-cases. The earwig, that well-known species of the genus Forficula, has been unjustly accused of causing death by penetrating the brain through the ear. This is a vulgar error:—the insect may lodge in the external ear while a person sleeps on the ground, but it has no power to penetrate further. This accident may have given rise to the tale; for it is the habit of the earwig to hide itself wherever it can, and it is no uncommon thing to place the bowl of a tobacco-pipe on an upright stick in gardens as a trap, into which they collect in numbers.

SPECIFICATION.

FORFICULA AURICULARIA. F. elytris apice albis. *Linn. Syst. Nat.* 1. *p.* 686. *Gmel.* 1. *p.* 2038. *Fabr. Syst. Ent. p.* 269. *Spec. Ins.* 1. *p.* 340. *Mant. Ins.* 1. *p.* 224.

Schaeff. Elem. t. 63.

——— *Icon. t.* 144. *f.* 3, 4.

Inhabits Europe, and is found under the bark of trees, under stones, and in gardens.

Pl. 30. a. The body with the wings expanded. b. A horn. c. A leg.

ORDER II.

HEMIPTERA.

THE word Hemiptera, which signifies half wings, is expressive of the semi-coriaceous, or parchment-like state of the Elytra in the insects of this Order. In the Coleoptera, the elytra are separated from each other by a suture, and are perfectly coriaceous. In the Order Hemiptera, the wing-cases do not meet together in the same manner, but have their inferior margins crossed, or laid one over the other, and the upper half is often of a horny nature, while the lower half is a perfectly transparent membrane. In this respect, there is a considerable deviation, *i. e.* in the proportion of the coriaceous matter which partly composes the upper wings. In some it is considerable, while in

others, especially in the genus Cicada, it is so small as to form, as it were, the connecting link between insects with semi-coriaceous elytra, and those with their four wings entirely naked. If it be absolutely necessary that the classific character should be uniform, and constant in all the genera, we ought rather to depend on the form of the mouth, which is a species of rostrum, or beak, bent inwards along the breast, and is a character which is not only easily perceived, but belongs exclusively to the insects of this Order.

BLATTA.

B. orientalis

GENUS XXXI. *BLATTA.*

GENERIC CHARACTER.

Antennæ setaceous. *Palpi* unequal, filiform. *Head* inflated; hidden under the anterior part of the thorax. *Thorax* flattish, orbicular, and margined. *Elytra* and wings extended, smooth, semi-coriaceous. *Abdomen* terminated, in both sexes, by two moveable appendices, like horns. *Feet* formed for running.

General Observations.

The Blattæ are very active insects. They run very fast, and generally use their legs rather than their wings, though some of the species can fly very well. They for the most part avoid the light, and leave their lurking places only in the night, from which circumstance they were named by former Naturalists, *lucifugæ*. That pest of our kitchens and bakehouses, commonly called the *black beetle*, is a species of this genus, for which we were originally indebted to South America; and which, it seems, was

brought to us by the way of the East Indies, from whence is derived its trivial name of *orientalis*. It is fortunate for us, that the largest of the genus, the *B. gigantea*, cannot be naturalized, since the ravages it commits are such, as to make it hardly bearable in a house. In tropical countries, particularly in South America, these insects commit the greatest depredations: nothing comes amiss to them: they get at every thing, and what they cannot eat they spoil with their excrement. Drury describes them as being very fond of ink, into which they are apt to fall, and soon become so offensively putrid, that a man might as well sit over the cadaverous body of a large animal, as write with the ink in which they have died. They fly into the faces and bosoms of persons, exciting by their spiny legs a sudden horror not easily described. They make a noise in the night like a smart knocking with the knuckle on the wainscot; so that three or four of them will make such a drumming, as to disturb the rest of those who are not very good sleepers. Drury adds, that the sick and dying have their extremities at-

tacked by them, and that the ends of the toes and fingers of the dead, are frequently stripped of the skin and flesh.

SPECIFICATION.

BLATTA ORIENTALIS. B. ferrugineo-fusca; elytris abbreviatis: sulco oblongo impresso. *Linn. Syst. Nat. p.* 688. *Gmel.* 1. *p.* 2043. *Fabr. Ent. Syst.* 2. *p.* 9. *Spec. Ins.* 1. *p.* 343. *Mant. Ins.* 1. *p.* 226.

Degeer, Ins. 3. *p.* 530. *t.* 25. *f.* 1, 2.

Schaeff. Icon. t. 155. *f.* 6, 7.

Panzer, Faun. Ins. Germ. fasc. 96. *t.* 12.

Inhabits America, Asia, and Europe. Frequents houses, and is known by the name of black beetle.

Pl. 31.

GENUS XXXII. *MANTIS.*

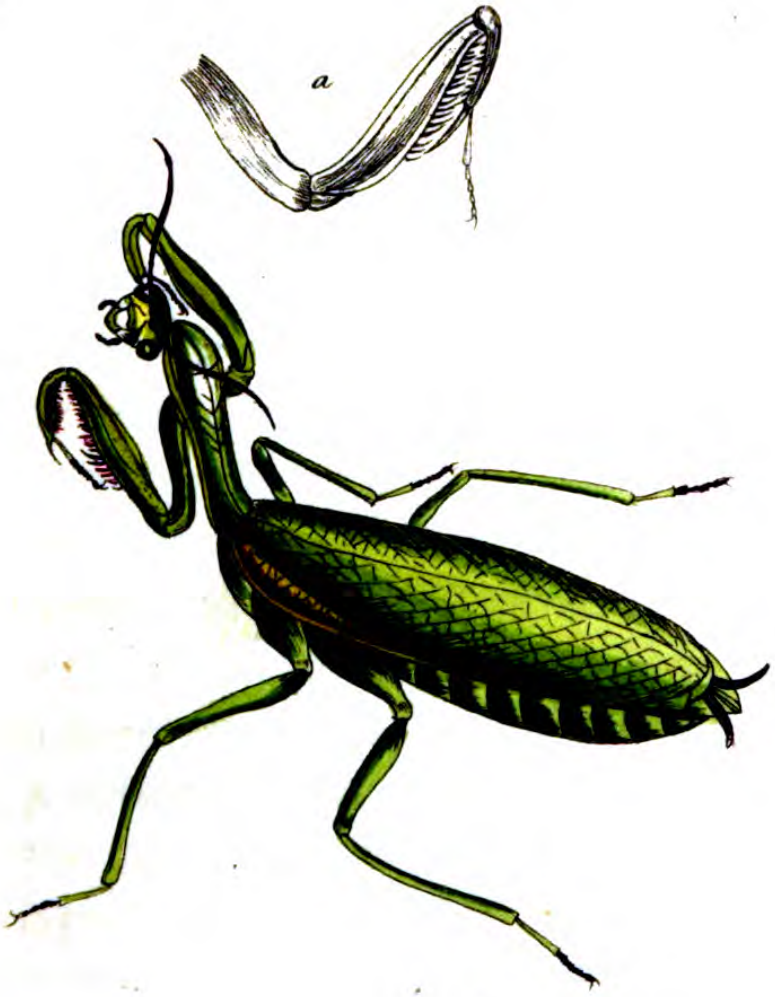
GENERIC CHARACTER.

Antennæ setaceous. *Head* unsteady, armed with strong jaws, and furnished with Palpi. *Thorax* linear. *Wings* four, membranous, and wrapped round the body; the under ones folded. *Fore feet* compressed, serrated beneath, and terminated by a single nail or claw, and a setaceous, jointed foot. *Hind legs* smooth, and formed for walking.

General Observations.

This is a remarkable genus of insects, containing some species of the most singular figure imaginable. In one we meet with the exact resemblance of a dried leaf. In another, the limbs are, as it were, scattered about, and resemble the conjunction of so many withered stalks; while a third looks like a long dried stick, with six lateral branches. These are all remarkable only for their appearance, but there is one, the *Mantis religiosa*, whose peculiarity of manner has attracted universal notice. This

MANTIS.



M. religiosa.

insect is generally seen in a sitting posture, with the two fore-legs raised and closed together, which gives it such a praying attitude, that the Eastern devotees will not suffer it to be disturbed. The Turks are said to believe that they stand with their heads towards Mecca, and move their hands in prayer to Mahomet.

These insects are so quarrelsome, and have such a disposition to destroy each other, that the Chinese keep them in bamboo cages, and make them fight for their amusement. In the event of a battle, the conqueror, without scruple, devours his antagonist.

The female lays a considerable number of long yellow eggs, which she generally fixes to the stem of some plant, and covers them with a glutinous secretion, which in drying forms a tough coriaceous nidus.

SPECIFICATION.

MANTIS RELIGIOSA. M. thorace lævi subcarinato, elytris viridibus immaculatis. *Linn. Syst. Nat.* 1. *p.* 690. *Gmel.* 1. *p.* 2050. *Fabr. Spec. Ins.* 1. *p.* 348. *Ent. Syst.* 2. *p.* 20. *No.* 30 β.

Roesel. Ins. 2. Gryll. t. 1. *f.* 2. *t.* 2. *f.* 6.

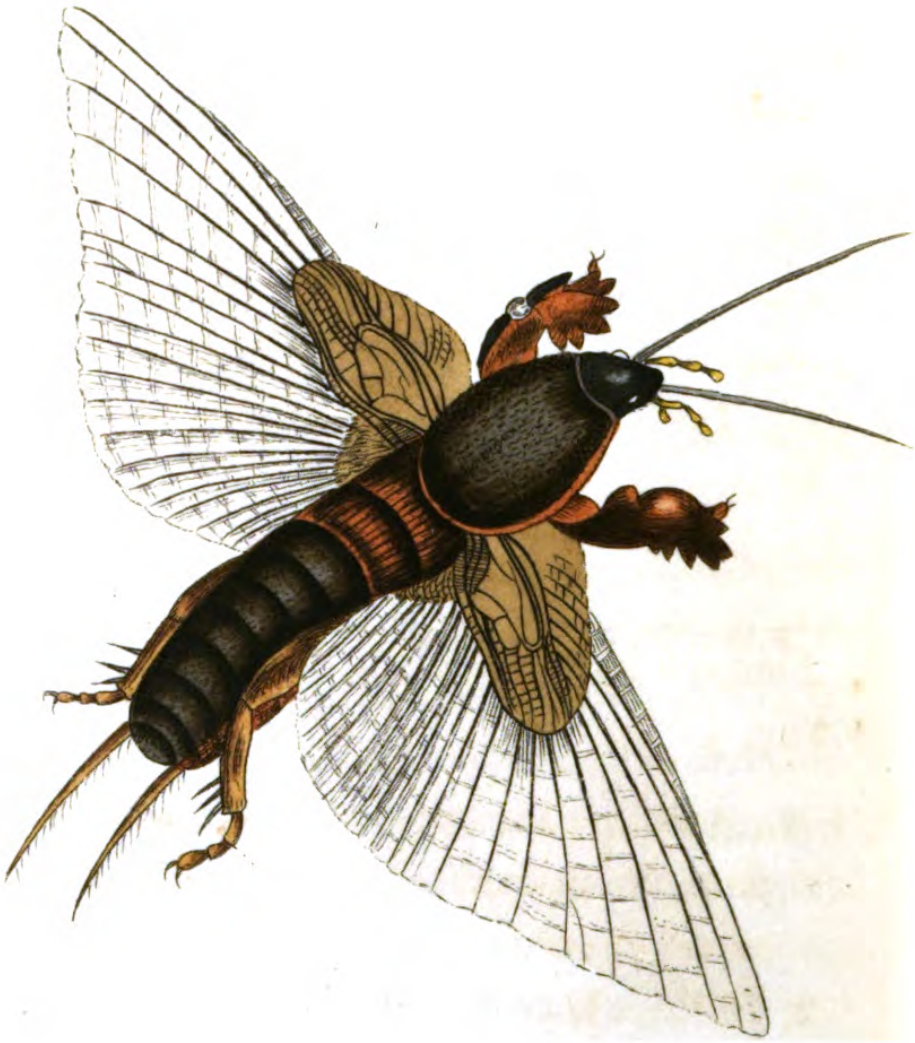
Schaeff. Elem. t. 81.

Panzer, Faun. Ins. Germ. fasc. 50. *t.* 8.

Inhabits the East, and is found also in the South of France and in Germany.

Pl. 32. a. A fore-leg, with its claw and little foot.

GRYLLUS.



G. Gryllotalpa.

GENUS XXXIII. *GRYLLUS.*

GENERIC CHARACTER.

Antennæ setaceous in some, in others filiform. *Palpi* four, filiform. *Head* inflected. *Maxilla* horny, thin, pointed, with a long and sharp interior tooth. *Wings* four, deflexed, and convoluted; under ones concealed beneath the elytra. *Hind feet* formed for leaping. *Tarsi* with three articulations terminated by two nails or crotchets.

General Observations.

Linnæus has divided the Grylli into the following sections:—

1. *Acridæ.* Having a conical head longer than the thorax. Antennæ ensiform, or sword-shaped.
2. *Bullæ.* Having the thorax carinated or keeled, with the Antennæ shorter than the thorax, and filiform.
3. *Achetæ.* Having two setæ or bristles in the tail.

4. *Tettigoniæ.* The female having a sheath or tube projecting from the tail. Antennæ setaceous.
5. *Locustæ.* Having the tail simple, without bristles or tube, with the Antennæ filiform.

With the exception of those of the first section, which prey on other insects, all the Grylli are herbivorous. The Achetæ feeding chiefly on roots, and the Tettigoniæ and Locustæ, on leaves.

It is no longer a doubt that the sharp chirping made by the grasshopper and cricket is effected by friction. When the Gryllus is inclined to make a noise, it raises its elytra, or wing-cases, till they form a sharp angle with the body, and then rubs them forcibly together with a rapid motion that produces the sound. The insect makes this noise only when in perfect security. As you approach a grasshopper, the sound diminishes, and ceases entirely when you are too near.

The most singular insect of this genus, and

at the same time the most disagreeable in appearance, is the mole cricket, which burrows under ground like a mole, raising a furrow as it proceeds. It is at once distinguished from all others, by the apt formation of its fore-feet, which are divided into several segments, or claws, spreading out like the palm of the hand, by means of which the insect is enabled to perform its instinctive functions in the most effective manner. It moves slowly, and never leaves its hiding-place till the close of the day. The female lays between two and three hundred eggs in an oval nest under ground, and is very careful of her charge till they are hatched.

SPECIFICATION.

GRYLLUS GRYLLOTALPA. Gr. thorace rotundato, alis caudatis elytro longioribus, pedibus anticis palmatis tomentosis. *Linn. Syst. Nat.* 1. *p.* 693. *Gmel.* 1. *p.* 2059.

Acheta Gryllo-talpa. *Fabr. Syst. Ent. p.* 279. *Spec. Ins.* 1. *p.* 353. *Mant. Ins.* 1. *p.* 231. *Ent. Syst.* 2. *p.* 28.

Roesel. Ins. 2. *Gryll. t.* 14, 15.

Schaeff. Icon. Ins. t. 37. *f.* 1.

Inhabits Europe, and frequents the sides of ponds and streams. Is commonly known by the name of mole cricket; feeds on vegetables, and often destroys young cabbages, &c.

Pl. 33.

FULGORA.

F. Candelaria.

GENUS XXXIV. *FULGORA.*

GENERIC CHARACTER.

Antennæ short, seated below the eyes, with two articulations; the exterior the largest, and globose. *Head* produced, extended and empty. *Rostrum* inflected, elongated, articulated, channelled, and containing three unequal bristles. *Feet* formed for walking. *Tarsi* with three articulations.

General Observations.

Among the various ways in which it has pleased Nature to diversify the different subjects of her extensive kingdom, there is no example more peculiar, or better adapted to answer the end designed, than that of the Fulgora. In the largest species of the genus (the *F. Lanternaria*) is seen a bladder, like a head, of very considerable dimensions compared with the body, and of an elongated shape. It is perfectly transparent, and is, in fact, similar to a horn lantern. Within this cavity a natural operation, imitated by chemistry, is going on;

phosphorus is formed, and in the night so strong a light emitted, that by the help of a single insect a common newspaper may be read. The largest and finest of the Fulgoræ are found in South America, in Cayenne, or in Surinam.

There is also a species found in China, the *F. Candelaria,* figured in Pl. 34, which is remarkable for the neatness of its shape and the pretty marking of its wings. This, like the others, has a projecting snout, which gives a lively shining light in the night time, equal in proportion to its size, to the larger species of South America. It has not hitherto been observed that those found in Europe possess the shining quality, though one might naturally suppose, that the same faculty pervaded the whole genus. These smaller European species frequent shrubs and bushes, and are very easily taken; but those inhabiting the hotter climates fly with agility, and living on the tops of large trees, are very difficult to catch. The larvæ are unknown.

SPECIFICATION.

FULGORA CANDELARIA. F. fronte rostrata subulata adscendente elytris viridibus luteo maculatis, alis flavis apice nigris. *Linn. Syst. Nat.* 1. *p.* 703. *Gmel.* 1. *p.* 2089. *Fabr. Spec. Ins.* 2. *p.* 213. *Mant. Ins.* 2. *p.* 260. *Ent. Syst* 4. *p.* 2.

Roesel. Ins. 2. *Gryll. t.* 30.

Sulz. Ins. t. 10. *f.* 62.

Inhabits China, where it is very common.

Pl. 34.

GENUS XXXV. *CICADA.*

GENERIC CHARACTER.

Antennæ setaceous, shorter than the head. *Rostrum* bent inwards under the breast, channelled in its upper part, and containing a sucker formed of three thin bristles. *Wings* four, membranous, and declining along the sides of the body. *Feet*, in the majority, made for leaping.

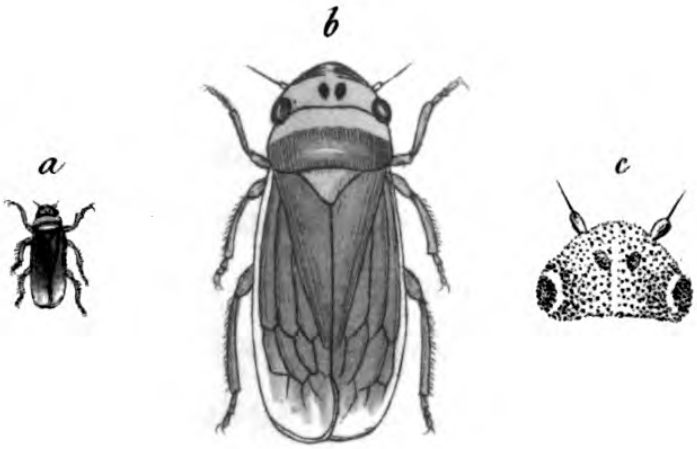
General Observations.

Linnæus has divided the Cicadæ into the following sections:

1. *Foliaceæ.* Thorax compressed, membranous, and larger than the body.
2. *Cruciatæ.* Thorax with a horn or spine, on each side.
3. *Maniferæ.* Feet not made for leaping.
4. *Ranatræ.* The hind feet made for leaping.
5. *Deflexæ.* Wings deflected, or wrapped round the sides of the body.

It is in the months of June and July in the

CICADA.



C. viridis.

warmer climates, that the Cicadæ are heard to make the chirping noise, which has gained them the notice of Virgil, and the praise of Anacreon. This noise is sharp, monotonous, and tiresome from its constant repetition. It is said, that a single Cicada hung up in a cage is almost sufficient to drown the voice of a whole company. They are generally found on the trunk or in the branches of trees, and rarely change their place. They, however, can fly with great strength and rapidity, and are very active in the middle of the day; but the slightest cold benumbs them: consequently the best time to take them is early in the morning, or after sunset. What has chiefly excited the attention of Naturalists in the history of the Cicada, is the piercing sound which proceeds from its little body. For the investigation of the cause by which the sound is produced, we are indebted to the labours of Reaumur and Roesel, who have unfolded the curious apparatus which enables the Cicada to effect its purpose. "It proceeds from a pair of concave membranes, seated on each side the first joints of the abdo-

men. The large concavities of the abdomen, immediately under the two broad lamellæ in the male insect, are also faced by a thin, pellucid, iridescent membrane, serving to increase and reverberate the sound; and a strong muscular apparatus is exerted for the purpose of moving the necessary organs." It is the male alone that makes the noise, the female is perfectly mute. She has a borer or trunk, projecting from the end of the abdomen, with which she pierces the dead and half-decayed branches of trees, and deposits in the hole her white, oblong, pointed eggs. She makes many holes a quarter of an inch deep, and deposits in each eight or ten eggs, placing them in such a manner, that the posterior end of one may be opposite the anterior end of the following.

That froth, adhering to the leaves and stems of plants, which is so well known to every one by the name of Cuckow-spittle, contains the larva of the *Cicada spumaria*, which, in due time, leaves its watery mansion, and skips about the fields in its perfect state. It is then the children's Froghopper.

SPECIFICATION.

CICADA VIRIDIS. C. elytris viridibus, capite flavo; punctis nigris. *Linn. Syst. Nat.* 1. *p.* 711: *Gmel.* 1. *p.* 2114. *Fabr. Spec. Ins.* 2. *p.* 326. *Mant. Ins.* 2. *p.* 271. *Ent. Syst.* 4. *p.* 37.

Panzer, Faun. Ins. Germ. fasc. 32. *t.* 9.

Inhabits Europe, and is found on flowers and on different plants.

Pl. 35. a. Natural size. b. Magnified. c. The head.

GENUS XXXVI. *NOTONECTA.*

GENERIC CHARACTER.

