A

SHORT HISTORY

OF

INSECTS.

FRONTISPIECE.

Explanation of the chief parts of an Insect.

a.a Palpi. *b.b* Antennæ. *c* Head. *d* Thorax. *e* Abdomen.
ff Elytra or Wing-Cases. *gg* Wings.

Specimens of some kinds of **ANTENNÆ**.

1. Filiform. 2 Setaceous. 3 Moniliform or Bead-shaped. 4 Club-shaped. 5. Capitate. 6 Fissile. 7 Perfoliate. 8 Pectinate.

G Quinton. Sculp.

A

SHORT HISTORY

OF

INSECTS,

(EXTRACTED FROM WORKS OF CREDIT.)

Designed as an

Introduction

TO THE

STUDY OF THAT BRANCH

OF

Natural History,

AND AS A

POCKET COMPANION

TO THOSE WHO VISIT THE

LEVERIAN MUSEUM.

Norwich:

PRINTED AND SOLD BY

STEVENSON AND MATCHETT,

SOLD ALSO BY BELL, NO. 148, OXFORD-STREET; WHITE, FLEET-STREET; SCATCHERD, AVE-MARIA-LANE; CHAMPANTE AND WHITROW, JEWRY STREET, ALDGATE, LONDON.

There is not a Fly but has had

INFINITE WISDOM;

Concerned not only in its structure,
but in its destination.

'TIS GOD

Who gives its lustre to an Insect's wing.

TOO glorious art Thou, O Lord, in thyſelf; and Thy direct rays ſhine too bright for our eyes.

Yet may we venture to praiſe Thee in thy works; and contemplate Thee at leaſt reflected from Thy Creatures. In them we may ſafely behold OUR MIGHTY MAKER; and freely admire the magnificence of our GOD.

Heaven and Earth are full of His Greatneſs!

Were my body ſo large that I could ſweep all the fixed ſtars viſible from the world in a clear night; and graſp them in the hollow of my hand: and were my ſoul great and capacious in proportion to ſo vaſt a body; I ſhould, notwithſtanding, be infinitely too

narrow-minded to conceive His Wiſdom when He formed a *Fly*;—and how then ſhould I think of conceiving Himſelf?—There is no Inſect ſo ſmall; not even an atom of matter ſo minute as not to ſhare in His attention and care:—and as to *Man*, who is a being of much greater importance; He numbers the very hairs of his head; and therefore muſt be ſuppoſed to care for his immortal ſoul with the tenderneſs of a moſt affectionate Father.

INSECTS

———Waved their limber fans,
For wings and ſmalleſt lineaments exact;
In all their liveries decked of ſummer's pride,
With ſpots of gold, and purple, azure and green.

PREFACE.

NATURAL HISTORY seems likely to become the amusement of our Wives and Children; but the enormous expence of books on that subject; and other reasons still more cogent, point out the expedience of an epitome for the use of Ladies and Young Persons: not to mention the convenience of a Manual to refresh the memory and assist the researches of an abler student:

student: How far the little work here offered to the Public may answer the wish of the compiler in supplying such a Manual it is not for that compiler to decide.

The rudiments are given; the general manners pointed out; and the most interesting particulars relative to the œconomy of Insects collected from our best Authors. Upon early impressions it depends whether your Son shall, through life, make it his sport to torment and destroy; or take delight in studying the nature of Animals; in order to discover the wisdom of God

in

in forming them:—Whether your Daughter shall feel (or at least affect) aversion and terror at the sight of an Insect which she esteems deformed; or pursue the rational amusement of learning how its seemingly mis-shapen parts are suited to the modes of life allotted by its Maker.

Who would not wish his Child to imbibe a love for such innocent amusement?—Who would not gladly infuse a taste for such laudable pursuits?

ERRATA.

PAGE	LINE
xi	8 *for* ſpiraculæ *read* ſpiracula.
xii	6 *for* or *read* like.
xiv	10 *for* is *read* it.
xviii	21 *for* 5 *read* 6.
1	4 *for* Scarabeus *read* Scarabæus.
7	17 *for* verticiliated *read* verticillated.
8	23 *for* ſpire *read* ſpine.
9	11 *for* lentiles *read* lentils.
14	2 *for* ſpíre *read* ſpine.
22	8 *for* maniſeræ *read* manniſeræ.
29	19 after moth, *for* period *read* comma, and *insert* and.
40	11 *for* neſt *read* reſt.
48	18 *for* pollex *read* pollen.
—	24 *for* Ignitis *read* Ignita.
60	8 *for* Mutila *read* Mutilla.
70	5 *for* ſeveral *read* ſevere.
84	8 *dele* of.
87	24 *for* conchareus *read* conchaceus.
93	1 *for* Scarabeus *read* Scarabæus.
103	9 *for* foreceps *read* forceps.
104	13 *for* horizontally *read* horizontal.