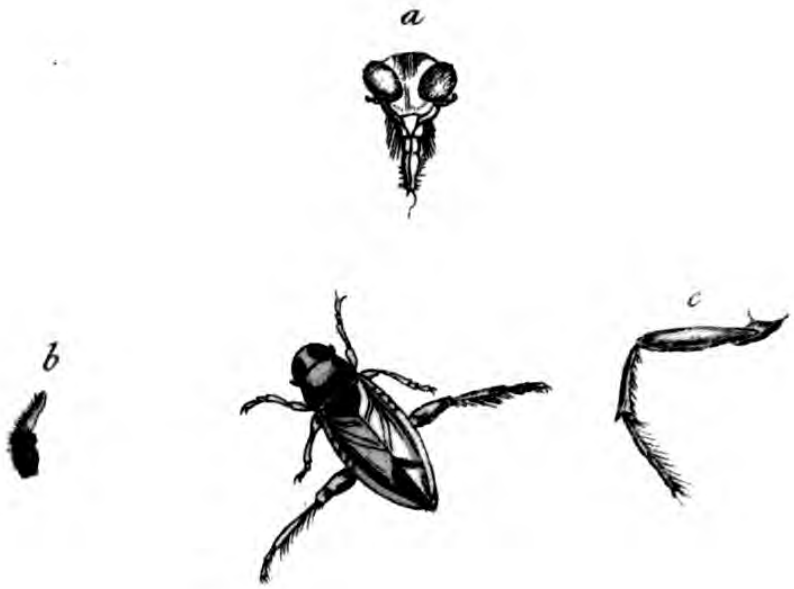
Antennæ shorter than the thorax. *Rostrum* inflected. *Wings* four, coriaceous from the base to the middle, crossed over each other. *Hind feet* edged with hairs, and formed for swimming.

General Observations.

The Notonectæ are aquatic insects, inhabiting standing waters and sluggish rivers. They swim on their back, and generally in an inclined position. Unless disturbed they remain upon the surface of the water; but on the approach of danger, they immediately disappear, though they cannot remain any great length of time without coming to the top to breathe. They frequently creep on the water plants and the mud, in search of the smaller insects on which they feed. In the fine warm nights they often land and fly about, sometimes to a considerable distance.

The female lays a great number of white,

NOTONECTA.



N. glauca.

elongated eggs, which she generally places on the stems and leaves of aquatic plants. In the beginning of spring the little ones break their shell, and directly swim upon their back as well as their mother. The larvæ resemble the perfect insect, except in the want of wings. They have the same habits, living in the same manner, and waging continual war with the lesser insects. In about two months they take upon them the chrysalis state, and in a short time after, undergo their last change, and appear with their wings and semi-coriaceous wing-cases.

SPECIFICATION.

NOTONECTA GLAUCA. N. elytris griseis, margine fusco punctato apice bifidis. *Linn. Syst. Nat.* 1. *p.* 712. *Gmel.* 1. *p.* 2118. *Fabr. Spec. Ins.* 2. *p.* 331. *Mant. Ins.* 1. *p.* 275.

Roesel. Ins. 3. *App. t.* 17.

Schaeff. Icon. Ins. t. 33. *f.* 5, 6.

Panzer, Faun. Ins. Germ. fasc. 3. *t.* 20.

Inhabits Europe, and is common in standing waters.

Pl. 36. a. The head magnified. b. A horn. c. A leg.

Genus XXXVII. *NEPA.*

GENERIC CHARACTER.

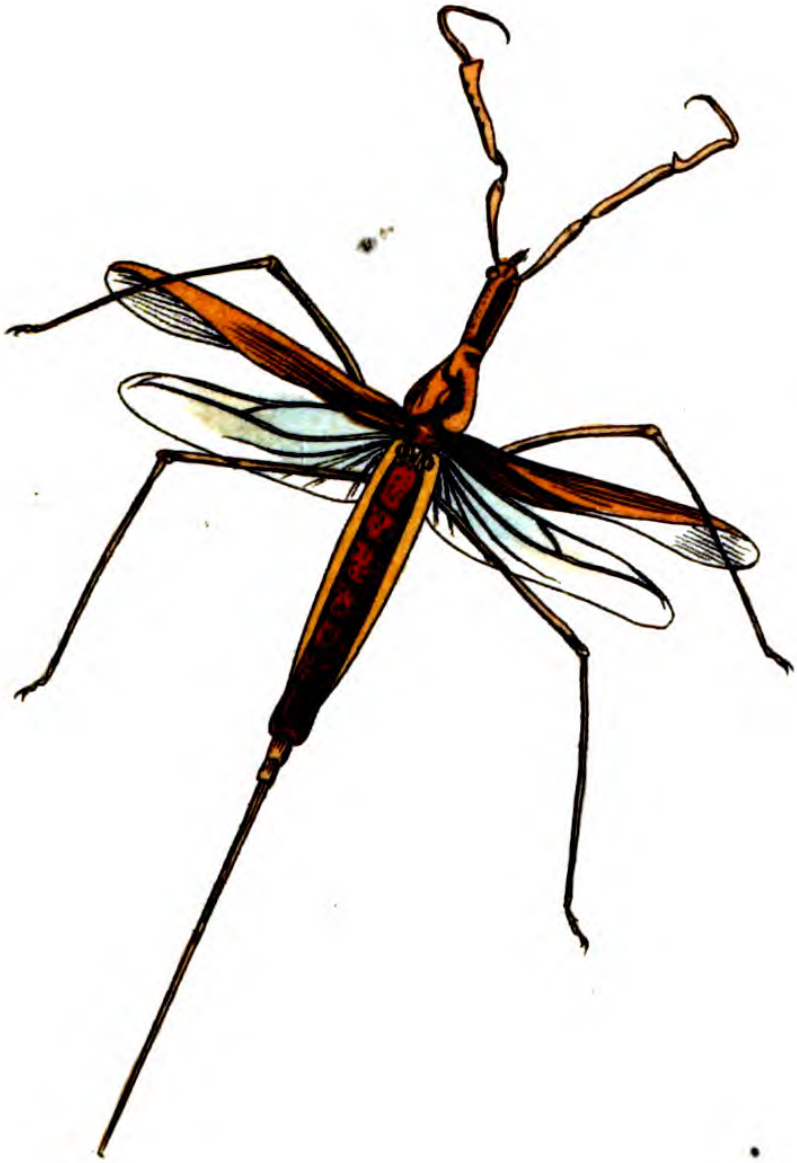
Antennæ very short, triarticulate, and hid under the eyes. *Rostrum* inflected; sheath containing three bristles. *Wings* four, folded together crosswise; the anterior part coriaceous. Two fore-feet cheliform (crab-like), the four others formed for walking.

General Observations.

The Nepæ, like the Notonectæ, inhabit ditches, canals, marshes, lakes, and other standing waters. They swim but slowly, and spend most of their time at the bottom of the water, seeking on the mud for the different insects which serve them for food, and which they seize very forcibly with their crab-like feet. In the night they leave the ponds, and fly about with great agility.

The larvæ, which are found in the same places, differ from the perfect insect only in

NEPA.



N. linearis.

the want of wings. Their habits are the same, and their appetite for other insects equally voracious. The larva of the common Water Scorpion (*Nepa cinerea*) proceeds from an egg of a very singular form. It is oval, and from one end proceed seven delicate filaments, which give it the appearance of some of the seeds of plants belonging to the class Syngenesia. Swammerdam, who has described and figured these eggs, speaks of their arrangement in the ovaria, which are five in number, on each side the abdomen of the female. He says they are so disposed, that the filament of that nearest the orifice, embraces the egg which is to follow, which again is entangled with the one behind, and so on to the last. The eggs of the *Nepa linearis* differ from the above, in having but two filaments at the end.

SPECIFICATION.

NEPA LINEARIS. N. linearis, manibus spina laterali pollicatis. *Linn. Syst. Nat.* 1. *p.* 714. *Gmel.* 1. *p.* 2122. *Fabr. Syst. Ent. p.* 692. *Spec. Ins.* 2. *p.* 334. *Mant. Ins.* 2. *p.* 277.

Degeer, Ins. 3. *p.* 396. *t.* 19 *f.* 1, 2.

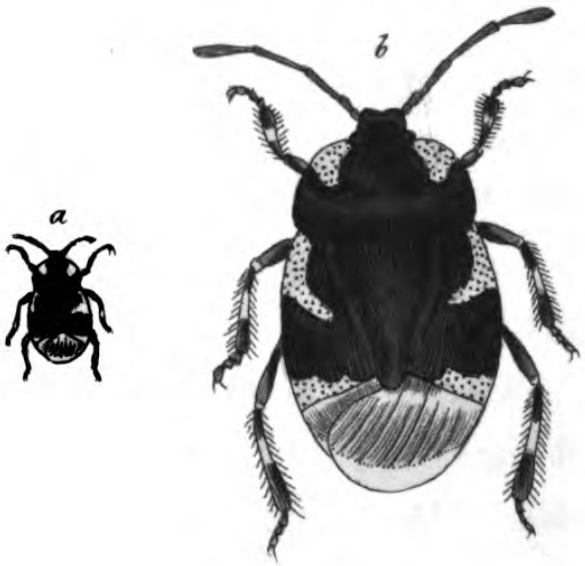
Roesel. Ins. 3. *App.* 1. *t.* 23.

Schaeff. Icon. Ins. t. 5. *f.* 5, 6.

Inhabits Europe, and is found in stagnant waters.

Pl. 37.

CIMEX.



C. bicolor.

GENUS XXXVIII. *CIMEX.*

GENERIC CHARACTER.

Antennæ longer than the thorax. *Rostrum* inflected. *Wings* four, folded together crosswise; the upper ones coriaceous from their base towards the middle. *Back* flat. *Thorax* margined. *Feet* formed for running.

General Observations.

The Linnæan divisions of this genus are as follows:—

1. *Apteri.* Without wings.
2. *Scutellati.* With the escutcheon as long as the abdomen.
3. *Coleoptrati.* With the elytra almost wholly coriaceous.
4. *Membranacei.* Much depressed, like a leaf.
5. *Spinosi.* In which the thorax has a spine on each side.
6. *Rotundati.* Of an oval shape.

7. *Seticornes.* With the antennæ setaceous towards the point.
8. *Oblongi.* Of an oblong shape.
9. Having the antennæ wholly setaceous.
10. *Spinipedes.* Having thin thighs armed with spines.
11. *Lineares.* With a narrow elongated body.

Among this numerous tribe of insects, there is one, which is unhappily but too well known, and too generally felt, to be disregarded. The bed-bug, *Cimex lectularius*, we have every reason to believe, has been a domestic pest from time immemorial; at least it is mentioned by some of the Greek writers, who spoke of the animal with feelings wholly independent of a taste for Natural History. Southall, a celebrated bug-catcher, who published a treatise on the subject in the year 1730, says that the bug was scarcely known in England before the year 1670, when it was imported among the timber used in rebuilding the City of London

after the great fire in 1666; but we have the authority of Mouffet to prove, that this troublesome insect was known in this country long before the fire. In the beginning of summer, says Dr. Shaw, it deposits its eggs, which are very small, white, and of an oval shape, each standing on a kind of short pedicle or foot-stalk, in the cavities of walls or wood-work. The young, which are hatched in a few weeks, arrive at their full size in about three months. In their winter retreats they can bear the most intense frost without injury; and are always ready, as soon as the warm weather returns, to take the field.

Most of the species, when touched, have a very strong and disagreeable smell. They are met with in woods and shady places, &c., and many of them are very prettily marked.

SPECIFICATION.

CIMEX BICOLOR. C. ovatus elytris nigro alboque variis. *Linn. Syst. Nat. p.* 722. *Gmel. p.* 2156. *Fabr. Syst. Ent. p.* 715. *Spec. Ins.* 2. *p.* 358. *Mant Ins.* 2. *p.* 296. *Ent Syst.* 4. *p.* 121.

Wolff, Cimic. t. 7. *f.* 60.

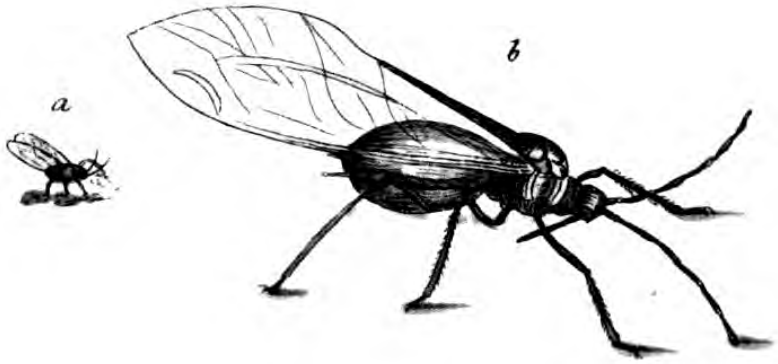
Schaeff. Icon. Ins. t. 41. *f.* 8, 9.

Panzer, Faun. Ins. Germ. fasc. 32. *t.* 11.

Inhabits Europe, in gardens and pastures.

Pl. 38. a. The natural size. b. The same magnified.

APHIS.



A. Rosæ.

GENUS XXXIX. *APHIS.*

GENERIC CHARACTER.

Antennæ setaceous, longer than the thorax. *Rostrum* inflected. *Wings* four, erect, or none at all. *Abdomen* with two little horns or spines on the hinder part. *Feet* formed for walking.

General Observations.

The following account of the Aphides is extracted from Stuart's Elements of Natural History. "The insects of this genus are small and defenceless, but very noxious animals, and most remarkable for the singularities in their history and manners. There are many species of the genus, which, for the most part, inhabit particular plants, attaching themselves generally to the young twigs, to the footstalks or leaves, and exhausting the juices; by which means these parts, particularly the leaves, are deformed and destroyed. They exude, partly from the horns on their abdomen, and partly from two orifices at the same place, a sweetish

juice which attracts ants and other inimical insects. There are often in the same species, and even in the same family, individuals with wings and without wings; and that without any respect to the difference of sex. But the males are in general much smaller than the females, and also less numerous. They seldom appear before autumn, when they impregnate their females, who soon after lay eggs, or rather a sort of capsules, in which the young Aphides lie, already perfectly formed, but do not break their shell till the following spring. When they appear it is very remarkable that they are almost wholly females, with hardly a male to be seen during the whole spring and summer. Notwithstanding this, all these female Aphides without any communication with a male are able to propagate their species; and seem to have received the genial influence, not merely for themselves alone, but for their posterity to the ninth generation. During the whole summer they are viviparous, and if a young Aphis is taken, immediately upon exclusion from the mother, and kept apart, it will produce young;

which young, if also kept apart, will likewise produce, and so on, without the presence of a male. Towards autumn, however, this singular fructification begins to lose its wonderful effects. The Aphides cease to bring forth females only; males likewise are produced, who immediately celebrate that nuptial rite which is to communicate fertility to the whole female posterity of the following summer. These facts are unquestionable; and the experiments are easily made. Let a person, in summer, take the leaf of a cabbage, which is infected with these minute insects, and he will find on the under surface a number of them together, covered with a sort of powder or whitish down. Upon carefully observing one of the largest, he will not fail, in a short time, to detect it in the act of parturition, when the young may be separated and kept apart on fresh cabbage leaves.—Most plants have their peculiar Aphides, but some are found on several plants. The species are with difficulty distinguished, and with still more difficulty defined. Linnæus has described but

few, and has contented himself with mentioning the plants on which they are to be found."

To this account we shall only add, that according to Reaumur each Aphis may produce about ninety young; and that, consequently, in five generations, the descendants from a single insect would amount to five thousand nine hundred and four million, nine hundred thousand.

SPECIFICATION.

APHIS ROSÆ. A. Rosæ. *Linn. Syst. Nat.* 1. *p.* 734. *Gmel.* 1. *p.* 2204. *Fabr. Syst. Ent. p.* 737. *Spec. Ins.* 2. *p.* 387.

Degeer, Ins. 3. *p.* 65. *t.* 3. *f.* 10.

Reaumur, Ins. 3. *t.* 21. *f.* 1—4.

Inhabits the stems of the rose.

Pl. 39. a. Natural size. b. The same magnified. c. Aphides on the rose.

CHERMES.

C. Buxi.

GENUS XL. *CHERMES.*

GENERIC CHARACTER.

Antennæ setaceous, longer than the thorax. *Rostrum* placed in the breast, and formed of a triarticulate sheath, and three unequal bristles. *Wings* four, deflected. *Thorax* gibbous. *Abdomen* terminated by four very short filaments. *Feet* formed for leaping.

General Observations.

The insects of this genus, like the Aphides, are found on the leaves, young shoots, and bark of different vegetables. The larvæ have six feet; and are generally covered, more or less, with down. Some have on the hind part of the body a flocculent substance of a white colour. This is particularly seen in the larva of the *C. Alni*; and if rubbed off will be quickly reproduced. The winged or perfect insects leap with great agility. The females occasion the little tubercles or galls, seen upon the leaves of the ash and other trees, by wounding them

with a tube with which she is provided for the purpose of introducing her eggs into the leaf.

SPECIFICATION.

CHERMES BUXI. C. Buxi. *Linn. Syst. Nat.* 1. *p.* 738. *Gmel.* 1. *p.* 2212. *Fabr. Syst. Ent. p.* 740. *Spec. Ins.* 2 *p.* 391. *Mant. Ins.* 2. *p.* 317. *Reaumur, Ins.* 3. *t.* 19. *f.* 1—14.

Inhabits the Box-wood. The larva is to be met with on the young shoots early in the spring.

Pl. 40. a. Natural size. b. Magnified.

COCCUS.

C. Persicorum.

GENUS XLI. *COCCUS.*

GENERIC CHARACTER.

Antennæ filiform. *Rostrum* rising from the breast. *Wings* two, erect, none in the females. *Abdomen* bristly behind.

General Observations.

The Cocci are found on the leaves and bark of various vegetables. They are natives of different parts of the world, and many of the species are found in England. There is one exotic species, universally known as producing that beautiful colour called cochineal. This proceeds from the *Coccus Cacti,* so named from its feeding on that succulent plant, the *Cactus Opuntia.* It forms an article of commerce of no mean consideration between this country and South America; where, especially in the country of Mexico, the collecting of the drug gives employment to a considerable number of people. It is the female insect, when distended with eggs, so as rather to resemble a seed than an animal, that produces the colour; and

great care is taken to pick her off the plant before she has deposited her eggs, and by so doing defeated the purpose of the proprietor.

One of the species, the *Coccus Hesperidum*, infests our conservatories of plants, sometimes in such numbers as to injure the shrubs, &c. They run up and down the branches and leaves, and are most abundant upon the orange, citron, and lemon-trees. They are so prolific, that a single female is said to contain about a thousand eggs.

SPECIFICATION.

Coccus Persicæ. C. persicæ rotundus. *Linn. Syst. Nat. Gmel.* 1. *p.* 2220.

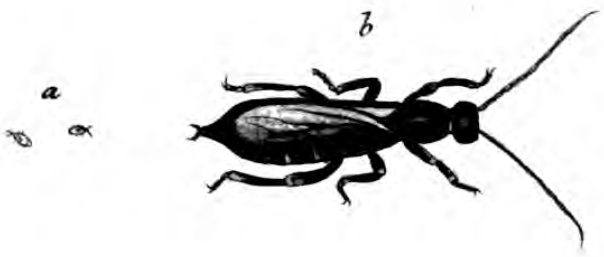
Geoff. Ins. 1. *p.* 506.

Reaumur, Ins. 4. *t.* 2. *f.* 1, 3.

Inhabits the peach.

Pl. 41. a. Natural size. b. c. The same magnified.

THRYPS.



T. Physapus.

GENUS XLII. *THRIPS.*

GENERIC CHARACTER

Antennæ filiform, as long as the thorax. *Rostrum* indistinct. *Body* slender, linear. *Abdomen* curved upwards. *Wings* four, straight, lying on the back, narrow, and slightly crossed.

General Observations.

The insects of this genus are so diminutive as almost to escape notice. They live in flowers, and under the bark of trees. In the same places we meet with the larvæ, which differ only in the want of wings from the perfect insect. The most common of the tribe, the *T. Physapus*, is a very small, black insect, frequently seen in the spring and summer running upon the petals of different flowers, or skipping from place to place, and bending back its body as it goes.

It is said to be very hurtful to grain.

SPECIFICATION.

THRIPS PHYSAPUS. Th. elytris glaucis, corpore atro.

Linn. Syst. Nat. 1. *p.* 743. *Gmel.* 1. *p.* 2222. *Fabr. Spec. Ins.* 2. *p.* 396. *Mant. Ins.* 2. *p.* 320.

Degeer, Ins. 3. *p.* 6. *t.* 1. *f.* 1.

Schaeff. Elem. t. 127.

Inhabits flowers, especially those of the class Syngenesia, descending to the bottom of the florets.

Pl. 42. a. Natural size. b. The same magnified.

END OF VOL. I.

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Shoe Lane, London.

ILLUSTRATIONS

OF THE

LINNÆAN GENERA

OF

INSECTS.

By W. WOOD, F.R.S. and L.S.

Author of Zoography, General Conchology, Index Testaceologicus, &c.

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1821.

LINNÆAN GENERA
OF
INSECTS.

ORDER III.
LEPIDOPTERA.

THE insects of this Order are particularly distinguished by their scaly wings, from which alone they derive their name of Lepidoptera These wings are four in number, and are generally variegated by the most brilliant colours, entirely produced by an infinity of little oval scales, either of a conical or triangular shape, and placed one above another, like the tiles on the roof of a house. These scales, which may be called the feathers of the Butter-

fly, are fixed on a kind of pedicle, but come off on the fingers, like a farinaceous powder, with the slightest touch; leaving the bare wing, a thin, transparent, elastic membrane, devoid of beauty, and studded with longitudinal rays, showing the places to which the scales were formerly attached. The mouth in these insects is a sort of trunk, which is not unaptly called a spiral tongue, since when not in action, it is completely rolled up and placed between two palpi, or downy feelers, which hide it entirely. This trunk, which differs in length, and is sometimes very short, is composed of two pieces, or laminæ, convex on one side, and concave on the other. These laminæ are easily separated at the will of the insect, and when reunited form a hollow cylinder.

The Lepidoptera are so elegant in their appearance, and perfect in their shape, that they claim the highest rank among the numerous and extensive class of insects to which they belong. Such is their variegated beauty, and such the softness of their blended tints, that we might almost fancy them ethereal beings, who in their

passage through infinite space, had stained their wings in the colours of the rainbow.

The Lepidoptera are perfectly harmless, and have no organ with which they can either injure others or defend themselves. Their aërial state is comparatively transient. It is that short but gay period of perfection and enjoyment, when they may be seen in pairs, fluttering from flower to flower, and with their long extended tongue, searching each nectary, and extracting the sweets from every cup.

GENUS XLIII. *PAPILIO.*

GENERIC CHARACTER.

Antennæ thickening towards the extremity, commonly ending in a knob, or club. *Wings* when at rest erect, meeting upwards, and touching above the body. *Flight* diurnal.

General Observations.

The sections into which Linnæus has divided this numerous tribe of insects are as follows:

1. *Equites.* With the upper wings longer from their hinder corner to their anterior extremity, than from the same point to their base. Their antennæ are frequently filiform.

The Equites are either

- α. *Tröes,* or Trojans; black with bloody spots on the breast, or
- β. *Achivi,* Greeks, without the red marks, but often with an eye-shaped spot on the inner angle of the lower wings.

2. *Heliconii.* With the wings narrow and entire, sometimes naked, especially towards the

PAPILIO.

P. Urticæ.

extremities. Upper ones oblong; under ones very short.

3. *Danai.* Wings entire.
   - α. *Candidi.* With white wings.
   - β. *Festivi.* With variegated wings.

4. *Nymphales.* With scolloped or indented wings.
   - *A. Gemmati.* Wings adorned with eyes.
   - α. ——— In the upper wings only.
   - β. ——— In the under wings only.
   - *B. Phalerati.* The wings without eyes.

5. *Plebeii.* Butterflies of a small size, divided into
   - α. *Rurales.* With the wings obscurely spotted.
   - β. *Urbicoli.* In which the spots on the wings are often transparent.

The Butterflies of which this genus is entirely composed, differ completely in their habits from the insects of the two following genera, inasmuch as the former fly only in the open day, the latter in the twilight. Their larvæ, known universally by the name of cater-

pillars, when grown to their full size change into the chrysalis, and at the appointed time burst forth in all the plenitude of beauty.

SPECIFICATION.

PAPILIO URTICÆ. P. alis angulatis fulvis nigro-maculatis: primoribus supra punctis tribus nigris. *Linn. Syst. Nat. p.* 777. *Gmel. p.* 2313. *Fabr. Spec. Ins.* 2. *p.* 92. *Mant. Ins.* 2. *p.* 490.

Roesel. Ins. 1. *pap.* 1. *t.* 4.

Schaeff. Icon. t. 142. *f.* 1, 2.

Inhabits the common nettle.

Pl. 43.

SPHINX.

S. Atropos.

GENUS XLIV. *SPHINX.*

GENERIC CHARACTER.

Antennæ thickest in the middle, somewhat prism-shaped, and attenuated at each end. *Wings* deflected. *Flight* slow and heavy.

General Observations.

The genus is divided into the following families:

1. *Legitimæ.*
   - α. With angulated wings.
   - β. With wings entire and the anus smooth.
   - γ. With the wings entire and the anus tufted.
2. *Adscitæ.* Differing from the others in their external appearance and caterpillars.

The Sphinges, which are generally known by the name of Hawk-Moths, confine their heavy flight to the close of evening, and the dawn of day. They may then be seen hovering about a flower; and, without settling, inserting their long spiral tongue, to suck the

nectar from the bottom of the cup. When at rest they fold their antennæ under their breast. Some of the small species fly in the day-time.

The bodies of the caterpillars are for the most part large, smooth, and dotted, with a horn above the tail. They undergo their metamorphosis in the earth; and their chrysalids, which are inclosed in a sort of web of a coarse texture, remain locked under ground till the spring.

The large Death's-head Moth (*Sphinx Atropos*) from its formidable appearance, and death-like head upon its back, has been considered as an insect of ill omen, and the harbinger of fate. From its egg proceeds a large and beautiful caterpillar, of a bright yellow colour, spotted with black, and marked on the sides with seven violet and sky-blue stripes. It feeds on the potatoe and jasmine, and retires under ground in September.

SPECIFICATION.

SPHINX ATROPOS. S. alis integris: posticis luteis fasciis fuscis, abdomine luteo cingulis nigris. *Linn.*

Syst. Nat. p. 799. *Gmel. p.* 2378. *Fabr. Ent. Syst. p.* 539. *Spec. Ins.* 2. *p.* 1. *Mant. Ins.* 2. *p.* 95.

Degeer, Ins. 2. *p.* 242.

Roesel. Ins. 8. *t.* 1, 2.

Panzer, Faun. Ins. Germ. fasc. 8. *t.* 16.

Inhabits Europe. Found, but rarely, in England.

Pl. 44.

GENUS XLV. *PHALÆNA.*

GENERIC CHARACTER.

Antennæ setaceous, decreasing in size from the base towards the point. *Wings* when at rest, in general deflected. *Flight* nocturnal.

General Observations.

The number of species of which this genus consists, has induced Linnæus to divide it into the following families:

1. *Attaci.* With wings inclining downwards and spreading open. These have either
   - α. Pectinated antennæ, without a tongue.
   - β. ———— and a spiral tongue, or
   - γ. Setaceous antennæ, with a spiral tongue.
2. *Bombyces.* With wings incumbent, and antennæ pectinated.
   - *A. Elingues,* which want the spiral tongue.
     - α. With reversed wings.
     - β. With deflexed wings.
   - *B. Spirilingues.* With a spiral tongue.
     - α. With smooth backs.
     - β. With crested, or tufted, backs.

PHALÆNA.

P. militaris.

3. *Noctuæ.* The wings incumbent as in the Bombyces, but the antennæ setaceous.

   A. Elingues, without tongues.

   B. Spirilingues, with spiral tongues.

4. *Geometræ.* Wings when at rest extended horizontally.

   A. Pectinicornes. With the antennæ pectinated.

   B. Seticornes. With the antennæ setaceous.

   The under wings in the above two divisions are either angulated or round.

5. *Tortrices.* With very obtuse wings, curved at the exterior margin. They have short, awl-pointed palpi.

6. *Pyralides.* With the inner margin of the wings laid one over the other, in shape resembling a delta, or triangle.

7. *Tineæ.* With the wings convoluted, or wrapped round the body, giving the insect almost a cylindrical shape. The front, or forehead, is stretched out.

8. *Alucitæ.* With digitated wings, divided

nearly to the base, and resembling distinct plumes.

Some moths fly by day; but they may be said, generally, to avoid the light, and leave their lurking-places only in the evening. The caterpillars vary greatly in size and shape. Among the most singular is that of the *Phalæna Vinula*, or Poplar Moth. It is more than two inches long, with a flat face, and pointed shoulder; but the tail is the most remarkable feature, being extended into two long tubular processes, which can be further lengthened at the pleasure of the animal.

Of the chrysalids of moths, some are quite simple, while others are provided with a hook at one end. All of them weave a covering, which, in such as pass their time under ground, is of very coarse materials. Many of the species attach themselves to the under sides of branches of trees, to walls, or any convenient substance chosen by the insect for that purpose. Of these the web is much finer, and generally contains more silk.

SPECIFICATION.

PHALÆNA MILITARIS. Ph. alis concoloribus luteis apice maculisque violaceis: primoribus extus albo maculatis. *Linn. Syst. Nat. Gmel. p.* 2407. *Fabr. Spec. Ins.* 2. *p.* 171. *Mant. Ins.* 2. *p.* 110.

Roesel. Ins. 4. *t.* 6. *f.* 3.

Cram. pap. 3. *t.* 29. *f.* B.

Inhabits Asia.

Pl. 45.

ORDER IV.

NEUROPTERA.

THE Order Neuroptera is composed of insects with four naked, membranous, and reticulated wings. There is one exception however with respect to the number, the Ephemera having but two wings instead of four. The wings are in most instances nearly equal in size, that is, the first pair are hardly longer or broader than the second, though in some cases the lower pair are much the smallest; and in the Ephemera, as has been just observed, they are wholly wanting. For the most part they are very large, and widely extended; naked, or covered with fine scattered hairs, very different in their form and arrangement from the little close and imbricated scales, which entirely

cover the wings of the Lepidoptera. These hairs, where they exist, are placed more particularly along the nerves, which, by their disposition, give that peculiar reticulated or network appearance to the wings. It is well to observe the arrangement of the principal nerves, which pass from the base to the extremity of the wings, since they serve to mark the genera, being constantly disposed in the same manner, in the species of the same genus. This observation applies with equal force to the transversal nerves. They exhibit differences as remarkable, and as constant with respect to the genera, as those which run in a longitudinal direction.

LIBELLULA.

L. quadrimaculata.

GENUS XLVI. *LIBELLULA.*

GENERIC CHARACTER.

Antennæ shorter than the thorax, setaceous. *Mouth* armed with jaws, more than two in number. *Wings* extended. *Tail* in the male furnished with a kind of forceps.

General Observations.

This genus is divided by Linnæus into two families. In the first,

The wings, when at rest, are spreading out.

In the second,

The eyes are placed at a distance from each other, and the wings are erect.

Dr. Shaw observes, that the Libellulæ or Dragon-flies, sometimes called by the very improper title of Horse-stingers, exhibit an instance scarcely less striking than the butterfly, of that strange dissimilitude in point of form, under which one and the same animal is destined to appear in the different periods of its

existence. He adds, that perhaps few persons not particularly conversant in the history of insects would imagine that these brilliant and lively animals, which may be seen flying with such strength and rapidity round the meadows, and pursuing the smaller insects with the velocity of a hawk, had once been inhabitants of the water, and that they had resided for a long space of time in that element before they assumed their flying form.

The eggs, which the female drops into the water, sink to the bottom, and are hatched into very ugly larvæ, of a brown colour, with six feet. When advanced to the chrysalis state, the wings begin to appear on the back, and from their head projects a strong jointed arm, with a most formidable pair of forceps or prongs at the end. They are two years in passing from the egg to the perfect insect; during which time, from their voracity, their cruelty towards their companions, and the destruction they make amongst them, they have not unaptly been called the Crocodiles of aquatic in-

sects. When the chrysalis, which is in no degree less active than the larva, is about to be transformed, it creeps up the stem of a water-plant, and making an effort by which the skin is burst, slowly emerges from its sheath, which is left behind sticking to the plant. This is generally effected in the morning, and in the sun-shine, that the wings may be sooner dry, and as little time lost of the short comparative space allotted to the insect to skim the surface of the pools as possible. The change of the Libellula from one state of life to the other is striking. Deprive the larva of water, and it will die; plunge the perfect insect into the same element, and it will be as effectually destroyed.

SPECIFICATION.

LIBELLULA QUADRIMACULATA. L. alis posticis basi omnibusque medio antico macula nigricante. *Linn. Syst. Nat. p.* 901. *Gmel. p.* 2619. *Fabr. Ent. Syst.* 3. *p.* 373. *Spec. Ins.* 1. *p.* 519. *Mant. Ins.* 1. *p.* 336.

Reaum. Ins. 6. *t.* 35. *f.* 1, 2.

Schaeff. Icon. t. 9. *f.* 13.

Panzer, Faun. Ins. Germ. fasc. 88. *t.* 19.

Inhabits Europe, and is found about rivers and stagnant waters.

Pl. 46. a. One of the antennæ magnified.

EPHEMERA.

E. vulgata.

GENUS XLVII. *EPHEMERA.*

GENERIC CHARACTER.

Antennæ thin, setaceous, and shorter than the head. *Mouth* without mandibles. *Palpi* four, very short, nearly equal and filiform. *Stemmata* two, large, and situated above the eyes. *Wings* erect, the hind ones very small. *Tail* terminated by two or three setaceous filaments.

General Observations.

Of the two sections, into which Linnæus has divided this genus, the insects of the first have two, and of the second three bristles in the tail.

The Ephemera derives its name from its short and transient existence in its perfect state. Some of the species die the same hour they are born; others never see the sun, they burst through their filmy covering at the close of day, and die before the dawn. The term Ephemera is not strictly correct; for the existence of certain species is prolonged for two or three days; conse-

quently it designs a space of time too long for some, and too short for others.

The larva and the chrysalis are nearly alike; they have six feet, and six plumated fins on the sides of the abdomen, and range about beneath the waters for a year or two, before they emerge to become inhabitants of the air. In May or June the transformation happens. The chrysalis creeps to the shore, the skin bursts, the tender fly issues from the cavity, unfolds its wings, and launches into the air. Myriads are thus produced, and will cover the clothes of any person standing by a brook or pond, in a warm close evening in the month of June. The males have very little activity; they merely flutter above the surface of the water till they drop; and seem scarcely born for any other purpose than to die. Not so the females: they have an important duty to fulfil; a future generation depends on their exertions, and their short existence is occupied in depositing their eggs. Two large packets, each containing three or four hundred, are inclosed within the body of every female, from whence they

are excluded at the same moment, and fall together in one mass upon the water. Providence, ever ready to supply deficiencies, where those deficiencies may prove injurious to its creatures, has provided this little insect with a couple of small bladders, which it has the power of filling with air immediately after the exclusion of the eggs. Without such provision, which gives it the means of restoring the equilibrium, a vacuum so suddenly formed, might prove fatal to the Ephemera.

SPECIFICATION.

EPHEMERA VULGATA. Ep. cauda triseta, alis nebuloso-maculatis. *Linn. Syst. Nat.* 1. *p.* 906. *Gmel. p.* 2628. *Fabr. Ent. Syst.* 2. *p.* 68. *Spec. Ins.* 1. *p.* 383. *Mant. Ins.* 1. *p.* 243.

Degeer, Ins. 2. *t.* 16. *f.* 1.

Schaeff. Icon. Ins. t. 9. *f.* 5, 6.

Panzer, Faun. Ins. Germ. fasc. 94. *t.* 16.

Inhabits Europe. The larva is found in the water; the perfect insect in the trees and bushes on the banks.

Genus XLVIII. *PHRYGANEA.*

GENERIC CHARACTER.

Antennæ setaceous, longer than the thorax. *Mouth* without teeth, but furnished with a horny, short, arched, acute mandible. *Palpi* four. *Stemmata* three. *Wings* incumbent, or laid horizontally on the body, the hinder ones folded.

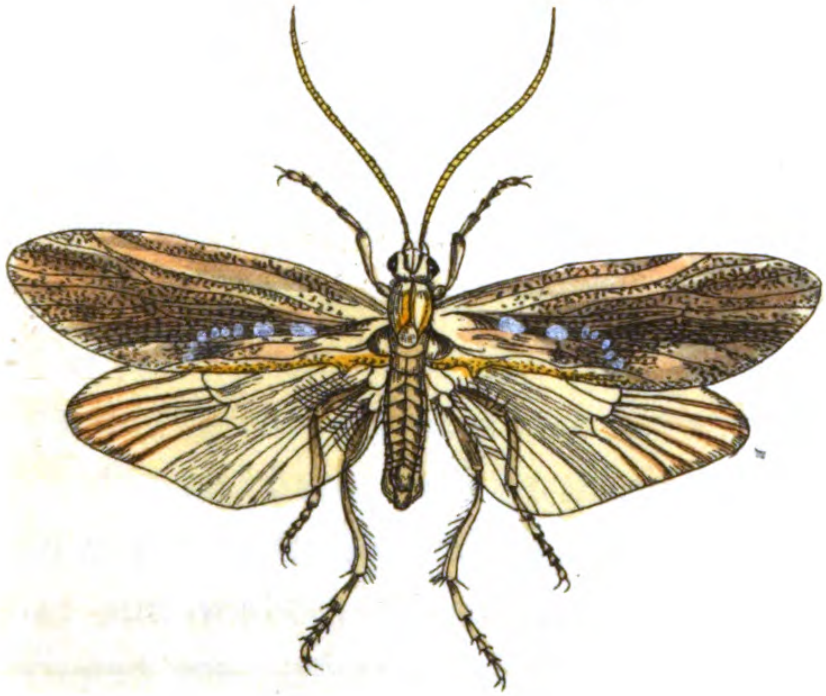
General Observations.

This genus is divided into two sections:

1. With two setæ or threads in the tail.
2. With the abdomen simple, or without setæ.

The larvæ of the Phryganeæ live in fresh water; they are of a lengthened shape, with six legs and a ringed body, and inhabit tubular cases, formed by themselves of pieces of wood, shells, particles of sand, &c. These cases, though rough without, are smooth within, being lined by the insect throughout with silk. There is one species in particular deserving of

PHRYGANEA.



P. grandis.

notice, for the neatness with which it forms its case. It is made of the leaves of duck-weed, which is found in such abundance floating on the surface of the water. These leaves might do very well in their original shape; but the insect, dissatisfied with their appearance, cuts them into very regular square pieces, and joins them end to end, so as to form a spiral habitation, somewhat resembling a green ribbon rolled upon a cylinder. These larvæ in general are well known to fishermen by the name of Cadis, and are an excellent bait for many fish.

The larva prepares for the usual change by projecting its case a little above the surface of the water, and fixing itself by silken threads to a water-plant. In this state it becomes a chrysalis; and in about a fortnight or three weeks a winged and perfect insect.

SPECIFICATION.

PHRYGANEA GRANDIS. P. alis cinereo-testaceis: lineolis duabus longitudinalibus nigris: puncto albo. *Linn. Syst. Nat. p.* 909. *Gmel. p.* 2633.

Fabr. Ent. Syst. 2. *p.* 76. *Spec. Ins.* 1. *p.* 389. *Mant. Ins.* 1. *p.* 245.

Roesel. Ins. 2. *Aquat. t.* 17.

Schaeff. Icon. t. 109. *f.* 3, 4.

Panzer, Faun. Ins. Germ. fasc. 94. *t.* 18.

Inhabits Europe. Generally settles on the sides of walls, on the branches of trees, &c. in the shade. The larva inhabits a tube made of bits of bark, &c.

Pl. 48.

HEMEROBIUS.

H. Chrysops

GENUS XLIX. *HEMEROBIUS.*

GENERIC CHARACTER.

Antennæ setaceous, projecting before the head, and longer than the thorax. *Mouth* with two teeth and four unequal filiform palpi. *Stemmata* none. *Wings* deflected, not folded as in the preceding genus. *Abdomen* simple. *Tarsi* with five articulations.

General Observations.

The eggs of the Hemerobii are deposited in groups on the leaves of a water-plant, on blades of grass at the edge of the water, or on trees in its neighbourhood. Their appearance is singular, each egg being supported on a slender footstalk, so that it resembles vegetable mould, or a very diminutive fungus. The larvæ when hatched are of an oblong oval shape, pointed at the end. They have six feet, and a short pair of curved forceps, with which they seize their prey. They feed almost entirely on Aphides, a weak race, without defensive arms, too slow in their motions to escape by flight, and

too stupid to do it if they could. These Aphides are abundant on the leaves of the same plant, and one of the active larvæ rushing among them, will suck the juices of a dozen in a few minutes. Notwithstanding the abundance of this food, and the facility with which it is procured, it often happens that, if two of these larvæ chance to meet, they will attack each other with ferocity, and the weakest must submit to be devoured by the conqueror. They increase so rapidly in size, that in about fifteen days they have attained their full growth, and are then three quarters of an inch long. When about to change into the chrysalis state, the animal spins a fine white silk from the end of its abdomen, which it fixes to a leaf or twig, and then continuing the operation, envelops itself completely, forming a silken case as round as a ball and not larger than a pea. It is difficult to conceive, how a body of so large a comparative size, can be made to occupy so small a space; but Nature is all sufficient! Soon after the case is finished, the larva is transformed into a chrysalis, and in about three

weeks, sometimes sooner, issues the delicate and tender Hemerobius from its silken tomb.

SPECIFICATION.

HEMEROBIUS CHRYSOPS. H. viridi nigroque varius, alis hyalinis maculis reticulatis. *Linn. Syst. Nat.* 1. *p.* 912. *Gmel. p.* 2640. *Fabr. Ent. Syst.* 2. *p.* 83. *Spec. Ins.* 1. *p.* 393. *Mant. Ins.* 1. *p.* 247.

Roesel. Ins. 3. *App. t.* 21. *f.* 3.

Degeer, Ins. 2. *p.* 68. *t.* 22. *f.* 1.

Schaeff. Icon. t. 5. *f.* 7, 8.

Inhabits Europe, and is found in moist woods and shady places in summer. It is the *H. maculatus* of Olivier.

Pl. 49.

GENUS L. *MYRMELEON.*

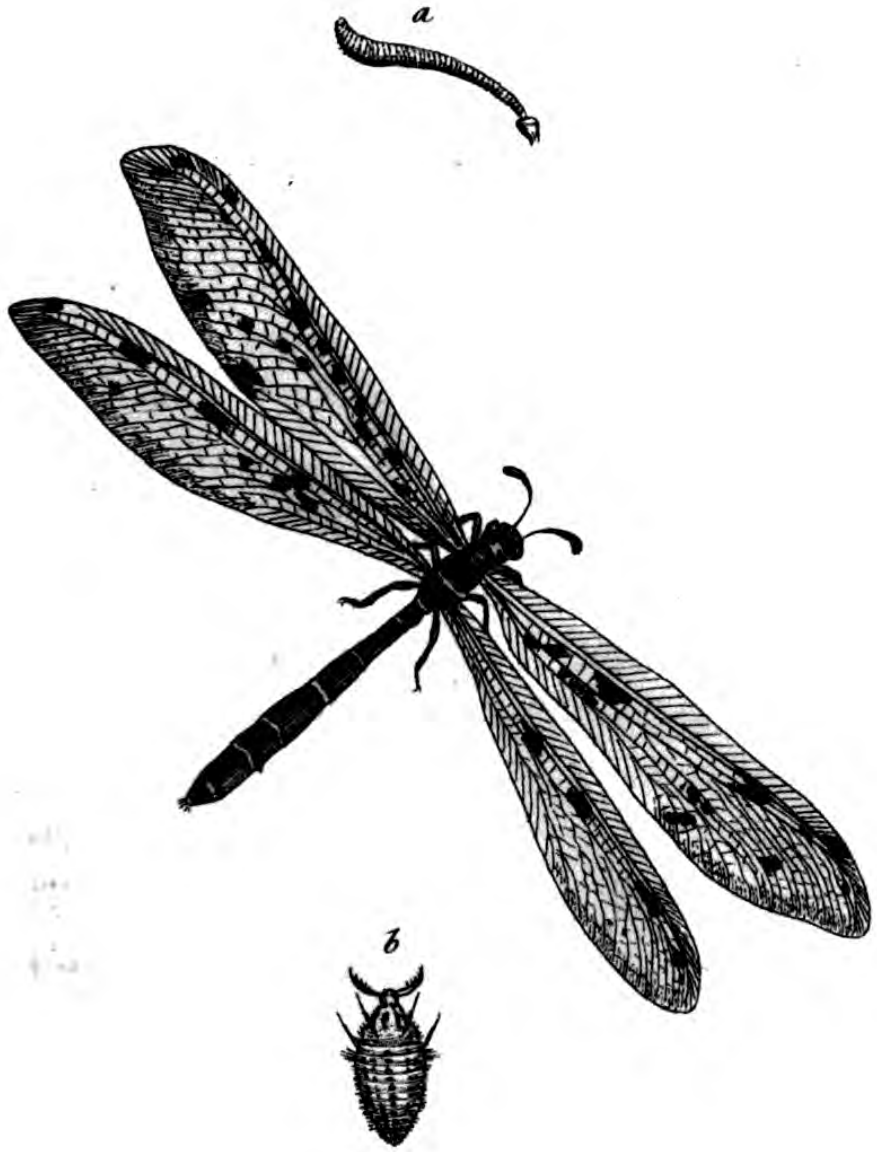
GENERIC CHARACTER.