INSECTS.

INSECTS are ſo called from a ſeparation in the middle of their bodies, whereby they are cut into two parts; which are joined together by a ſmall ligament.

They are ſmall animals having many feet; and breathing through pores arranged along their ſides, called *ſpiraculæ:* their ſkin (with which they are covered as with a coat of mail) is of a hard or boney conſiſtence; whence they are deſcribed as having their bones on the outſide: it is likewiſe remarked, that they have no red blood; no brains; no noſtrils; no ears; no eye-lids.

They are furniſhed with moveable antennæ (which ſeem to be endued with an exquiſite ſenſe of feeling,) growing from the head.

The palpi are jointed, fixed to the mouth, and generally either four or ſix in number; theſe ſeem to ſerve inſtead of hands to the inſect, to bring other food

food to the mouth, and hold it whilſt eating: The mouth is generally placed under the head, ſometimes in the breaſt; it is furniſhed with a proboſcis; an upper lip; jaws placed tranſverſely; teeth; a tongue; and a palate: ſome inſects have no mouth.

The ſtemmata, or ſmall eyes, are three glittering convex ſpots placed upon the crown of the head.

Inſects are the ſmalleſt of animals; but are a powerful part of the creation; being exceedingly formidable from their numbers.

Some are employed in preparing; ſome purifying; and others in deſtroying the materials on which they work.

Their influence in the œconomy of nature is very great; they preſerve a due proportion among plants; conſume what is miſplaced, dead, or decayed, &c. and themſelves afford nouriſhment to other animals; chiefly birds:—Thus the ſtudy of Inſects ſeems to be very important.

METAMORPHOSIS.

Inſects in general undergo a material change in their form at ſtated periods; there are ſome, though few in compariſon, which burſt from the egg perfectly formed; as ſpiders, &c. but the greater part exiſt in three different ſtates; in the intermediate or middle ſtate, lying as if they were dead.

The egg is depoſited in a convenient place, where the worm which is to be hatched from it may find food.

From the egg is produced the larva, (called likewiſe grub, caterpillar, or worm) which is of a moiſt, or humid ſubſtance, ſofter and larger than the egg; ſlow in its motion, and exceedingly voracious when it meets with the food to which it is moſt addicted; but more temperate when obliged to put up with that of which it is leſs fond.

Larvæ in general, have a great many feet; ſome have none. In this ſtate they grow, and change their ſkin.

Larva ſignifies a *maſk*; and inſects in the larva ſtate are in diſguiſe.

Some call the inſect in this ſtate *maggot*; ſome *eruca*.

The pupa, or chryſalis is drier and harder than the larva; confined in a narrow compaſs; and is either naked or covered with a kind of web.

Pupa ſignifies doll or *baby*; many inſects in the pupa ſtate have ſome reſemblance to a child wrapped in ſwathing cloaths.

This is called by various names; as Aurelia, Bean, Cod, Cone, Nymph.

The inſect eſcaped from the ſecond ſtate, in which it lay concealed in a kind of priſon or tomb; appears in a more glorious one called the *perfect* ſtate; it is then ſtiled the *compleat* inſect; is active, furniſhed with antennæ, which is generally wanted in its other forms; and in this ſtate it always lays its eggs.

In the perfect ſtate many inſects do not feed; ſome ſubſiſt on the juice of fruit, or of flowers, which they extract with a proboſcis; or by means of a long tongue, when at reſt curled up in a ſpiral form like the ſpring of a watch: ſome prey upon other inſects; ſome on dead animals; others on plants, &c. &c. which will be remarked in the progreſs of the work.

SENSES.

Hearing.

Barbut imagined that the antennæ were the organs of hearing; remarking, that as they were hollow and jointed, they were fitted to convey ſounds in a leſſened degree, beſt ſuited to the nature of the animal. But it remains doubtful for what purpoſe the antennæ are deſigned; and after being conjectured to be the organs of ſmelling; of hearing; and by ſome aſſerted

asserted to be susceptible of the least motion of the air; one of our latest writers on insects says; "We must conclude that the antennæ of insects are appropriated for some other purposes than those it is at present suspected they answer. The organs of hearing in the crab and lobster have been discovered and figures of them published: the external orifice of the organ in these animals is placed between the long and the short antennæ; the cochlea, &c. being lodged in the upper part, which Linnæus calls the thorax, near the serrated projection at its apex."