Antennæ short and thickening towards the end. *Mouth* armed with mandibles, and jaws. *Palpi* six. *Stemmata* none. *Wings* deflected. *Tail* in the male, armed with forceps. *Tarsi* with five articulations.

General Observations.

The species of this genus resemble in some degree the Libellulæ, but are not, in general, so light or elegant. They couple in the summer, and the female deposits her oblong eggs in dry and shady places. From one of the species proceeds a larva, of which several Naturalists, especially Reaumur and Roesel, have given a particular and detailed account. The *Myrmeleon Formicarium*, or Lion-Ant, is an insect living by rapine, but in its larva state denied the power of pursuit. This want it supplies by stratagem, and selecting the driest sand it can meet with, forms a hollow like the cavity of a funnel, at the bottom of which the

MYRMELEON.



M. Formicarium.

wary insect lies concealed, with merely its pincers exposed above the surface. The sides of the trap are so very loose, that they give way and precipitate its prey to the bottom, from whence it stands but little chance of returning alive. The moment the Lion-Ant is apprized, by the falling of a few grains of sand, that something is in the pit, it rushes forward, seizes it with avidity, and, having plunged its forceps into its body, drags it under the sand to be devoured at leisure.

When preparing to change into the state of a chrysalis, the insect collects and agglutinates a quantity of sand into the shape of a ball, lining the inside with very fine pearl-coloured silk. It remains in this situation about a month, and is then changed into a light and most elegant fly, the very opposite to the uncouth ill-shaped creature from which it proceeded.

SPECIFICATION.

MYRMELEON FORMICARIUM. M. alis macula alba marginali postica. *Linn. Syst. Nat. p.* 914. *Gmel. p.* 2643. *Fabr. Spec. Ins.* 1. *p.* 399. *Mant. Ins.* 1. *p.* 249.

Reaum. Ins. 4. *t.* 11. *f.* 6—8.

Roesel. Ins. 3. *t.* 17—20.

Schaeff. Icon. t. 22. *f.* 1, 2.

Panzer, Faun. Ins. Germ. fasc. 95. *t.* 11.

Inhabits Europe, and is found in sandy places.

Pl. 50. a. One of the antennæ magnified. b. The larva of the natural size with the forceps expanded.

PANORPA.

P. communis

GENUS LI. *PANORPA.*

GENERIC CHARACTER.

Antennæ filiform, longer than the thorax. *Head* prolonged into a horny cylindrical snout, or proboscis, bearing the parts of the mouth at the end. *Palpi* four, nearly equal. *Stemmata* three. *Tail,* in the male only, with a chela, or claw, at the end.

General Observations.

The chief singularity in the conformation of the Panorpa, is to be found in its tail. From the last ring of the abdomen proceed two moveable fangs, which crossing each other at their extremity, form a pair of pincers, not unlike in shape and make to the thick claw of a lobster. The use of this singular appendage is not clearly ascertained. It is not, like the tail of the Scorpion, an offensive weapon; it contains no poison; and although carried in an upright and threatening position, is not used by the insect to seize its prey. As this apparatus is peculiar to the male, may not its use be con-

fined to its connexion with its mate? The head also is prolonged into a beak, that might lead us to suppose the insect robbed the nectaries of flowers, if we were not aware that its habits are carnivorous, that it lives by rapine, and that it feeds on small flies, and other dipterous insects.

The Panorpæ appear at the end of the spring and during the summer in meadows, in woods, and in moist and shady places. They avoid the heat of the sun; and although they have ample wings and strong muscles to put them in motion, they fly but to a short distance, and that seemingly with difficulty. Sometimes they will hardly take the trouble to expand their wings, but, upon the approach of danger, glide beneath the bushes, and conceal themselves from sight.

We have no knowledge of their larvæ, and cannot say whether they are aquatic, or live in the interior of vegetables, or seek their prey upon the surface of the earth.

SPECIFICATION.

PANORPA COMMUNIS. Pa. alis æqualibus nigro maculatis. *Linn. Syst. Nat.* 1. *p.* 915. *Gmel.* 1. *p.* 2645. *Fabr. Syst. Ent.* 1. *p.* 313. *Spec. Ins.* 1. *p.* 400. *Ent. Syst.* 2. *p.* 97.

Degeer, Ins. 2. *p.* 86. *t.* 24. *f.* 3, 4.

Schaeff. Icon. t. 88. *f.* 7.

Panzer, Faun. Ins. Germ. fasc. 50. *t.* 10.

Inhabits Europe, and is found in moist and shady places, in the spring and summer.

Pl. 51. a. The rostrum or snout magnified. b. b. Antennæ. c. The cheliform tail.

GENUS LII. *RAPHIDIA.*

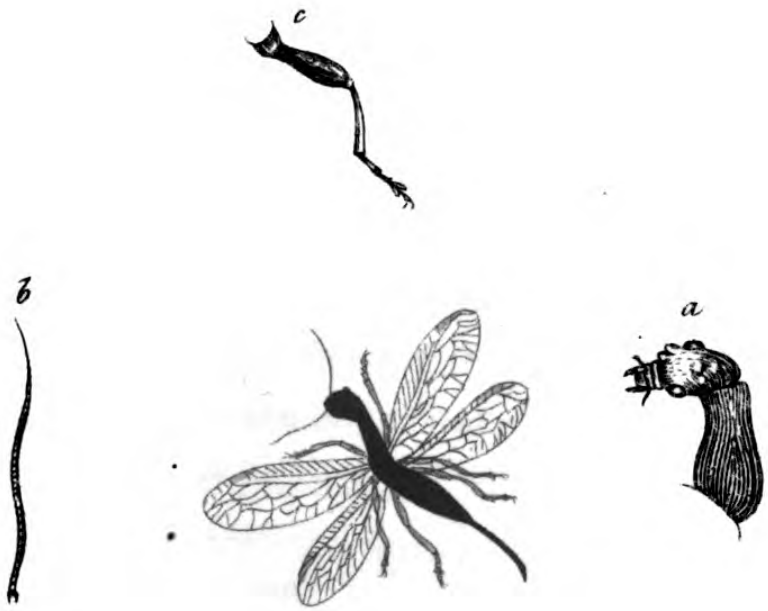
GENERIC CHARACTER.

Antennæ filiform, as long as the thorax, the anterior part of which is elongated and cylindrical. *Mouth* with two teeth. *Palpi* four. *Head* depressed and horny. *Stemmata* three. *Wings* deflected. *Tail* of the female with a recurved lax bristle.

General Observations.

The Raphidia is remarkable for the size of its head, and its lengthened thorax, which, in the example selected for our plate, gives it a snake-like appearance. The genus is confined to a very few species, the habits of which are but little known. Of the larva we were quite ignorant, till Latreille, in the Bulletin de la Société Philomathique, described it as being very straight and long, of a mixed grey and black colour, with a scaly head and six feet. It resembles a small worm; is extremely vivacious, runs very quickly, and turns on all sides to insinuate itself the more readily into the crevices

RAPHIDIA.



R. opbiopsis

of trees. Linnæus mentions the pupa of the *R. ophiopsis*, and says it is like the mother, except that it wants her wings.

SPECIFICATION.

RAPHIDIA OPHIOPSIS. R. thorace cylindrico. *Linn. Syst. Nat.* 1. *p.* 916. *Gmel.* 2647. *Fabr. Spec. Ins.* 1. *p.* 402. *Mant. Ins.* 1. *p.* 251. *Ent. Syst.* 2. *p.* 99.

Roesel. Ins. 3. *App. t.* 21. *f.* 6, 7.

Schaeff. Icon. t. 95. *f.* 12.

Panzer, Faun. Ins. Germ. fasc. 50. *t.* 11.

Inhabits Europe, and is found in England, but rarely, in gardens and pine-forests. In certain years it is very common in the woods about Paris, preying upon the lesser insects.

Pl. 51. a. The head and thorax magnified. b. A horn. c. A hind leg.

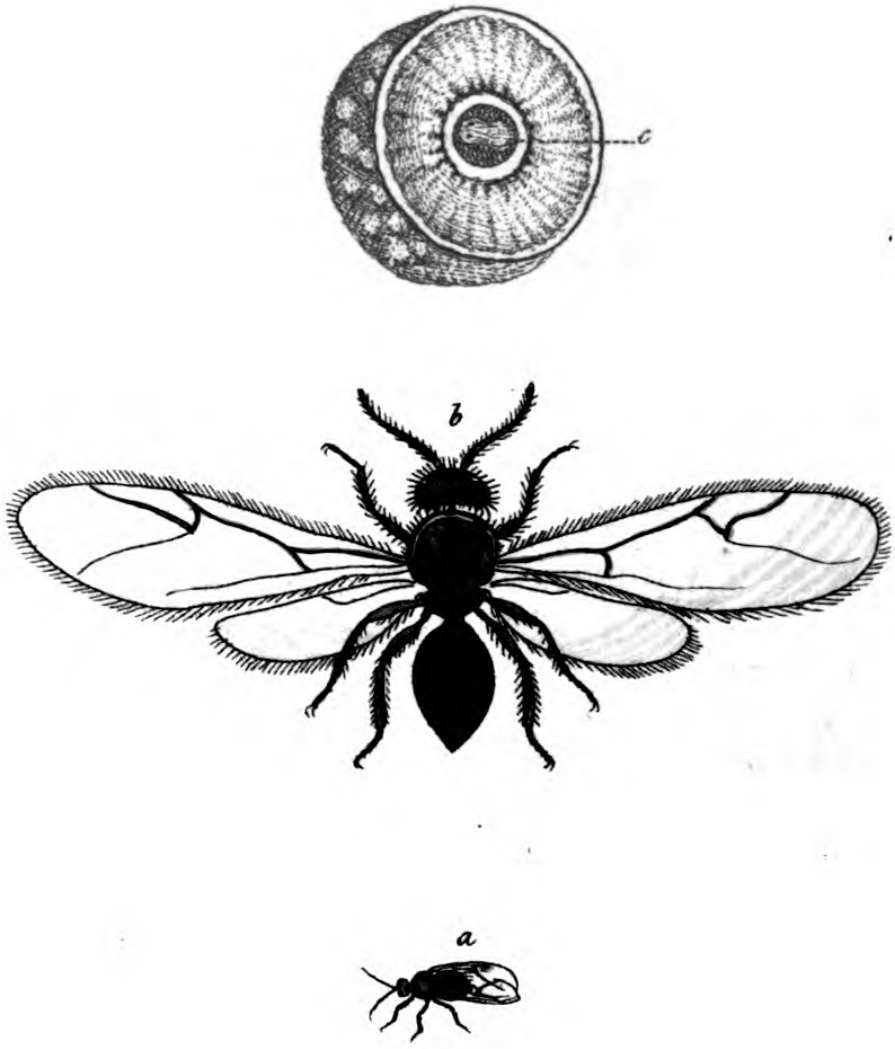
ORDER V.

HYMENOPTERA.

THE Hymenoptera have four transparent, membranous wings, of unequal size; the two inferior being always much the smallest. All the wings are strongly marked with longitudinal nerves, but the transversal nerves are not so evident. While the Hymenoptera are flying, the wings are extended on the same plane, and are strongly united by means of several little hooks, which are not visible without the help of the microscope. This union is effected by hitching the internal edge of the upper wing to the external edge of the lower, so that the wings never separate during flight; but seem, as it were, formed of a single membrane. The mouth also is a character of consequence in

the insects of this order, and is sometimes armed with strong jaws, calculated for gnawing and biting with considerable force. Most of them, in the room of jaws, have a sort of trunk, with which they extract the honeyed liquor from flowers, or fruits. This organ is very apparent in some genera, but in others it is very minute. It should be noticed that, independent of two large, reticulated eyes, the Hymenoptera have on the upper part of the head, three little shining specks or stemmata, probably placed there for the purpose of sight, and disposed in a triangle. We observe some insects of this order that have no wings, and which never obtain any. Such are to be found in the genus Formica and Mutilla; but then they are the neuters, or mules; the males and females are never wingless.

CYNIPS.



C. Quercus folii.

GENUS LIII. *CYNIPS.*

GENERIC CHARACTER.

Antennæ cylindrical, moniliform. *Mouth* armed with jaws, but no proboscis. *Palpi* four, short, unequal, and capitated. *Sting* spiral, and contained within the body.

General Observations.

It is the species of this genus that produce those vegetable excrescences known by the name of galls. These galls are of various figures and sizes. Some are round like small apples, some are isolated; others again are in clusters; many are of an irregular figure, and are occasionally bristled with little fibres. Each particular species of Cynips seems to form an excrescence of its own, which deviates in some respects from the rest, but that of all others the most interesting on account of its utility, is the oak-gall, produced by the *C. Quercus-folii.*

When the female Cynips is desirous to lay

her eggs, she pierces the leaf of the oak with the needle or borer at her tail, and deposits an egg in each puncture. The wounds thus made, in a few days begin to swell, and increase from July to September, when they have attained their full size, as represented in the upper part of plate 53. Upon opening one of these galls, we find in the centre a small larva snugly seated, in a cavity perfectly round, and generally rolled into the shape of a ball. In September it becomes a chrysalis, and in about three weeks after gnaws its way through the gall, and issues a perfect insect, leaving that small round hole which is to be seen in every nut. The Galls used in the arts are chiefly imported from the Levant, and are much stronger than what arise from the Oak of this country.

SPECIFICATION.

CYNIPS QUERCUS-FOLII. C. nigra, thorace lineato, pedibus griseis, femoribus subtus nigris. *Linn. Syst. Nat.* 1. *p.* 918. *Gmel.* 1. *p.* 2650. *Fabr. Ent. Syst.* 2. *p.* 101. *Spec. Ins.* 1. *p.* 403. *Mant. Ins.* 1. *p.* 252.

Reaum. Ins. 3. *t.* 39. *f.* 14—17.

Roesel. Ins. App. t. 52, 53.

Inhabits Europe.

Pl. 53. a. Natural size. b. Magnified. c. The gall-nut opened to show the included larva.

GENUS LIV. *TENTHREDO.*

GENERIC CHARACTER.

Mouth with jaws, but no proboscis. ***Palpi*** four, unequal and filiform. ***Wings*** extended, swelled or slightly inflated. ***Sting*** with two serrated, or saw-like laminæ, nearly hidden within the abdomen. ***Scutellum*** with two small distant tubercles.

General Observations.

The great variation in the formation of the Antennæ of the Tenthredines, has induced Linnæus to divide them into the following families, founded upon that circumstance:

1. With the antennæ club-shaped.
2. With the antennæ not articulated, but of one continued thread.
3. With pectinated antennæ.
4. With the antennæ somewhat club-shaped and articulated, or jointed.
5. With filiform antennæ, having seven or eight articulations, besides the base.

TENTHREDO.

T. Caprea.

6. With setaceous antennæ, composed of several articulations.

The instrument which the female Tenthredo uses to deposit her eggs, is contained between two scaly laminæ, or grooves, at the end of the abdomen. She can exert it at pleasure; and, being serrated, it serves her as a gimblet or borer, with which she is enabled to penetrate the outer bark of vegetables.

A familiar example may be met with in the *T. rosæ*, the female of which may be seen in a fine summer morning, about ten o'clock, running with eagerness over all the branches of the rose, and generally selecting that which is near the extremity of the principal stem. Here she makes an opening with her borer, and when she considers the hole of a proper size, deposits an egg in the cavity. She then remains perfectly quiet for some minutes, with the borer still in the hole; after this pause she partly withdraws the instrument, and in the act emits a frothy liquor which fills the cavity. The use

of this liquor is not well understood, but as soon as it is emitted, the insect wholly withdraws her borer, to repeat the operation in another place. Of these holes, she will make from four to twenty by the side of each other. That part of the rose-branch where the deposition has been effected, begins to turn brown on the following day, and the wounds it has received begin to rise and increase in convexity from day to day, till in due time the enclosed egg gives birth to a larva, which bursts its green covering, to seek its food on the surface of the rose-leaf.

The larvæ of the Tenthredines bear a strong resemblance to caterpillars, but have a greater number of feet. They inhabit different trees according to their species; and some of them exhibit in their economy, peculiarities deserving of notice. The larvæ of the *Tenthredo pini* live in society on the pine-tree. Their company frequently amounts to a hundred; and when they have consumed all the leaves of the branch they have selected, the whole colony with one

consent march off in search of another, where they can again satisfy their appetite. They do not confine themselves to the leaves only, but also bark the young shoots of the pine. When touched they exude from their mouth a drop of clear resinous juice, which has the consistence and aromatic smell of that which issues from the tree when wounded.

Nearly all the species towards the end of summer enclose themselves in a double case, in which they remain, many of them, all the winter, before they change into the chrysalis state. In about a fortnight or three weeks after the change, the perfect insects appear.

SPECIFICATION.

TENTHREDO CAPREÆ. T. Salicis. *Linn. Syst. Nat.* 1. *p.* 928.

T. flava capite, thorace abdomineque supra nigris, alis puncto flavo. *Linn. Syst. Nat. Gmel.* 1. *p.* 2663. *Fabr. Spec. Ins.* 1. *p.* 414. *Mant. Ins.* 1. *p.* 255. *Ent. Syst.* 2. *p.* 118.

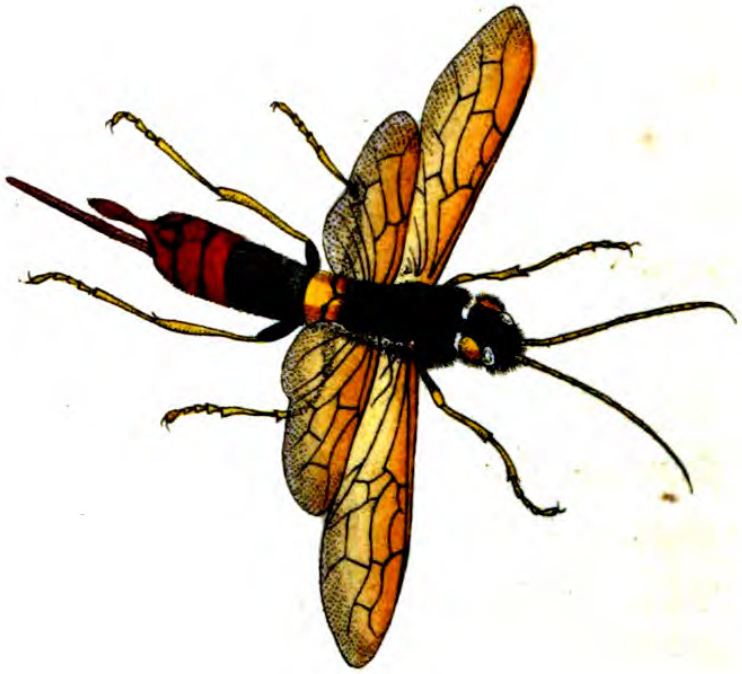
Reaum. Ins. 1. *t.* 1. *f.* 18. and 5. *t.* 11. *f.* 5, 6.

Panzer, Faun. Ins. Germ. fasc. 65.

Inhabits the willow, and currant bushes. The larva, which is blue and fulvous, with nine rows of black spots, is very destructive to the gooseberry and red currant bushes.

Pl. 54. a. Natural size. b. The same magnified. c. One of the antennæ enlarged.

SIREX.



S. gigas.

GENUS LV. *SIREX.*

GENERIC CHARACTER.

Antennæ filiform, with more than 24 articulations. *Mouth* armed with two strong jaws. *Palpi* four, the hind ones the longest; thick towards the tip. *Sting* projecting, strong, stiff, and serrated. *Abdomen* slender and terminating in a point or spine, from which the sting projects. *Wings* lanceolate, or pointed at the extremities, flat, not folded.

General Observations.

The larvæ of these insects live in decayed vegetables. They have six feet, and are soft and of a cylindrical shape. The chrysalis enclosed in a case, resembles the perfect insect, with the limbs in a contracted state, and without wings. The sting of the Sirex is formidable; and one in particular, the *Sirex Spectrum*, which is very vigorous, and is found in putrid wood, especially of the pine and fir, is said to sting with such force, as to pierce one's

finger to the bone. The largest of the genus is the *Sirex Gigas*, which often exceeds the size of the one represented in pl. 54. It is chiefly among cone bearing-trees, and has a very conspicuous sting, or terminal tube. With this sting the female perforates the fir-trees, and deposits her eggs in clusters, sometimes to the number of two or three hundred. The larva is above one inch long, and not unlike a yellow grub in appearance, but has a short black spine at the end of the abdomen. It feeds in the body of the tree, changes to a chrysalis in July, and in three weeks time becomes a winged insect. Some of them change late in the season, and remaining all the winter shut up, emerge from their case the following spring.

SPECIFICATION.

SIREX GIGAS. S. abdomine ferrugineo; segmentis 3, 4, 5, 6, nigris, thorace villoso. *Linn. Syst. Nat.* 1. *p.* 928. *Gmel. p.* 2671. *Fabr. Spec. Ins.* 1. *p.* 418. *Mant. Ins.* 1. *p.* 257. *Entom. Syst.* 2. *p.* 124.

Roesel. Ins. 2. *Vesp. t.* 8, 9.

Schaeff. Icon. 10. *t.* 2, 3.

——— *Elem. t.* 13. *f.* 7.

Klug. Monogr. Siric. Germ. pl. 2. *f.* 1.

Inhabits Europe, and is found in coniferous trees.

Pl. 55.

GENUS LVI. *ICHNEUMON.*

GENERIC CHARACTER.

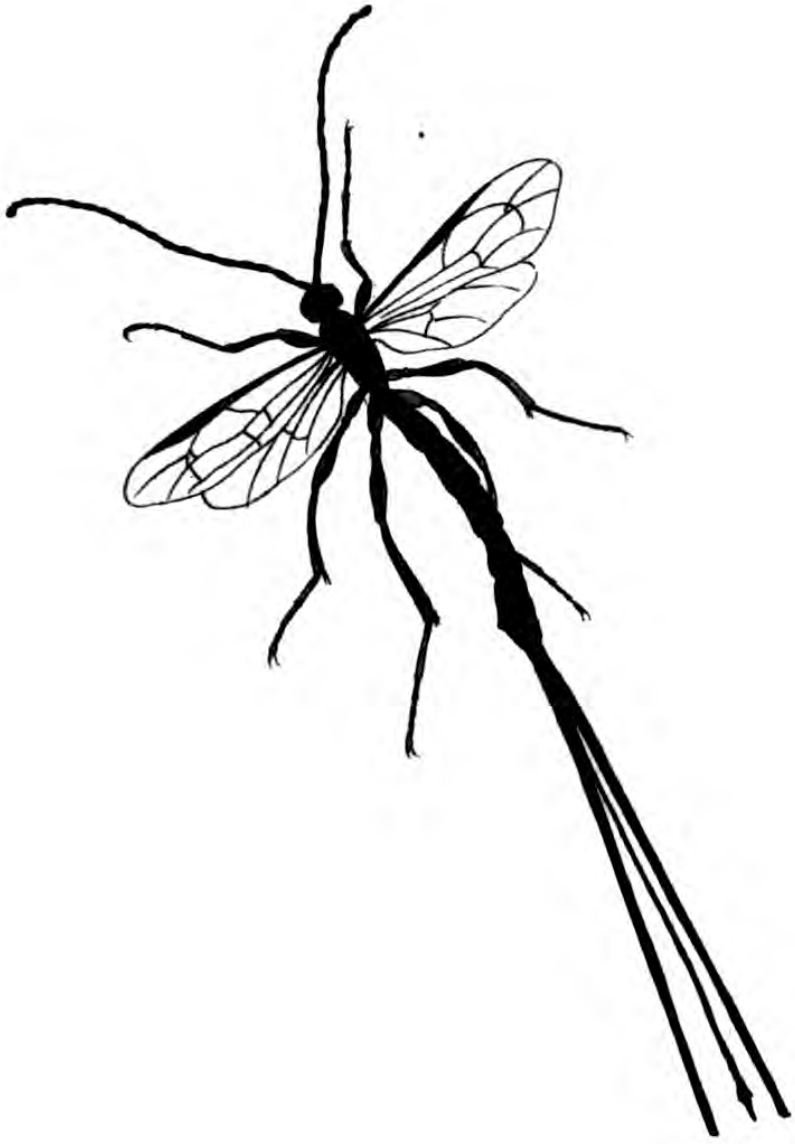
Antennæ filiform, or setaceous, with more than thirty articulations. *Mouth* armed with jaws, without any tongue. *Palpi* four. *Abdomen* in most species joined to the body by a pedicle, or stalk. *Sting* projecting, and enclosed in a cylindrical sheath composed of two valves.

General Observations.

The following are the Linnæan divisions of this genus:

1. With the scutellum white, and the antennæ with a white ring.
2. With the scutellum white, and the antennæ wholly black.
3. With the scutellum of the same colour as the thorax, and a white ring on the antennæ.
4. The same as the preceding, but the antennæ black and setaceous.
5. With the antennæ yellow and setaceous.

ICHNEUMON.



I. manifestator.

6. The species of this division are very small, and have filiform antennæ, with the abdomen oval, and not joined to the thorax by a pedicle.

Instinct leads the different species of this numerous genus to provide for their future progeny in a manner distinct from each other. Some lay their eggs in the crevices of walls; others insert their long borers into the clefts of trees, and there deposit their burden; while a third division, and that the most singular in the adoption of its object, singles out an unlucky caterpillar, and the female Ichneumon plunging her long tube into its body, introduces egg after egg, and notwithstanding all the attempts of her victim to rid itself of its tormentor, continues her operation till her whole stock of eggs is deposited. The numerous larvæ, which originate in the body of the caterpillar from the eggs thus laid, and which live at its expense, and feed on its substance, do not, as one might reasonably suppose, destroy the animal directly, but carefully avoiding the immediate destruction

of that, which would at the same time be death to themselves, they leave the vital parts and principal viscera untouched, feeding only on that fatty substance with which the body of the caterpillar is plentifully provided. This substance furnishes nourishment enough for the larvæ to exist till they have attained their full size; and when they are ready for their usual transformation they pierce the skin of the caterpillar with their teeth, and creeping out in various places spin themselves a silken covering, in which they pass the chrysalis state. In the mean time the languid and shrivelled caterpillar, with its body like a sieve, after having yielded all its substance to its parasitical companions, is in a short time relieved from its sufferings by death.

The insects of this genus are for the most part remarkable for the continued vibration of their antennæ.

SPECIFICATION.

ICHNEUMON MANIFESTATOR. Ich. corpore atro immaculato, abdomine sessili cylindrico, pedibus rufis. *Linn. Syst. Nat.* 1. *p.* 934. *Gmel. p.* 2691.

Fabr. Spec. Ins. 1. *p.* 430. *Mant. Ins.* 1. *p.* 265
Ent. Syst. 2. *p.* 162.
Reaum. Ins. 6. *t.* 29. *f.* 16.
Degeer, Ins. 1. *t.* 36. *f.* 9.
Schaeff. Icon. t. 10. *f.* 3.
Panzer, Faun. Ins. Germ. fasc. 19. *t.* 21.
Inhabits Europe, and is found in woods.
Pl. 56. The figure is somewhat larger than the usual size.

GENUS LVII. *SPHEX.*

GENERIC CHARACTER.

Antennæ filiform, with 10 articulations. ***Mouth*** armed with jaws, but no tongue. ***Palpi*** four. ***Wings*** extended and incumbent in both sexes. ***Sting*** short, pointed, and concealed within the abdomen.

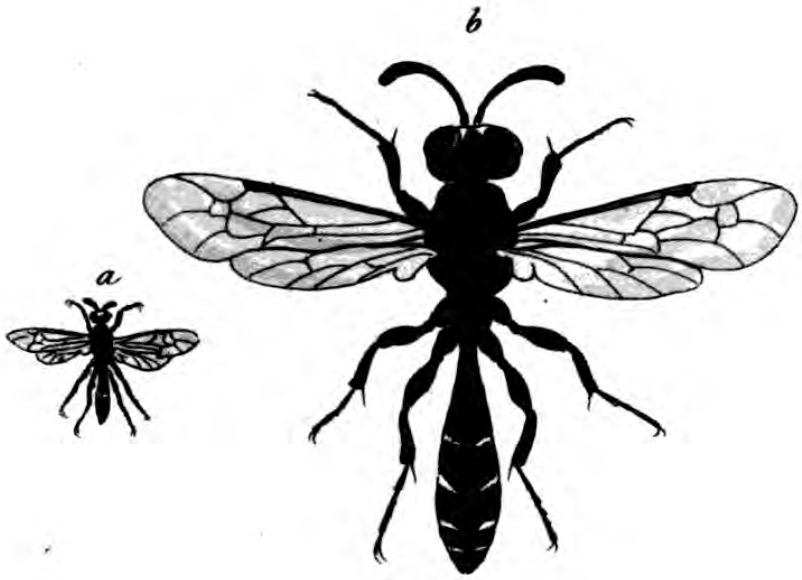
General Observations.

This genus is divided into two families:

1. With the antennæ filiform, and the abdomen connected to the thorax by a pedicle, or stalk.
2. With the antennæ filiform, but the abdomen sessile, or joined to the thorax without the intervention of a pedicle.

The Spheges live entirely on the honey of flowers. The females may be seen flying from place to place in search of a proper situation to form their nest, and at times making a humming noise, which is supposed to be a mark of

SPHEX.



S. figulus.

some particular affection. The insect chooses a dry and sandy situation exposed to the sun, where it forms a nest for the preservation of its posterity. In digging the hole the Sphex uses its mouth and feet, carrying away with its teeth the grains of sand, and throwing to a distance the particles of earth with its hind-feet, which are then in continual motion, and resemble the action of a hen while scratching the ground in a hot summer day. With great labour the insect at length makes a hole some inches deep, and carried in an oblique direction from the surface of the ground. This operation may be easily watched, as the nest is generally formed by the way-side. When the business is completed, the female seeks for a spider or caterpillar, which it kills with its sting, and having dragged it into its hole, deposits an egg in the body. The mouth of the nest is then carefully closed by the insect with earth, and the larva thus provided with food till the time of its change.

The female of the American Sphex, *Sphex*

Pensylvanica, which is a large insect an inch and a quarter long, proceeds in the same way with its nest, but provides its progeny with grasshoppers only. They are of the large green kind; three of which at different times are dragged to the nest, an egg laid in the body of each, and the mouth of the hole closed upon them. These insects use a cruel precaution with the grasshoppers, that their larvæ may not find them putrid when they issue from the egg. They wound them, but in such a manner that they may exist for some days after being buried.

The sting of the Sphex is sharp, but does not cause the same inflammation as that of the wasp or bee.

SPECIFICATION.

SPHEX FIGULUS. S. atra, abdomine subpetiolato: marginibus segmentorum lucidis. *Linn. Syst. Nat.* 1. *p.* 942. *Gmel. p.* 2727. *Fabr. Spec. Ins.* 1. *p.* 444. *Mant. Ins.* 1. *p.* 274. *Ent. Syst.* 2. *p.* 202. *Panzer, Faun. Ins. Germ. fasc.* 80. *t.* 16.

Inhabits Europe. At Upsal makes its nest in the

holes of wooden partitions abandoned by other insects, placing a piece of moist clay at the bottom, and sticking a spider upon it. After depositing its egg in the spider's body, closes up the entrance with clay, and leaves it to be devoured by the larva.

Pl. 57. a. Natural size. b. The same magnified.

GENUS LVIII. *CHRYSIS.*

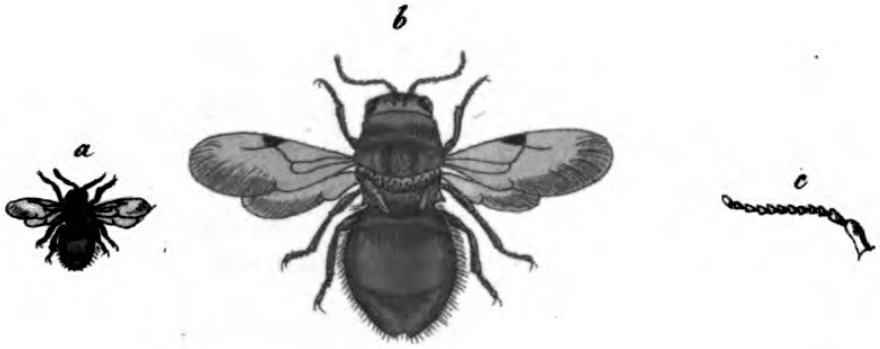
GENERIC CHARACTER.

Antennæ filiform, with eleven articulations, the first long in proportion to the others. *Mouth* armed with jaws, no proboscis. *Palpi* four, unequal, and filiform. *Abdomen* arched beneath with a lateral scale on each side, and dentated at the end. *Wings* extended, not folded as in the wasp. *Body* of a shining colour, appearing as if gilt. *Sting* hid within the abdomen.

General Observations.

What has been said relative to the Ichneumon and Sphex, will apply for the most part to the Chrysis; their habits and metamorphosis being much the same. The Chryses are however far more beautiful insects, and are in general distinguished by the most brilliant metallic colours. They are generally seen in the hottest part of a summer day flying about walls, or near decayed wood, in the crevices of which

CHRYSIS.



C. aurata.

the female deposits her eggs. Their movements are lively, and their flight rapid.

SPECIFICATION.

CHRYSEIS AURATA. C. glabra nitens, thorace viridi, abdomine aureo, ano bidentato. *Linn. Syst. Nat.* 1. *p.* 948. *Gmel. p.* 2746. *Fabr. Spec. Ins.* 1. *p.* 456. *Mant. Ins.* 1. *p.* 284. *Ent. Syst.* 2. *p.* 242.

Schaeff. Icon. t. 42. *f.* 5, 6.

Panzer, Faun. Ins. Germ. fasc. 51. *t.* 8.

Inhabits Europe, and is found about walls. This species varies considerably in size.

Pl. 58. a. The natural size. b. The same magnified. c. One of the antennæ.

GENUS LIX. *VESPA.*

GENERIC CHARACTER.

Antennæ filiform, increasing in size towards the end. *Mouth* armed with jaws, no tongue. *Palpi* four, unequal, and filiform. *Eyes* like a crescent. *Upper wings* plaited. *Body* smooth. *Sting* concealed within the abdomen.

General Observations.

Wasps build their upright oval nests of bits of wood and glue. The males are employed to collect the wood from the frames of windows, and from old posts and rails. They use their strong jaws to cut the wood, and carry away the saw-dust with their feet, making it into a mass at the nest, with a glutinous liquor which falls from their mouth. The nest is twelve inches or more in diameter, and is formed of several horizontal stages of hexagonal cells. The substance of the nest, after being kneaded and worked by the industrious inhabitants, is very like coarse whitish-brown paper. In each

VESPA.

V. vulgaris.

cell the female deposits an egg, which is hatched into a larva or maggot. These larvæ are fed by the labouring wasps with a kind of honey, but very inferior to that of the common bee. The mothers attend to them with the greatest assiduity, and it is interesting to observe with what activity they visit the cells one after another, feeding each larva as they go along. When the larvæ are become large enough to fill their respective cells, they close up the mouth by spinning a very fine silken web, pass into the chrysalis state, and after a certain period, emerge in their perfect form. The males have no sting, and are not numerous; the females are but very few, but the neutral or labouring wasps abound, and compose nearly the whole of every swarm. They lay up no store of honey for the winter, and most of them perish in the cold season. The few that survive lay the foundation of a new colony in the spring, which by the month of July is raised to a full and healthy swarm.

SPECIFICATION.

VESPA VULGARIS. V. thorace utrinque lineola interrupta, scutello quadrimaculato, abdominis incisuris punctis nigris distinctis. *Linn. Syst. Nat.* 1. *p.* 949 *Gmel.* 1. *p.* 2750. *Fabr. Spec. Ins.* 1. *p.* 459. *Mant. Ins.* 1. *p.* 287. *Ent. Syst.* 2. *p.* 256.

Reaum. Ins. 6. *t.* 12. *f.* 7, 8.

Degeer, Ins. 2. *t.* 26. *f.* 7.

Schaeff. Elem. t. 130.

Inhabits Europe, and makes its nest in the ground.

Pl. 59. a. The head magnified. b. b. The jaws, within which are seen the four unequal palpi. c. A horn.

APIS.

a

b

A. terrestris.

GENUS LX. *APIS.*

GENERIC CHARACTER.

Antennæ filiform and short. *Mouth* armed with jaws, and having an inflected proboscis enclosed in a bivalve sheath. *Palpi* four, unequal, and filiform. *Wings* flat or without plaits. *Sting* in the females and neuters, concealed within the abdomen. *Tarsi* with 5 articulations, the first very long.

General Observations.

The bees which compose a hive are generally very numerous. Of the females there are rarely two, and never three; of the males from two to nine hundred and more; and of the neuters not less than fifteen or sixteen thousand. The three different kinds may be easily distinguished. The males, or drones, by their being larger and more downy than the neuters, or workmen. Their head is larger and rounder; their eyes also are larger, their trunk is shorter; they have no sting, and the hind feet have not the rows of hair observable in the workmen.

The working bees are smaller, and have a longer trunk than the males; their feet are furnished with several rows of short, close, and rough hairs, and they are armed with a sting. The female is remarkable for her size, which is nearly double that of the male: her body is more elongated; she has a shorter trunk than the workmen; the hind feet have not the rows of hairs which we observe in the others, and she has a very sharp sting. Upon opening a female the ovaria will be found to contain a quantity of eggs, more or less according to the season.

The history of the habits, manners, and economy of this industrious race, has occupied the pens of different writers till the subject is exhausted; but it still remains a doubt with naturalists, to what particular country the wild bee, as a native, ought to be referred. Some have fixed their origin in the vast forests of Muscovy and the North, where they colonize in hollow trees and clefts of rocks. It is certain, that in Italy, in almost the whole of Asia, and even in the southern provinces of France, wild bees are often found: and it is probable

they exist in Africa, since some travellers have found honey at Madagascar of a green colour, and very agreeable taste, but much thinner than ordinary.

The Humble-bees, which form a considerable division of this numerous genus, may be distinguished at once by their size, and by their body being covered with thicker and longer hair than the smaller kinds. They live in small societies, from 30 to 50, never exceeding a hundred. They for the most part make their nest in the ground, or under moss, &c. forming cup-shaped cells, in which they deposit their eggs. The *Apis lapidaria* makes its nest in gravelly places, while the *Apis centuncularis*, or carpenter-bee, forms its tubular cavities in the body of a tree, and lines them with rose-leaves. The *Apis terrestris* is one of the largest of the species; the males are somewhat smaller than the females, and the neuters are much less than either. They live in society, and range from flower to flower, collecting the honey with great assiduity. Mr. Kirby, in his inestimable Monograph of English Bees, says that he has

often been amused at the time of the sycamores being in flower, with seeing these insects, busily engaged upon its very summit in collecting honey and pollen from its blossoms, and making a hum that might be heard at a considerable distance; and this even after sun-set. He observes that they are as alert in the morning, and he has frequently seen them at work in his garden, when the gooseberry was in blossom, before seven o'clock.

SPECIFICATION.

APIS TERRESTRIS. A. hirsuta, nigra, thoracis cingulo flavo, ano albo. *Linn. Syst. Nat.* 1. *p.* 960. *Gmel.* 1. *p.* 2781. *Fabr. Spec. Ins.* 1. *p.* 475. *Mant. Ins.* 1. *p.* 299. *Ent. Syst.* 2. *p.* 317.

Reaum. Ins. 6. *t.* 3. *f.* 1.

Schaeff. Elem. t. 20. *f.* 6.

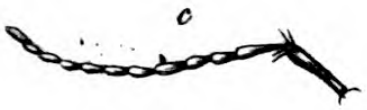
——— *Icon. t.* 69. *f.* 7.

Panzer, Faun. Ins. Germ. fasc. 1. *t.* 16.

Inhabits Europe. Is very common, and constructs its nest of moss under ground.

Pl. 60. a. The head enlarged, with the antennæ projecting. b. A horn magnified.

FORMICA.



F. rufa.

GENUS LXI. *FORMICA.*

GENERIC CHARACTER.

Antennæ filiform, elbowed. *Palpi* four, unequal. *Mouth* armed with large jaws, an upright scale between the thorax and abdomen. *Sting* confined to the females and neuters, and concealed within the abdomen. Males and females winged, neuters apterous.

General Observations.

Of this industrious race there are three distinct kinds, the males, the females, and the neuters. They differ in several particulars, and especially in their size; the females are the largest, the neuters, in general, the smallest, and the males seem to hold a middle place between the two. The labour of the ant-hill falls entirely upon the most numerous class, the neuters, while the males and females seem to have little more to do than to sleep and propagate. After the female has laid her eggs she seems to consider herself as acquitted from all

further trouble; the care of the larva, a little scaly-headed worm without feet, being committed entirely to the neuters, whose affection for a progeny, which they have had no share in begetting, cannot be sufficiently admired. They work incessantly in their behalf, either in providing them with food, or carrying them daily in fine weather from the interior to the outside of the hill, that they may benefit by the influence of the sun. About the preservation of the chrysalis, which is contained within an egg-shaped cone of white silk much larger than themselves, they are extremely solicitous, and may be seen in the greatest confusion when a nest is disturbed, running in all directions, not to save themselves, but their charge. Till the moment when the final change takes place, they are constantly employed in the preservation of the chrysalids, carefully exposing them to the warmth of the sun in fair weather, and defending them with equal solicitude from the humidity of a wet season.

Their persevering industry is proverbial; they are never disheartened by the magnitude of

their undertaking, but prove, by their constant and active exertions, how few difficulties there are which may not ultimately be overcome. When one of these little creatures has tried its utmost efforts to drag towards the magazine a mass of provision too large for its strength, another will come to its assistance, or more if necessary, till at length by the division of labour the task is accomplished.

It is commonly in the month of May or June, and sometimes even earlier, that the transformation of the larva to the chrysalis takes place, and in July the perfect insect appears. This appearance, however, cannot take place without the assistance of the working ants, who gnaw a sufficient opening in the cone for the passage of the insect, without which the helpless chrysalis would infallibly perish. An instance of the unusual early appearance of the perfect insect, and the bustle attending the circumstance, is thus mentioned by Degeer.

In the beginning of the month of May, and in the middle of a fine day when the sun was

shining in all its lustre, he visited an ant-hill, and found the colony in full action. A vast number were walking in the neighbourhood, and on the surface of the nest, insomuch that it was almost entirely covered, while many others climbed upon the trunks and branches of pine-trees, returning to and from the nest with as much bustle and activity as in the warmest day of summer. Attentive in his observation, Degeer all at once perceived in the midst of them a large winged ant which he found surrounded, and, as it were, hid by the workmen. He was the more surprised at this discovery, as he hardly expected to find a winged ant so early in the season.

SPECIFICATION.

FORMICA RUFA. F. thorace compresso, toto ferrugineo, capite abdomineque nigris. *Linn. Syst. Nat.* 1. *p.* 962. *Gmel.* 1. *p.* 2798. *Fabr. Spec. Ins.* 1. *p.* 489. *Mant. Ins.* 1. *p.* 308. *Ent. Syst.* 2. *p.* 351.

Degeer, Ins. 2. *p.* 305. *t.* 14. *f.* 1, 2.

Schaeff. Elem. t. 64.

——— *Icon. t.* 5. *f.* 3.