EYES.

The eyes are covered with a transparent, crustaceous set of lenses, to protect them, being a luminous coat of mail.

Many insects have two crescents or immoveable caps; composing the greatest part of their head; and containing a prodigious number of little hemispheres or round protuberances; placed with the utmost regularity and exactness, in lines crossing each other and resembling lattice work: these are a collection of eyes.

One may see the figure of a candle multiplied almost to infinity on their surfaces; shifting its beams into each eye according to the motion given it by the observer's hand; and as other creatures are obliged to turn their eyes to objects, this sort have always some

or other of their eyes directed towards objects on whatever ſide they preſent themſelves: all theſe little hemiſpheres are real eyes; having in the middle of each a minute tranſparent lens and pupil; through which, objects appear topſy turvey, as through a convex glaſs; this becomes alſo a ſmall teleſcope when properly placed.

Mr. Leeuwenhoek looked through the eye of an inſect (with the help of a microſcope) as a teleſcope; and viewed the ſteeple of a church which was 299 feet high, and 750 feet from the place; he could plainly ſee the ſteeple, though not apparently larger than the point of a fine needle: he likewiſe viewed a houſe, and could diſcern the front; diſtinguiſh the doors and windows; and perceive whether the windows were open or ſhut.

Mr. Hook computed 14000 hemiſpheres in the two eyes of a drone.

Mr. Leeuwenhoek reckons in each eye of the dragon fly, 12544 lenſes; or in both 25088: the pictures of objects painted thereon muſt be millions of times leſs than the images of them pictured on the human eye. There is no doubt that inſects ſtill ſmaller, have eyes contrived to diſcern objects ſome thouſands of times leſs than themſelves; for ſo the minute particles they feed on muſt certainly be. What a power then of magnifying are ſuch eyes endued with! And what extraordinary diſcoveries might

might be made were it poſſible to obtain glaſſes through which *we* could ſee as *they* do.

Spiders have eight eyes; two on the top of their head, or body, (for there is no diviſion between them, a ſpider having no neck) that look directly upwards; two others in front a little below theſe, to diſcover all that paſſes forward; and on each ſide a couple more; one of which points ſideways forward, and the other ſideways backward; ſo that the inſect can ſee almoſt quite round it.

As a Fly (the ſpider's natural prey) is extremely cautious and nimble, and comes from above; it was neceſſary the ſpider ſhould be furniſhed with a quick ſight; and an ability of looking upwards, forwards, and ſideways, at the ſame time.

WINGS.

The two firſt orders have their wings ſecured by caſes; called *Elytra.*

The three next orders have under wings which aſſiſt them in directing their flight.

The inſects of the ſixth order have but two wings; and theſe would be liable to be interrupted in their paſſage through the air, but for two balancers or poiſers with which they are provided; theſe are called *halteres*; They are little balls or bladders ſet at the top of ſlender footſtalks, moveable every way at plea-

ſure ; with theſe they balance themſelves in flight, as a rope-dancer does with his pole loaded at each end : theſe bladders being hollow may ſerve to produce ſounds, and be a means of calling to each other.

LEGS AND FEET.

The legs and feet of inſects are wonderful in their ſtructure and contrivance, according to their different circumſtances and neceſſities of life ; and afford a pleaſing variety of objects for the microſcope.

It is pretty to obſerve the ſharp hooked claws, and the ſkinny palms of ſome flies ; which enable them to walk on glaſs and other ſmooth ſurfaces, (even with their bodies hanging downwards) by means of the preſſure of the atmoſphere : this they are not able to overcome in cold damp weather ; but ſtick faſt and die. Others have a ſort of ſpunges which preſerve their claws from being broken or blunted by ſtriking againſt hard bodies ; as the ſoft fleſhy protuberances at the bottom of the feet preſerve the claws of cats, &c. The ſpider has each foot armed with a comb ; probably to ſecure the 5 threads which iſſue from ſo many orifices, from tangling.

ANTENNÆ.

The antennæ are various : thoſe of the cockchafer open and ſhut like the leaves of a book ; or the folds of a lady's fan.

TONGUE.

TONGUE.