Inhabits Europe, and is found in fields and woods. It makes its nest in the ground.

Pl. 61. a. The winged ant. b. The neuter. c. One of the antennæ.

GENUS LXII. *MUTILLA.*

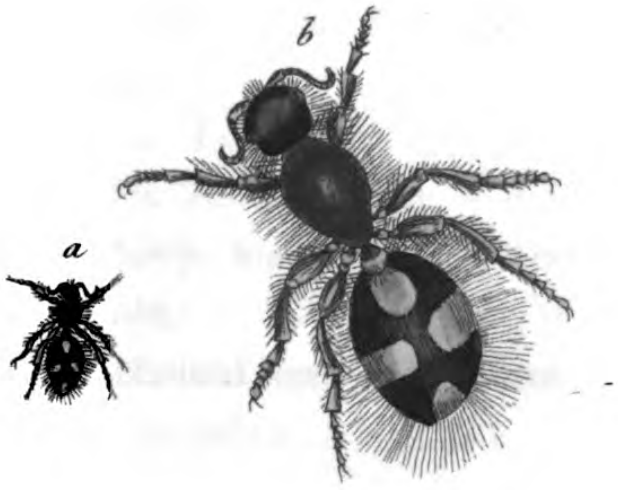
GENERIC CHARACTER.

Antennæ filiform. Three shining eyes in the male. *Mouth* horny, with strong jaws, and a projecting lip, with four unequal palpi at the end. *Wings* for the most part wanting. *Body* downy. *Thorax* hollowed behind. *Sting* concealed.

General Observations.

A few of the insects of this genus have four unequal, veined wings, and these, by some, are supposed to be either males or females, while those without wings are thought to be neuters; thus bearing a strong affinity in their divisions to the genus Formica. This opinion, however, has been set aside by Latreille, who has ascertained that all the winged insects are males, and those without wings females. Very little is known respecting the history of the Mutillæ. The apterous species are found in the summer in sandy places running on the ground, and burying themselves in their holes,

MUTILLA.



M. maura.

which they dig to a considerable depth. The winged Mutillæ are much more difficult to find, and generally frequent flowers, but are too quick in their motions to be taken without great address.

SPECIFICATION.

MUTILLA MAURA. M. nigra, abdomine maculis quatuor albis, thorace rufo. *Linn. Syst. Nat.* 1. *p.* 967. *Gmel. p.* 2806. *Fabr. Ent. Syst.* 2. *p.* 369. *Syst. Piezat. p.* 431.

Coqueb. Illust. Ins. 2. *p.* 67. *t.* 16. *f.* 7.

Panzer, Faun. Ins. Germ. fasc. 46. *t.* 18.

Inhabits Europe, and is found in Germany and the South of France.

Pl. 62. a. Natural size. b. The same magnified.

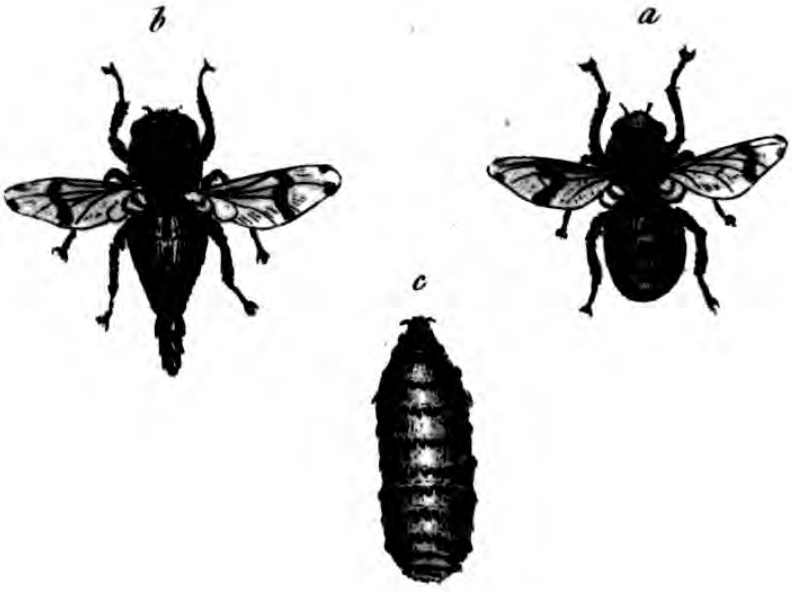
ORDER VI.

DIPTERA.

THE insects of this Order, as the name implies, have two wings only. These are thin, membranous, transparent, and nervous. On the wings of the gnat we may perceive, by the aid of a magnifier, some little scales similar to those on the wings of butterflies and moths, but much smaller, and disposed in the direction of the nerves only. In the Order Diptera the wings are generally placed horizontally on the body of the insect, one covering the other, insomuch that they cross and hide the abdomen. In some genera, however, they are differently situated, and leave the body quite exposed. There is one very striking particular observable

in this Order of insects, and which would alone distinguish it from every other. It is the poiser, or balancer; a little ball fixed to the end of a slender stem, which is itself attached under the origin of each wing. It seems a provision of Nature to compensate for the want of the second pair of wings, and by its quick and lively action, while the insect is in flight, to keep the body in a due state of equilibrium. It is to the dipterous insect, what the loaded pole is to the rope-dancer. In the Tipulæ, and Culices, these balances are large and apparent; in other genera they are small and concealed.

OESTRUS.



Œ. Equi.

GENUS LXIII. *OESTRUS.*

GENERIC CHARACTER.

Antennæ very short, setaceous, and triarticulate. *Mouth* a simple orifice, without trunk or apparent palpi. *Wings* variable. *Body* downy. *Tail* inflected.

General Observations.

The manners of this tormenting genus of insects will be sufficiently illustrated by an attention to the type chosen in the plate of the *Oestrus Equi.* Other species differ in the choice of their residence during the larva state. The ox, the sheep, and, according to Bruce, the camel, and even the elephant and rhinoceros are subject to the attacks of this persevering fly. Mr. Bracy Clark, to whom we are indebted for a very scientific and interesting account of this genus, says, that when the female of the Horse Gad-fly (*Oestrus Equi*) has been impregnated, and the eggs are sufficiently matured, she seeks among the horses a subject for her purpose, and approaching it on the wing,

holds her body nearly upright in the air, and her tail, which is lengthened for the purpose, curved inwards and upwards: in this way she approaches the part where she designs to deposit her egg; and suspending herself for a few seconds before it, suddenly darts upon it, and leaves her egg adhering, by means of a glutinous secretion, to the hair. This operation is repeated by various flies of the same kind, till four or five hundred eggs are sometimes placed on one horse. After the eggs have remained on the hairs four or five days they become ripe; and if at this time, the horse in licking itself touches the egg, its operculum is thrown open, and a small active worm is produced, which adhering to the surface of the tongue is conveyed with the food into the stomach. These larvæ, says Mr. Clark, attach themselves to every part of the stomach, but are generally most nnmerous about the pylorus; and are sometimes, though much less frequently, found in the intestines. They have two small hooks at the lesser end, with which they fix themselves, commonly in clusters, to the inner membrane of

the stomach. The larvæ attain their full growth by the end of May, and continue dropping from the horse the whole of June. As soon as they reach the ground, they find out some convenient retreat, and change to the chrysalis, and in about six or seven weeks the fly appears.

SPECIFICATION.

OESTRUS EQUI. Oe. alis albidis, fascia punctisque duobus nigris, abdomine toto ferrugineo. *Fabr. Syst. Antl. p.* 228. *Clark, Trans. of the Linn. Soc.* 3. *p.* 326. *t.* 23. *f.* 8, 9.

Oestrus Bovis. *Linn. Syst. Nat.* 1. *p.* 969. *Gmel.* 1. *p.* 2809.

Inhabits Europe, and is found in pastures in the months of July and August.

Pl. 63. a. The male. b. The female. c. The larva.

GENUS LXIV. *TIPULA.*

GENERIC CHARACTER.

Antennæ filiform. *Mouth* arched over by the upper jaw extended from the head. *Palpi* two, curved, equal, filiform, and longer than the head. *Proboscis* very short, and bent inwards.

General Observations.

Linnæus has divided this genus into two sections:

1. With the wings open or extended when at rest.
2. With the wings covering the body horizontally when sitting.

The Tipulæ are readily distinguished from other dipterous insects by the length and thinness of their bodies, by the extent of their wings, and by the length and slenderness of their legs, which seem hardly capable of supporting their bodies. Several of the smaller species bear a strong resemblance to the gnat; but a slight

TIPULA.

T. pectinicornis.

examination of the mouth will suffice to show their difference, the trunk of the gnat being long and advanced, while that of the Tipula is very short and bilabiate.

The largest species of this genus may be seen in the meadows from the beginning of spring to the end of autumn. Although they rise high, they do not fly far, and at certain seasons they use their wings only to assist their legs in running. The smaller Tipulæ are continually in the air, flying up and down in swarms before the passenger, and making a slight humming noise like gnats, for which they are often, though improperly, mistaken.

The larvæ of the Tipulæ differ considerably in shape, and in the places they inhabit. Some are found under ground; some in the cavities of decayed trees, or in different species of Fungi; others in cow-dung; and one division inhabit the waters. Some of these last swim with great agility, while others quietly live in holes, which they make at the bottom or on the sides of rivulets.

When the female is desirous to deposit her

eggs in the ground, she makes use of two scaly pieces in the shape of pincers at the end of her abdomen. During the operation her attitude is very singular. She keeps her body in a vertical position, plunging her pincers into the earth; and having deposited by this means a single egg in the hole, she flies off to make another; and thus repeats the process, laying a single egg at a time, till the whole are discharged from her ovarium.

The *Agaricus quercinus*, whose leather-like substance is found attached to old pales, stumps, and decayed trees, feeds a larva of singular habits, which does not penetrate the substance of the plant, but lives beneath the gills. It has no feet, but a slimy skin, which leaves a trail behind it wherever it moves. It fixes itself to the fungus by a strong glutinous liquor, which it draws from its mouth, and applies in thin laminæ one against the other, attaching the ends to an opposite point; with the same it also forms a little roof for a shelter, so that, when completed, the retreat serves the purpose both of a bed and a tent. Seldom more than eight

or ten of these larvæ are found on the largest Agaric. Towards the end of summer, the larva encloses itself in a case spun of the same matter with which it constructed its nest. The case is of a conical shape with a rough surface, and in this the chrysalis remains about a fortnight before the perfect Tipula appears.

The well known Gaffer Long-legs, so frequently seen in houses in the autumnal evenings, flying about the flame of the candles, and often perishing in the blaze, is the *T. rivosa*, one of the larger species of this genus.

SPECIFICATION.

TIPULA PECTINICORNIS. T. antennis pectinatis, alis macula nigra, thorace flavescente. *Linn. Syst. Nat.* 1. *p.* 970. *Gmel.* 1. *p.* 2812. *Fabr. Spec. Ins.* 2. *p.* 399. *Mant. Ins.* 2. *p.* 321. *Ent. Syst.* 4. *p.* 233.

Degeer, Ins. 6. *p.* 400. *t.* 25. *f.* 3.

Schaeffer, Elem. t. 13. *f.* 8. & 129. *f.* 3.

——— *Icon. t.* 106. *f.* 5, 6.

Inhabits Europe, and is found in moist places.

Pl. 64.

GENUS LXV. *MUSCA.*

GENERIC CHARACTER.

Antennæ short. *Mouth* with a short fleshy proboscis or trunk, which is retractile, bilabiate, and channeled. *Palpi* two, very short.

General Observations.

Linnæus has divided the Muscæ into the following families, founded on the form of their antennæ:

1. *Filatæ.* With simple antennæ, or without any lateral hair, or feather.
2. *Armatæ.* In which the antennæ have a lateral hair, or plume. These are subdivided into

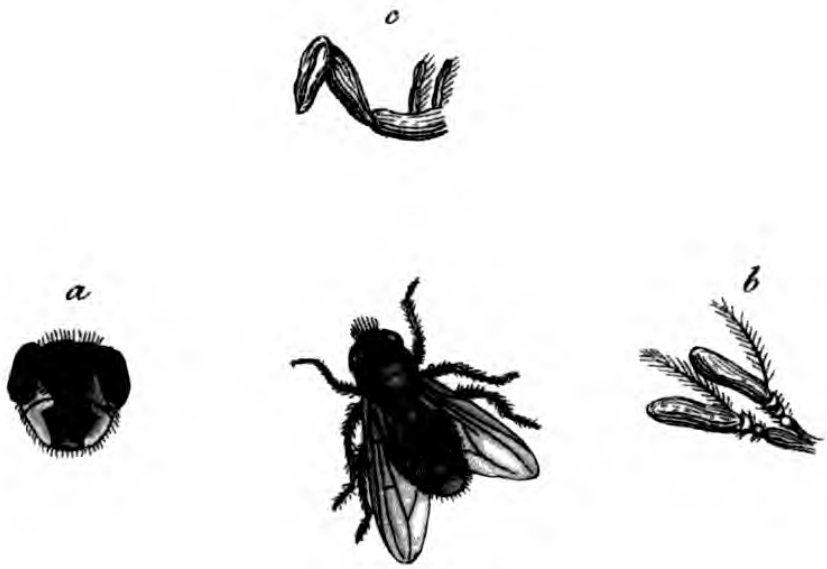
Tomentosæ or *Pilosæ.*

The former have the body very slightly downy, and the antennæ are either

Plumatæ, feathered, or

Setariæ, with a simple lateral bristle.

MUSCA.



M. meridiana.

The *Pilosæ* have a few hairs, chiefly on the thorax, and their antennæ are either

Plumatæ or

Setariæ.

"In the morning of the ninth of September," says Leeuwenhoek, "I found 145 eggs laid as I judged by one fly. Some of these eggs, with a piece of dried flesh, I put into a glass, and carried in my pocket, the weather being cold, to see in what space of time maggots would be produced, and I found some of them the very same day. The next morning all the others were hatched; and I found that, in one night, they had all grown twice the size of the eggs."

The rapid multiplication of the fly is thus calculated by the same author. "Let us suppose that in the beginning of June there shall be two flies, a male and female, and the female shall lay 144 eggs, which eggs in the beginning of July shall be changed into flies, one half males and the other half females, each of which females shall lay the like number of eggs; the number of flies will amount to 10,000: and

Schaeff. Icon. t. 108. *f.* 7.

Panzer, Faun. Ins. Germ. fasc. 10. *t.* 17.

Inhabits Europe, and is common in woods.

Pl. 65. a. The head magnified. b. The antennæ. c. The trunk.

TABANUS.

T. bovinus.

GENUS LXVI. *TABANUS.*

GENERIC CHARACTER.

Antennæ short, the third articulation with a lateral tooth. *Mouth* extended into a fleshy proboscis, terminated by two lips. *Rostrum* having two awl-shaped palpi on each side, and parallel to the proboscis.

General Observations.

The Tabani are the chief tormentors of horses and cattle; during the summer they fasten upon their hides, and suck their blood with the greatest avidity. In the woods, in moist meadows, and near watery places, these insects are to be met with in the greatest abundance; and such is their thirst for blood, that they will follow a horse to a considerable distance, and sometimes even attack a man. When once engaged in their occupation, they may be taken off the hide of the animal without attempting to escape. This taste for blood is confined to the female sex; the males are perfectly innocent, and are satisfied with the honeyed juice, which, by the

help of their proboscis, they are enabled to extract from the nectaries of flowers. The activity of the males is by no means equal to that of the other sex; they generally confine their flight to a small space, making several turns, and appearing, as it were, to invite the females to join them.

Of their larvæ little is known. Degeer is the only naturalist who has noticed that of the *T. bovinus*, which is of a yellowish white, with a cylindrical body divided into 12 rings, without feet, and having a scaly head armed with two large moveable fangs. It resides under ground in moist meadows, and changes into a brown chrysalis, having the abdomen fringed with long hairs. From this chrysalis in the space of a month the perfect insect proceeds.

SPECIFICATION.

TABANUS BOVINUS. T. oculis virescentibus, abdominis dorso maculis albis trigonis longitudinalibus. *Linn. Syst. Nat.* 1. *p.* 1000. *Gmel. p.* 2882. *Fabr. Spec. Ins.* 2. *p.* 455. *Mant. Ins.* 2. *p.* 354. *Entom. Syst.* 4. *p.* 363.

Reaum. Ins. 4. *t.* 17. *f.* 8.

Schaeff. Elem. t. 122.

Panzer, Faun. Ins. Germ. fasc. 2. *t.* 20.

Inhabits Europe, is found in moist pastures, &c. and stings horses and cattle.

Pl. 66. a. The antennæ somewhat magnified. b. The two palpi. c. The rostrum.

GENUS LXVII. *CULEX.*

GENERIC CHARACTER.

Antennæ setaceous; plumose in the male, hairy in the female. *Mouth* consisting of setaceous piercers within a flexible sheath. *Palpi* two, filiform, quadriarticulate, very long and hairy in the male, short and simple in the female.

General Observations.

The most troublesome species of this genus, the common Gnat, is well known to every one. Its approach is announced by the humming noise with which it troubles the silence of a summer-night; and its arrival by the sharp and venomous bite it inflicts upon our skin. Like many of the insect tribe, it enjoys successively those two kinds of life, which appear to be so diametrically opposite to each other. It is born in the water, but finishes its existence in the air. In the spring and summer, and even as soon as the ice is melted, the marshes, the ponds, and all the stagnant waters, exhibit the

CULEX.

C. pipiens.

small larvæ of the gnat, with their tails at the surface, and their heads beneath. These animals are very lively, and precipitate themselves to the bottom by the help of their little fins the moment they are approached. They return again, however, to their former position as soon as possible, on account of the organ of respiration, which is placed near the tail; and which is not calculated, like the gills of fish, to extract air from the water. When the larva becomes a chrysalis, this organ is multiplied, and its place is changed. Instead of one air-tube near the tail, we now find two upon the thorax, erect, like ears, with their open ends always above the surface of the water; the body at the same time is curled round, with the tail beneath the breast. In about ten days after becoming a chrysalis, the gnat prepares for its last transformation; the upper part of the body swells, the skin cracks, and the head of the insect appears above the surface of the water: the other parts by degrees follow through the same opening, till nothing is left behind but the tail. The gnat, during this operation, raises itself per-

pendicular, the deserted part of the sheath lies upon the water like a boat, while the body of the insect may be compared to the sail and mast. At this moment the animal is in considerable danger; for, should the slightest wind arise before the gnat can disengage itself, the water enters the boat, it sinks to the bottom, and the insect is infallibly drowned. Thus, in those days of transformation when the wind blows and the water is ruffled, thousands of gnats meet their death in that very element, without which, but a moment before, they could not have existed. When no such accident occurs, the body speedily dries, the tail is detached from the sheath, and the gnat flies into the air.

Instinct directs the fecundated female to return to the water, and prepare for the welfare of a future progeny, whose existence she will never live to witness. For this purpose she fastens herself by her four first feet to a floating leaf, or other substance, and crossing her hind legs, places in the angle thus formed, her first egg with the end of her tail, which in these in-

sects is remarkably flexible. She deposits successively her other eggs in the same manner, glueing them together, and giving them, with her feet, the form of a boat. This little vessel, which, when completed, consists of 2 or 300 eggs, placed with the utmost regularity by the side of each other, with their points upwards, has a head and a stern, and in fine weather floats securely upon the water. It is absolutely necessary that the eggs should float upon the surface till they are hatched (which happens in three or four days); for if by any chance the vessel should be wrecked, the larvæ will never be produced.

As one generation succeeds another in the course of a month, we may reckon upon six or seven in the year; insomuch that we should be buried in a cloud of gnats, if it were not for the accidents which happen to them by water, and for the birds, and a multitude of carnivorous insects, which prey upon them by land.

SPECIFICATION.

CULEX PIPIENS. C. cinereus, abdomine annulis

fuscis octo. *Linn. Syst. Nat.* 1. *p.* 1002. *Gmel.* *p.* 2886. *Fabr. Spec. Ins.* 2. *p.* 469. *Mant. Ins.* 2. *p.* 363. *Ent. Syst.* 4. *p.* 400.

Reaum. Ins. 4. *t.* 43, 44.

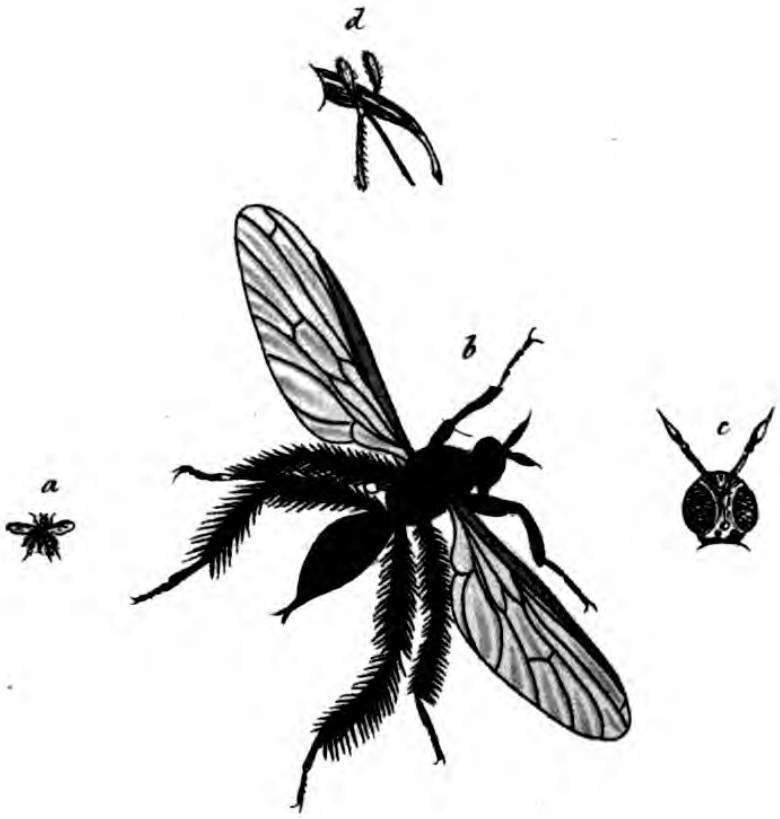
Roesel. Ins. 3. *t.* 15.

Schaeff. Elem. t. 54.

Inhabits Europe, and is found in vast abundance near stagnant waters.

Pl. 67. a. a. The plumose antennæ of the male magnified. b. The filiform rostrum, or piercer. c. The hairy palpi.

EMPIS.



E. pennipes.

GENUS LXVIII. *EMPIS.*

GENERIC CHARACTER.

Antennæ short, the last articulation ending in a lengthened point. *Mouth* with a strong, horny, bivalve proboscis, longer than the thorax, and bent inwards; the valves horizontal. *Palpi* two, very small, and triarticulate.

General Observations.

The species of this genus are for the most part very small; some indeed appear to exceed the size of a common fly, but it is more in the extent of their wings than in the volume of their bodies. They are all carnivorous; the larger species attacking flies, and the smaller ones a prey in proportion to their size. The male and female are often seen united for the purpose of propagating their species, and at the same time satisfying their voracity, by sucking through their long trunk the juices of a fly. The abdomen of the Empis is long, and pointed at the end. In the female it is terminated by two

little moveable stems: in the male, by a double scaly piece with two hooks, with which the insect grapples with the female when he wishes to confine her.

The larvæ are not known. The perfect insects frequent gardens, and are found about flowers.

SPECIFICATION.

EMPIS PENNIPES. E. antennis filatis nigra, pedibus posticis longis alterius sexus pennatis. *Linn. Syst. Nat.* 1. *p.* 1003. *Gmel. p.* 2889. *Fabr. Spec. Ins.* 2. *p.* 471. *Mant. Ins.* 2. *p.* 364. *Ent. Syst.* 4. *p.* 404.

Sulz. Ins. t. 21. *f.* 137.

Panzer, Faun. Ins. Germ. fasc. 74. *t.* 18.

Inhabits Europe, and frequents the flowers of the *Geranium sylvaticum* and *Cardamine pratensis*, &c. It varies greatly in size, from the figure in the plate to three-eighths of an inch long. The feathered legs are peculiar to one sex, the other has them not.

Pl. 68. a. The natural size. b. The same magnified. c. The head and pointed antennæ. d. The proboscis and the two palpi.

CONOPS.

C. subcoleoptrata.

GENUS LXIX. *CONOPS.*

GENERIC CHARACTER.

Antennæ very short, triarticulate, the last articulation clavated and terminated by a lateral hair. *Mouth* with an extended proboscis formed of three joints.

General Observations.

We find these insects in the fields, the gardens, the meadows, and every where, on flowers which yield the honeyed juice on which some of the species feed, while others suck the blood of animals. Among these last the Linnæan *C. calcitrans* (the *Stomoxys* of Geoffroy, &c.) is often mistaken for the common window-fly, but may be readily distinguished by its strong and pointed proboscis. Without such an examination, our legs are frequently made sensible of the difference in the autumnal season, by the sharp bite of the insect while in the act of sucking our blood. These, like the Tabani, are most troublesome on the approach of rain,

and are great tormentors of horses and cattle. Their metamorphosis is unknown.

SPECIFICATION.

CONOPS SUBCOLEOPTRATA. C. antennis setariis, abdomine subferrugineo, alis præmorsis externe crassioribus. *Linn. Syst. Nat.* 1. *p.* 1006.

Panzer, Faun. Ins. Germ. fasc. 74. *t.* 13. Thereva.

Inhabits Europe, and is found in Germany, &c.

Pl. 69. a. Natural size. b. The same magnified. c. The antennæ.

ASILUS.

A. ephippium.

GENUS LXX. *ASILUS.*

GENERIC CHARACTER.

Antennæ with four articulations, the last a bristle arising from a cone. *Mouth* with a straight, extended, horny, bivalve rostrum. *Palpi* two, short, downy and filiform.

General Observations.

In the insects of this genus, the halteres, or balancers, (two little globular bodies placed on slender stalks beneath the wings,) are very apparent. The body is more or less hairy; in some species it is very downy, and the head in general is furnished with hairs like those on the body. The Asili live by rapine, preying on other insects, and attacking not only flies, tipulæ, &c. but even bees, and some of the Coleoptera. They seize their prey with their long legs, kill it with their horny trunk, and suck all the juices from its body. The majority of the species frequent woods and dry places, flying about with rapidity in hot and clear weather: some

inhabit low, moist meadows, and are troublesome to cattle.

The larvæ, which are white, soft, cylindrical worms, pointed at both ends, and without feet, live under ground. The head, sometimes hairy, is armed with two moveable fangs of a dark colour, which the animal uses to work its way into the ground. The chrysalis is long, and the abdomen takes a conical figure. The head is large, and has several scaly points like spines.

The Asilus has such a propensity to sting, that it has not unaptly been called the Wasp-fly, though the sting is inflicted by the head, not the tail.

SPECIFICATION.

ASILUS EPHIPPIUM. A. hirsutus ater, thorace basi albo. *Linn. Syst. Nat. Gmel.* 1. *p.* 2896. *Fabr. Spec. Ins.* 2. *p.* 461. *Mant. Ins.* 2. *p.* 358. *Ent. Syst.* 4. *p.* 377.

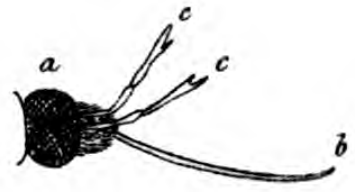
Degeer, Ins. 6. *t.* 13. *f.* 9.

Panzer, Faun. Ins. Germ. fasc. 39. *t.* 23.

Inhabits Germany, and is found in woods.

Pl. 73. a. One of the antennæ magnified.

BOMBYLIUS.



B. major.

HIPPOBOSCA.

H. Hirundinis.

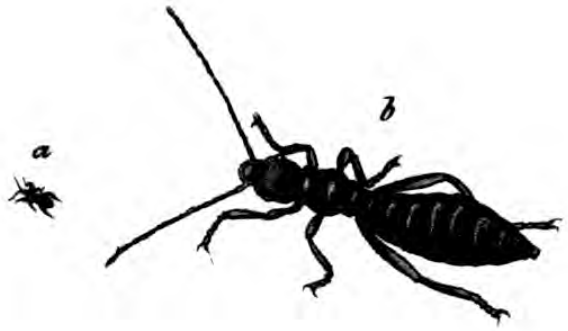
LEPISMA.

L. saccharina.

PODURA.

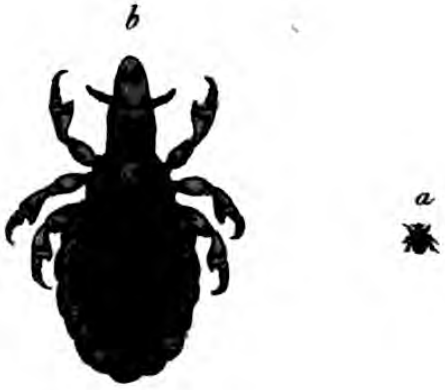
P. plumbea.

TERMES.



T. pulsatorium.

PEDICULUS.



P. Suis.

GENUS LXXVI. *PEDICULUS.*

GENERIC CHARACTER.

Antennæ the length of the thorax. *Mouth* contains an exserted sting. *Eyes* two. *Abdomen* depressed and somewhat lobed. *Feet* six, formed for walking.

General Observations.

All lice live by suction; some on the blood of man, others on that of quadrupeds and birds. The microscope shows the instrument by which this purpose is effected. It is a proboscis, generally concealed in its sheath, very sharp, and provided towards one end with some reversed prickles. Leuwenhoek affirms that the male has a sting in the tail, by which it inflicts the wound that causes the itching; but this is improbable, since the purpose of the insect is to obtain food, and that must first pass through the trunk, not the tail. These insects are oviparous, and multiply amazingly. The young soon issue from the eggs (or nits as they are called), and after having changed the skin two

or three times, are ready to produce in their turn. Experience has shown that in six days a louse will produce 50 eggs. The young leave the shell about the same period of time, and in about 18 days more are in a state for reproduction. From these observations, and the calculations arising from them, it appears that two females may have 18,000 little ones in the space of two months.

Oviedo makes a singular remark, though unsupported by proof. He says that the lice quitted the heads of the Spanish sailors in a certain latitude, while on their voyage to India, and returned to them again, in the same latitude, in their way back.

Hottentots and monkeys seem to delight in the filthy custom of eating these insects, and there is reason to believe that the same nauseous inclination prevails among the lower class of the Russians.

Most of the quadrupeds and birds seem to have their peculiar species of this disgusting genus, and even fish and insects are not totally exempt from them.

SPECIFICATION.

PEDICULUS SUIS. P. Suis Scrofæ. *Linn. Syst. Nat.* 1. *p.* 1017. *Gmel.* 1. *p.* 2925.

Redi Exper. t. 21. Pediculus Asini.

Panzer, Faun. Ins. Germ. fasc. 51. *t.* 16.

Inhabits the hog.

Pl. 76. a. The natural size. b. The same magnified.

GENUS LXXVII. *PULEX.*

GENERIC CHARACTER.

Antennæ moniliform, growing thicker towards the points. *Mouth* with an elongated, inflected, setaceous snout concealing a sting. *Eyes* two. *Abdomen* compressed. *Legs* six, formed for leaping.

General Observations.

It is singular that the Flea is the only one of the apterous insects, that undergoes the same metamorphosis with those of the other orders, all the other apterous insects being produced in their perfect state, either by the mother or from the egg. The larva has a forked tail, and spins a covering for the chrysalis, which has feet, of which, however, it can make no use, they being immoveable. Yeats, from whose Institutions of Entomology the above information is derived, adds that they are small, lively, and creep like caterpillars; they pass fourteen or fifteen days in their larva state, before they undergo their second transformation.

PULEX.

P. penetrans.

The flea has more strength and agility in proportion to its size than any other animal. A flea, by a dexterous contrivance, has been fastened to a small cannon, which it has dragged along without difficulty; and it is not uncommon to find it exhibited at country fairs, either drawing a chain fixed to its scaly body, at least thirty times heavier than itself, or springing along with a little ivory chariot behind it.

It was thought unnecessary to design this little animal, which is every where figured and every where known. Another species was therefore preferred, which, though it belongs to the same genus, is totally unknown in this climate. The Chigger (*Pulex penetrans*), the pest of the West Indies and South America, is so small as to be hardly perceptible: the magnified representation has consequently been given alone, which, together with the following description, is taken from Catesby: "It is a very small flea, that is found only in warm climates: it is a very troublesome insect, especially to negroes, and others that go barefoot and are slovenly. They penetrate the skin, under which they lay

a bunch or bag of eggs, which swell to the bigness of a small pea or tare, and give great pain till taken out; to perform which great care is required for fear of breaking the bag, which endangers a mortification, and the loss of a leg, and sometimes of life itself. This insect in its natural size is not above a fourth part so big as the common flea. From the mouth issues a hollow tube like that of the common flea, between a pair of antennæ. It has six jointed legs, and something resembling a tail. The egg is so small as to be scarcely discerned by the naked eye. These Chigoes are a nuisance to most parts of America between the tropics."

The feet and legs are particularly liable to the attacks of this insect. It generally gets under the nails of the toes, where it lays its eggs, and multiplies to a fearful degree if not removed in time.

SPECIFICATION.

PULEX PENETRANS. P. proboscide corporis longitudine. *Linn. Syst. Nat.* 1. *p.* 1021. *Gmel. p.* 2924.

Fabr. Spec. Ins. 2. *p.* 383. *Mant. Ins.* 2. *p.* 314. *Ent. Syst.* 4. *p.* 209.

Sloane's Jamaica, 2. *p.* 191. *Introd.* 125.

Browne's Jam. 418.

Catesby's Carolina, 3. *p.* 10. *t.* 10. *f.* 3.

Inhabits the West Indies and South America, and is called Chigger or Jigger.

Pl. 77.

GENUS LXXVIII. *ACARUS.*

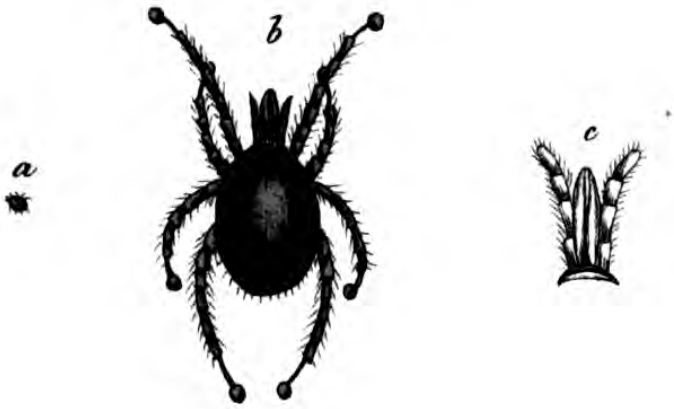
GENERIC CHARACTER.

Mouth with a rostrum inclosed in a sheath.
Eyes two, situated on each side of the head.
Two articulated tentacula in the form of feet.
Legs eight.

General Observations.

This is a numerous genus, and contains a well-known inhabitant of our mouldy cheese. Without the assistance of the microscope nothing could have been known of this diminutive being; but with such powerful aid we are enabled to discover a moveable lump of transparent fat, with eight legs, and a body scattered with long hairs. Such is the common mite, which is seen moving from one particle of cheese to another, with an awkward action of the legs, and dragging after it, seemingly with difficulty, its gross and unwieldy body. Leuwenhoek, that indefatigable observer of the microscopic world, tells us that mites are oviparous, laying very small, white, oval eggs; that the young

ACARUS.



A. coleoptratorum.

animals resemble the parents in all respects except in the number of legs, which at first are only six, and that it is not uncommon to see them struggling to get clear of the egg-shell for a whole day, before they can accomplish their purpose.

The animal which occasions the disease called the itch is an Acarus, as is also the harvest bug, which attends so closely to the legs of the traveller, as he passes through the corn-fields in Autumn. *Karapate* is a name given by the inhabitants of the Isle of Bourbon to a species of Acarus, which infests the fowls to such a degree, that they are sometimes unable to bring their wings close to their bodies, on account of the quantity of acari lodged under them. The only remedy is to burn the hen-roost, and that is often ineffectual, since the new building frequently becomes filled with these insects in the course of six months.

Of this genus there are some kinds that attach themselves peculiarly to other insects; of these the most common is the *Acarus Coleoptratorum*, figured in Pl. 78. This species has so strong

an attachment to the *Scarabæus stercorarius*, that its back is often covered with them, and the motion of its legs impeded by their numbers.

SPECIFICATION.

ACARUS COLEOPTRATORUM. A. rufus, ano albicante.

Linn. Syst. Nat. 1. *p.* 1026. *Gmel. p.* 2930. *Fabr. Spec. Ins.* 2. *p.* 491. *Mant. Ins.* 2. *p.* 373. *Ent. Syst.* 4. *p.* 432.

Degeer, Ins. 7. *t.* 6. *f.* 15.

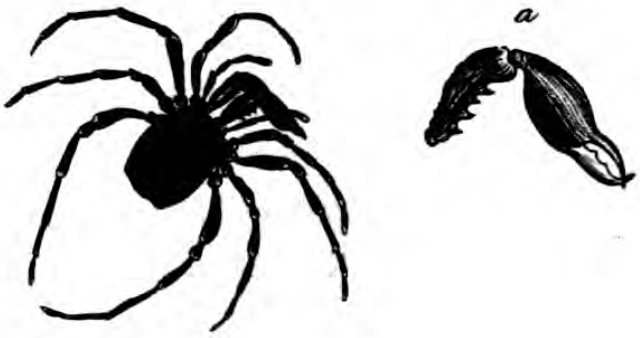
Roesel. Ins. 4. *t.* 1. *f.* 10—15.

Schaeff. Icon. t. 27. *f.* 2.

Inhabits Scarabæi.

Pl. 78. a. Natural size. b. The same magnified. c. The articulated tentacula, with the rostrum between.

PHALANGIUM.



P. Hellwigii.

GENUS LXXIX. *PHALANGIUM.*

GENERIC CHARACTER.

Front furnished with two cheliform mandibles, like crab's claws. *Eyes* four; two vertical, and two lateral. *Abdomen* rounded. *Legs* eight. *Tarsi* composed of many pieces.

General Observations.

The limbs of the Phalangium retain their vitality in a remarkable degree. They are very easily detached from the body, and the insect, in its endeavour to escape, will often leave one or two of its legs between our fingers. Children, with their usual propensity for mischief, and aware of what is to happen, separate a limb or two from the long-legged harvest spider; and laying it down, amuse themselves with observing the convulsive motion of the joints, which continue to act, alternately contracting and expanding the limb for some hours, before the motion entirely ceases. Geoffroy is of opinion, that the Phalangium has the power of reproduction; and, like the crab and the lob-

ster, will produce a new limb in the room of that which has been torn off. He was led to this persuasion from observing a Phalangium with seven full-sized legs, and an eighth at least two-thirds smaller than the others.

The Phalangia bear a strong general resemblance to the insects of the following genus, from which however they may be readily distinguished by their striking mandibles extending from the head, and terminating in a moveable fang; and by the abdomen making one with the thorax, instead of being separated, as in the spiders properly so called. The tarsi also are composed of many pieces in this genus, but of two only in the next.

The Phalangia undergo no transformation; they always retain the same form, with this difference only, that the legs of the young ones are proportionally shorter than those which are full grown. The different species vary greatly in size; some equalling the larger kinds of spiders, whilst others are very minute. All, it is believed, are of a carnivorous nature, and prey upon insects smaller than themselves. Their

provision for a future progeny is conducted in the usual manner. Degeer saw a female Phalangium laying her eggs the size of a grain of sand, perfectly spherical, very white, covered with a membranous and flexible skin, and deposited in little heaps by the side of each other.

SPECIFICATION.

PHALANGIUM HELLWIGII. P. atrum, abdomine lævi elliptico, chelis aculeatis.

Panzer, Faun. Ins. Germ. fasc. 13. *t.* 18.

Inhabits Germany.

Pl. 79. a. One of the cheliform fangs magnified.

GENUS LXXX. *ARANEA.*

GENERIC CHARACTER.

Eyes eight, convex. *Mouth* provided with two jaws, each terminated by a simple, arched, pointed, and moveable hook. *Palpi* two, articulated; the clubbed tips in the male distinguish the sex. *Abdomen* joined to the thorax by a short stalk, and terminated by papillæ, like nipples, through which the thread is drawn. *Legs* eight. *Tarsi* composed of two pieces.

General Observations.

This is a numerous and well-known genus, the terror of many and the antipathy of all. It is a proscribed race, which we think ourselves entitled to destroy whenever we have an opportunity, from feelings of disgust, rather than from the operation of reason. This feeling seems implanted as it were in our nature, from which even the Naturalist is not wholly exempt; and it tends, together with other causes, to

ARANEA.

A. diadema.

check the multiplication of an insect, which would otherwise become by far too numerous.

The eight eyes with which the spider is provided are fixed points, disposed in a different order in different species, insomuch that authors have taken advantage of the circumstance, to divide the genus into families. They are hard, smooth, and brilliant, and are always placed on the head, *i. e.* before the two oblique lines which are seen between the head and the thorax. The inconvenience which might arise from their want of motion, is remedied by their number and position, which is well calculated to comprehend every view compatible with the wants or safety of the animal. There is little doubt that the spider can inject a venomous liquor into the wound made with its fangs. Instances, and those related by authors of credit, have occurred, of inflammation succeeding the bite of a spider on the human body.

The female spider lays a number of eggs, of which she takes the greatest care, as well as of the young when they are hatched, exposing herself to every danger when it becomes ne-

cessary to defend them. At other times spiders are very fearful, and fly with precipitation whenever they are approached; but if by any chance while the female is carrying her little ones on her back one of them should fall off, she would rather perish than abandon it, and will wait with firmness till all danger be passed; after which the young one will remount, and the mother continue her journey. She is devoted to her eggs, which she never abandons. If they are taken from her, she exhibits the greatest degree of inquietude, moving about with rapidity from place to place in search of them: if they are restored, she seizes them with precipitation, and runs off as fast as possible. This fondness of the spiders for their young is the more remarkable, as they are a solitary race, appearing to avoid and hate their fellows, and even devouring each other when they have an opportunity.

Birds are for the most part very fond of spiders, and destroy vast numbers of them. They are also the prey of other insects, particularly of the Sphex and the Ichneumon. This may be illustrated by an extract from some manu-

cript notes and observations on the spiders of Georgia, in America, by Mr. Abbot. "Many very rare and curious spiders," says this gentleman, "may be found in the nests of their great enemies, the Dirt-daubers, or Mason-flies (probably the *Sphex spirifex*). These flies make oblong cases of clay, which they plaster in layers, to roofs, ceilings, and other convenient places. When finished, they lay an egg inside at the end, then fill it with spiders, and plaster them up. It is remarkable that they have the art to enchant, or rather to embalm alive the spiders. Upon opening one of these nests, cells, or cases, the spiders are found alive, but unable to walk or make the least resistance, being just able to move a little, sometimes a leg; they appear plump and fresh in colour, and not in the least emaciated. I imagine they do this by stinging them, a wonderful provision of nature, to provide the worms with fresh and proper food as long as they need it. Upon inclosing some of these spiders in a box, they continued plump and fresh for several days before they began to alter or wither. A single fly will build several

cells alongside and upon each other. They destroy an amazing number of spiders, generally putting all or the most part of one particular species together in one cell. Several of these are very rare, such as I imagine must live chiefly on the top branches of the loftiest trees, as I could never otherways meet with them. Opening several of these cases, at once affords a most curious and pleasing sight, to see such a large quantity of spiders at one view, of the rarest kinds and of the most beautiful colours. Could it be possible to continue their preservation in all their beauty and freshness, they would make a very interesting addition to this branch of Natural History."

SPECIFICATION.

ARANEA DIADEMA. A. abdomine subgloboso rubro-fusco; cruce albo punctata. *Linn. Syst. Nat.* 1. *p.* 1030. *Gmel. p.* 2946. *Fabr. Spec. Ins.* 1. *p.* 540. *Mant. Ins.* 1. *p.* 344. *Ent. Syst.* 2. *p.* 407.

Degeer, Ins. 7. *p.* 218. *t.* 11. *f.* 3.

Clerck, Aran. 25. *t.* 1. *f.* 4. 3.

Schaeff. Elem. t. 21.

Schaeff. Icon. t. 19. *f.* 9.

Panzer, Faun. Ins. Germ. fasc. 40. *t.* 21. A. regalis.

Inhabits Europe, in gardens, woods, &c.

Pl. 80. a. The eyes magnified. b. The jaws the same.

Genus LXXXI. *SCORPIO.*

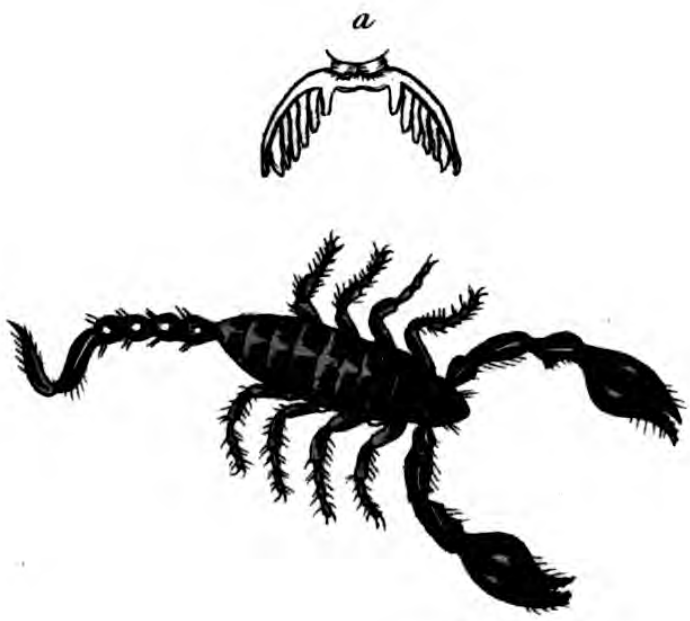
GENERIC CHARACTER.

Eyes eight; three on each side the thorax, and two on the back. *Legs* eight, besides two frontal chelæ or claws. *Tail* elongated, jointed, and terminated by a sharp crooked sting. Two pectens, or comb-like processes, are placed underneath between the thorax and the abdomen.

General Observations.

The insects of this genus delight in warm climates. They are to be found in the four quarters of the world, but the European species confines itself within a certain latitude. In the Journal de Physique for June 1817, Monsieur L. Dufour has given a detailed account of a reddish scorpion, which he has named *Scorpio occitanus*, a species inhabiting the same quarter of the globe, but specifically distinct from the *Scorpio Europæus*. Though alike in shape, in make, and in manners, these two species are never found together. It seems that they re-

SCORPIO.



S. europæus.

ciprocally avoid the same localities. The former is very common in the kingdom of Valencia, and in Lower Catalonia, provinces in Spain, in which M. Dufour was unable to discover the slightest trace of the *S. Europæus*. We may in vain seek for the European scorpion in the dry hills and mountains in the environs of Narbonne, on those of a schistous and desert nature, which form a maritime ridge extending eight or ten leagues from north to south between Barcelona and St. Philip, or on the confines of Lower Catalonia with Arragon, countries where the reddish scorpion is found, and often in abundance. It is curious to remark the natural limits of these creatures. A little beyond Barcelona, we meet with the first plantations of a very common tree, the *Ceratonia siliqua*, and here likewise we find the first traces of the reddish scorpion. This agreement, as it were, holds good in all cases, with respect to soil and situation. Neither the Ceratonia nor the Scorpion can prosper except in dry lands exposed to great heat and situated at a short distance from the sea. M. Dufour pre-

sumes that this scorpion is confined in Spain within the limits above mentioned, and does not think it inhabits a greater height than 150 toises above the level of the sea, since the mountains of Porta-Cœli, situated six leagues to the west of Valentia, although within the zone of the reddish scorpion, but on an elevation favourable to the propagation of sub-alpine plants, did not show, notwithstanding the strictest search, any trace of this animal. The European scorpion is obliged to submit in the same manner to the influence of soil and temperature. In France, this creature begins to show itself about the latitude of 44 degrees, or under the zone where the almond and pomegranate are cultivated, and is lost in those northern limits which are favourable to the propagation of the olive.

The scorpion lives a solitary life: seldom but one, and never more than two are found under the same stone, or within the same hole. When they quit their retreat in search of food, which is commonly in the evening, or during the night, they carry their pincers advanced, and trail

their tail. But if irritated, or menaced by any danger, they fling their claws backward, and curving their pointed tail above the body, so that the sting may protect the head, they remain prepared either for defence or attack. They feed upon insects, but will sustain a long fast. M. Dufour kept one six months without food, and it did not appear to suffer in the least. The females carry their young upon their back, like the Tarantula spider.

These formidable insects do not confine themselves entirely to the stones and dark holes of unfrequented places; in hot climates they enter the houses, and even the beds of the inhabitants. They vary greatly in size; those of Europe scarcely exceeding an inch in length without the tail, while those of Africa and India are sometimes five inches long, and large in proportion. The venom of one of these last has been known to kill a dog, and greatly to injure a man. Scorpions are viviparous, and produce several young at a time.

SPECIFICATION.

SCORPIO EUROPÆUS. S. pectinibus 18-dentatis, manibus angulatis. *Linn. Syst. Nat.* 1. *p.* 1038. *Gmel. p.* 2962. *Fabr. Spec. Ins.* 1. *p.* 551. *Mant. Ins.* 1. *p.* 348. *Ent. Syst.* 2. *p.* 434.

Degeer, Ins. 7. *p.* 344. *t.* 41. *f.* 5.

Roes. Ins. 3. *t.* 66. *f.* 1, 2.

Schaeff. Elem. t. 113.

Inhabits the warmer parts of Europe, and is found under stones and in holes. The specific character, taken from the number of teeth in the pecten, is not correct; they vary in different individuals of the same species.

Pl. 81. a. The pecten or comb magnified.

CANCER.

C. hirtellus.

GENUS LXXXII. *CANCER.*

GENERIC CHARACTER.

Eyes two, moveable, generally pedunculated, or placed on footstalks projecting from the head. *Legs* eight, sometimes six or ten, besides two with claws. *Palpi* six, unequal. *Tail* jointed and unarmed.

General Observations.

Linnæus has divided the Crabs into the following families:

1. Brachyuri, or short-tailed crabs.
   - α. Thorax smooth, with the sides entire.
   - β. ——— smooth, with the sides indented.
   - γ. ——— hairy, or spinous on the upper part.
   - δ. ——— with spines only.
   - ε. ——— with an uneven surface.
2. Macrouri, or long-tailed crabs.
   - α. Thorax smooth.
   - β. ——— uneven, or tuberculated.
   - γ. ——— spinous.

δ. Thorax oblong, and the hand without fingers.

ε. ——— longer than the shell, which it does not cover completely.

This genus, which includes the Lobsters, Shrimps, and Prawns, has lately been expelled from the class of Insects, and very properly arranged in a separate department, by the name of Crustacea.

Crabs, having neither fins nor tail adapted for swimming, are obliged to confine themselves to the bottom of the sea, or to the sand upon its shore. They run sideways with great agility, but if a wave leaves them dry upon the shore, they immediately draw in their legs and remain immoveable. Once a year they cast their shells. This happens in the spring, and after the operation they remain for some time concealed in the sand till their new coat is sufficiently strong to guard them from the common accidents of their situation. There is one species in particular, to which Nature has not only denied any covering, but has left it conscious of

its nakedness. The *Cancer Bernhardus*, feeling its defenceless situation, and being in want of a shell of its own, is obliged to put up with any dead univalve it can meet with to its purpose. From this circumstance it has obtained the name of Hermit-crab, retiring within its cell when at rest, but protruding the fore part of its body when in motion, and in search of its prey.

The species of this numerous genus are not entirely confined to the ocean; some few are found in lakes, and in rivers; and there are also terrestrial crabs, which live on the ground and in the sand, where they dig holes which serve them for a retreat. The *Cancer Ruricola*, or land-crab, is a remarkable instance of the strong effect of instinct, which obliges them once a year to leave their inland habitations, and seek the sea-shore, for the purpose of casting their spawn. These crabs inhabit the tropical climates in great abundance, and have their retreats in the mountains. At the appointed time they descend in immense bodies, and move towards the sea, making a clattering with their claws, which

may be heard at a great distance. Nothing stops their progress, no obstruction makes them turn aside, they never deviate either to the right or left, but pass over every obstacle that it is possible for them to surmount without breaking their line. When arrived at the shore, it seems necessary that the sea-water should pass two or three times over their bodies; after this ablution they retire to land till the spawn has increased to a sufficient size, when they return again, and having cast it into the sea, retire directly to the mountains. The little crabs, the produce of the spawn, soon leave the shore, and repair by slow degrees to the habitations of their parents.

SPECIFICATION.

CANCER HIRTELLUS. C. Brachyurus, thorace hirto, utrinque quinquedentato, manibus extus muricatis. *Linn. Syst. Nat.* 1. *p.* 1045. *Gmel. p.* 2977.

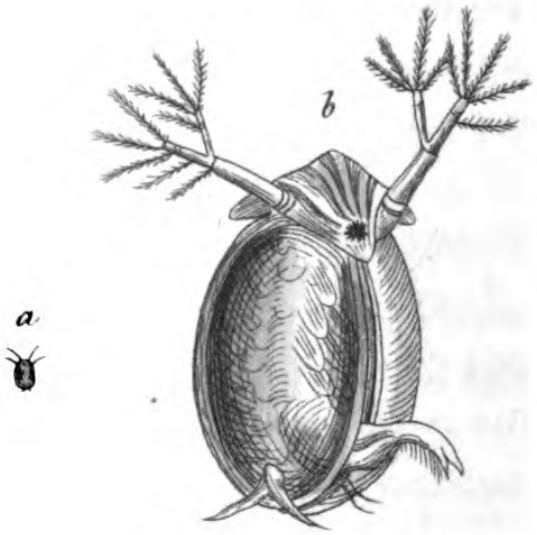
Penn. Brit. Zool. 1812. *vol.* 4. *p.* 9. *pl.* 6. *f.* 1.

Herbst. Canc. 5. *p.* 152. *t.* 7. *f.* 51.

Inhabits the Arctic Ocean. Is covered with stiff hairs, and has one claw much larger than the other.

Pl. 82.

MONOCULUS.



M. Pulex.

Genus LXXXIII. *MONOCULUS.*

GENERIC CHARACTER.

Antennæ (in such species as have them) two, simple, or branched; those of the male thicker and shorter. *Eyes,* in most species, approximated, and fixed in the shell. *Body* covered with a crustaceous tegument. *Feet* formed for swimming.

General Observations.

All the Monoculi with which we are acquainted are aquatic. They live in lakes and marshes, and are often met with also in rivers. Their manner of moving is very singular. They use their branched antennæ in the room of arms; and with their aid they advance in the water, as it were, by starts or leaps. Their feet are also employed for the same purpose, but are not so effective as the horns. Monoculi are oviparous, and being transparent, the ovaria in the female may be very plainly seen within their crustaceous covering. Some carry their eggs in a more exposed situation, near the

origin of the tail, where they are collected in two oval packets, one on each side, in the shape of a bunch of grapes. This is particularly observable in the *M. quadricornis*, a diminutive insect not much larger than a mite, which has sometimes been brought to table in our spring-water. The female, with her long forked tail and bunches of little grapes, may be seen springing about in the water with great agility. These bunches of eggs they never part with till the young are hatched. The species which is by far the most common, and the most familiar to the unscientific observer, is the *M. Pulex*, or Water-flea. This is found in ponds, ditches, &c. at all seasons of the year, and in warm weather in such abundance, as often to discolour the water it inhabits. Its appearance is very singular when examined by the microscope; its body being inclosed in a bivalve sheath, from the opening of which proceeds its forked leg. The horns are branched in a peculiar manner, and the insect can move them in all directions, so as to contribute materially by their action, to that jerking motion in the

water, from whence this species of Monoculus has derived its trivial name. In the body of the female the bunch of eggs is very plainly seen through the transparent shelly covering. The eyes are formed of little black globules, situated very near to each other, and invested with a common membrane, which gives them the appearance of unity.

The insects of this genus are for the most part very minute, insomuch that their delicate structure can by no means be observed by the naked eye; but there are two, the *M. Apus*, and *M. Polyphemus*, which are quite exempt from this inconvenience. The former, an inhabitant of Europe, is nearly an inch and three quarters long; and the latter, a native of India, and better known by the name of the Molucca Crab, may rather be considered as one of the largest of the Cancri, than an insect belonging to this genus.

SPECIFICATION.

MONOCULUS PULEX. M. antennis dichotomis, cauda inflexa. *Linn. Syst. Nat.* 1. *p.* 1058. *Gmel.* 1.

p. 2999. *Fabr. Spec. Ins.* 1. *p.* 373. *Mant. Ins.* 1. *p.* 240. *Ent. Syst.* 2. *p.* 491.

Muller, Entomostr. p. 82. *t.* 12. *f.* 4—7.

Lederm. Microscop. t. 75. *f.* 2.

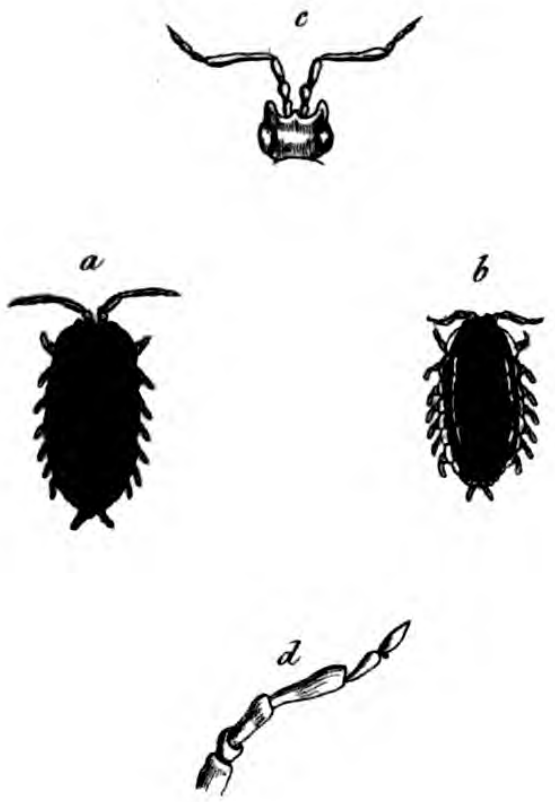
Schaeff. Elem. t. 29. *f.* 3, 4.

——— *Icon. t.* 150. *f.* 5. *a. b.*

Inhabits stagnant water. Is sometimes so abundant as to tinge the water of a reddish colour.

Pl. 83. a. The natural size. b. The same magnified.

ONISCUS.



O. Asellus

GENUS LXXXIV. *ONISCUS.*

GENERIC CHARACTER.

Antennæ setaceous, bent at an angle, and composed of 5 or 6 distinct articulations. *Mouth* with two toothed jaws and four filiform palpi. *Body* oval and annulated. *Feet* fourteen, ending in a simple nail, somewhat hooked.

General Observations.

The Onisci, commonly known by the name of Wood-lice, are of very retired habits. They but seldom appear in the day time, seeming to shun both the light and heat of the sun. They are mostly found under stones, in the crevices of walls, in cellars, and in subterraneous places. When undisturbed they move slowly, and their many legs seem but of little comparative use to them even in flight. The majority of the species are either so sensible, or so timid, that they roll themselves up as soon as they are touched; and, like the hedgehog, present a ball without the slightest appearance of head or feet. In this state they remain till they think the

danger past, when they gradually unfold, and slowly walk away.

The Onisci are viviparous, and the young are perfectly similar to the mother in the conformation of all their parts, except that the head is larger, and the antennæ thicker in proportion. They are born about the end of August; and Degeer, whose accuracy is not to be doubted, observed that the young when first hatched had but six pair of feet, absolutely wanting that seventh pair, and the corresponding ring to the body, with which they are all provided when full grown. These parts must be developed at some period between the time of their birth and their maturity, but the precise point at which this happens, has not as yet been discovered. In the progress of their growth, they often change their skin, and their remnant, which we sometimes meet with in the fields, or in the houses, is a thin white membrane, bearing the impression of that body to which it once belonged.

The Onisci feed on different substances; on leaves, on plants, and on fallen fruit. Most of

them live on the earth, but some inhabit the water. Of these the *O. aquaticus* is sometimes seen, like a small shrimp, swimming in our cisterns; while the marine species, the *O. Entomon*, of comparative gigantic size, measuring near two inches, is found about rocks, and under the arches of bridges, &c. subject to the tide.

One of the kinds, though no longer in fashion, was once the favourite of the physician, and extolled for virtues which it never possessed. The *O. Armadillo*, or Medical Wood-louse, has a dark and polished surface, and when rolled into a ball and dried, was administered by the name of Millepede, with equal efficacy, in many disorders.

SPECIFICATION.

ONISCUS ASELLUS. O. ovalis, cauda obtusa, stylis simplicibus. *Linn. Syst. Nat.* 1. *p.* 1061. *Gmel.* 1. *p.* 3013. *Fabr. Spec. Ins.* 1. *p.* 379. *Mant. Ins.* 1. *p.* 242. *Ent. Syst.* 2. *p.* 397.

Degeer, Ins. 7. *p.* 547. *t.* 35. *f.* 3.

Schaeff. Elem. t. 92.

——— *Icon. t.* 14. *f.* 5, 6. *& t.* 155. *f.* 1.

Panzer, Faun. Ins. Germ. fasc. 9. *t.* 21.

Inhabits houses, walls, cellars, &c.

Pl. 84. a. The *O. Asellus.* b. A variety. c. The head enlarged. d. One of the antennæ magnified.

SCOLOPENDRA.

S. coleoptrata.

GENUS LXXXV. *SCOLOPENDRA.*

GENERIC CHARACTER.

Antennæ setaceous. *Palpi* two, filiform, and articulated. *Body* depressed. *Feet* numerous, of an equal number on each side with the segments of the body.

General Observations.

The Scolopendræ vary greatly in size. The largest of those found in Europe scarcely exceed two inches in length, while those of India are at least four times as long. They live in holes in the ground, in decayed wood, under stones, and in other dark and humid places. The appearance of the larger kinds is very formidable, and the bite extremely painful. Leuwenhoek, who examined the strong, crooked fangs of these insects, found near the point an opening, which extended to the base, and through which an acrid liquor is ejected into the wound, causing that severe degree of pain and inflammation, which constantly succeeds the bite of the tropical Scolopendræ. India,

Africa, and the hotter parts of America, are alike subject to these hideous insects; and the negroes, whose occupation leads them into the woods and uncultivated places, often suffer severely from their bite. They sometimes insinuate themselves into the houses; and there are districts where they are so common, that the inhabitants are obliged to set the feet of their beds into pans of water, to prevent the Scolopendra from climbing the posts, and hiding itself between the sheets.

Of the European species, which are perfectly harmless, there is one, the *S. electrica*, that, when disturbed, emits a beautiful, greenish, phosphoric light. Another, the *S. subterranea*, although it inhabits the same damp places, and is so alike in shape and make as to be sometimes mistaken for the same species, is totally devoid of that beautiful lamp, which the former can illuminate at pleasure.

SPECIFICATION.

SCOLOPENDRA COLEOPTRATA. S. pedibus utrinque quatuordecim, thorace coleoptrato. *Linn.*

Syst. Nat. 1. *p.* 1062. *Gmel. p.* 3015. *Fabr. Spec. Ins.* 1. *p.* 531. *Mant. Ins.* 1. *p.* 341. *Ent. Syst.* 3. *p.* 389.

Pall. Spicil. Zool. fasc. 9. 85. *t.* 4. *f.* 16.

Panzer, Faun. Ins. Germ. fasc. 50. *t.* 12.

Inhabits Europe, and is found in Spain and Germany in dunghills and other damp and dirty places.

Pl. 85. a. One of the legs magnified.

GENUS LXXXVI. *JULUS.*

GENERIC CHARACTER.

Antennæ moniliform. *Palpi* two, articulated. *Body* semi-cylindrical. *Feet* numerous, twice as many on each side as the segments of the body.

General Observations.

In the Scolopendra the body is flattened; in the Julus it is nearly cylindrical. This is a strong distinctive character, independent of the number of legs; the latter having two pair to each joint, or segment of the body, while the former has but one. These insects are found in decayed wood, under stones, and in moist and shady places. They are perfectly harmless, notwithstanding the contrary opinion maintained by some tropical travellers, who have evidently mistaken them for Scolopendræ. They are oviparous, and lay in the ground a great quantity of eggs. The young are at first very deficient in the number of legs, as well as of rings, or segments to the body; both of which

JULUS.

J. terrestris.

increase as the Julus advances in age, till the number appointed by Nature is complete.

The European species of this genus are small, and do not exceed an inch and a half in length; but there is one, the *J. Indus*, inhabiting the woods of Asia and America, which is seven inches long, and of a size in proportion. The *J. maximus*, a much larger species, though not so well known, is a native of South America. It has been noticed by Lister, in his "Journey to Paris," and figured also by Seba, in his first Volume, plate 81.

SPECIFICATION.

JULUS SABULOSUS. J. pedibus utrinque centum viginti. *Linn. Syst. Nat.* 1. *p.* 1065. *Gmel. p.* 3019. *Fabr. Spec. Ins.* 1. *p.* 530. *Mant. Ins.* 1. *p.* 340. *Ent. Syst.* 2. .395.

Geoff. Ins. 2. *p.* 697. *t.* 22. *f.* 5.

Schaeff. Elem. t. 73.

Inhabits Europe, and is found under stones, and in the soft mould of hollow trees, where it is seen with its dark polished body, curled up in a flat spiral form.

Pl. 86. a. The head and antennæ magnified.

References to Plates 16 *and* 17, *omitted.*

Pl. 16. a. Natural size. b. The same enlarged. c. Part of the antennæ, head, &c. magnified.

Pl. 17. a. Natural size. b. The same enlarged. c. The antennæ magnified. d. d. The fringed lips, with two of the articulated palpi, considerably enlarged.

The Binder is directed to place each Plate at the *end* of its respective Genus.

INDEX TO THE GENERA.

THE END.

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