The tongue of a gnat pricks like a needle, and ſucks like a pump: that of ſome of the lepidopterous inſects is curled like the ſpring of a watch.

JAWS.

The mandibles of the dragon-fly are naked: this little creature is far more deſtructive among inſects than lions in the deſart; or ſharks in the ocean: this ferocious animal ſeizes every inſect which paſſes by it, and breaks its legs at the firſt bite.

MOUTHS.

The mouths of inſects are in general fortified with briſtles, &c. to keep out hurtful matter.

Inſects which have neither palpi nor ſpiral tongues, have perhaps ſome organ concealed.

SMELLING.

The ſenſe of ſmelling is perhaps ſituated in the palpi, which are continually in motion as if ſmelling and ſearching after food. Theſe organs are cloſed to ſecure the creature from the inconvenience of having them ſtopped with filth.

EXPLANATION.

EXPLANATION.

THE parts of an Inſect chiefly to be diſtinguiſhed are theſe four: Head, Trunk, Abdomen, and Limbs. The head, thorax, and abdomen are diſtinct in moſt inſects, but in the crab, and ſpider, the head and thorax coaleſce.

The mouth conſiſts of the clypeus, (i.e. its upper cover,) of the lips, the mandibles, the maxillæ, the galea (i.e. the covering of the back of the maxillæ,) the palpi, the ſpiral tongue, the proboſcis, the roſtrum, and the hauſtellum. N. B. All theſe parts are not found in the ſame inſect. The lips cloſe the undermoſt part of the mouth. The two mandibles, incloſe the ſides of the mouth *above*; and the maxillæ incloſe them *beneath*.

The *Palpi* are two, four, or ſix.

The *Spiral Tongue* is found in the Lepidoptera claſs.

The *Roſtrum* is a jointed ſheath of one valve, containing ſetæ or briſtles, generally three: this is found in many genera of the claſs Hemiptera.

The

The *Hauſtellum* conſiſts of ſetæ, either naked, or incloſed in a ſheath, which is bivalve, and without joints: this belongs to all the genera of the claſs Diptera.

The *Proboſcis* is fleſhy, with a cylindrical ſtem, ſtrait, having a capitulum or knob, furniſhed with 2 lips, and capable of being drawn back;—this is found in many genera of the claſs Diptera.—The Proboſcis differs from the hauſtellum, as it has always two lips, the hauſtellum never. The ſetæ of the hauſtellum often lie in the ſhaft or ſtem of the proboſcis.

Fabricius takes the characters of his claſſes from the various conſtructions of the mouth.

His ſyſtem, more modern than that of Linnæus, is much admired.

ANTENNÆ.

Are not found in the Spider, and Phalangium. Are two in general; four in Oniſcus, and ſix in the Lobſter.

Antennæ are termed filiform, or ſetaceous, in reſpect to their whole figure, the joints not being conſidered.

Capitate Antennæ, in different ſpecies have their capitulum or knob of different forms: this may be remarked likewiſe of the club-ſhaped, as the club is either entire, or perfoliate, &c.

The

The *Front*, is the upper part of the head, between the eyes, mouth and thorax.

The *Trunk*, ſituated between the head and the abdomen; conſiſts of the thorax, ſcutellum, breaſt, and ſternum.

The *Thorax* is the upper part of the trunk.

The *Scutellum* adheres to the hinder part of the thorax, and is extended between the wings.

The *Breaſt* is the lower part of the trunk, correſponding to the thorax: in this, four of the feet of ſuch inſects as have ſix are generally inſerted.

The *Sternum*, is a longitudinal line of the breaſt; often ſharp pointed, before and behind, as in the genus Dytiſcus.

ABDOMEN.

Compoſed of rings, perforated with lateral ſpiracula, and fixed to the thorax.

THE LIMBS.

The *Limbs*, which adhere to the thorax and abdomen, are the tail, the ſting, the feet, the wings, the halteres and the pectines.

The tail differs in proportion, figure, termination and ſetæ; has no valve.

The

The ſting terminates the abdomen, has two valves, puts forth a rigid, pungent briſtle, varies in proportion, figure and margin.

The Feet, conſiſt of the thigh, the tibia, and the tarſus.

The tibia is the joint between the thigh and the tarſus.

The Tarſus, generally jointed, terminates the foot.

(Geoffroy has taken his orders of inſects from the joints of the tarſus.)

THE WINGS.

Are either cruſtaceous and ſheathing, which are termed elytra; or ſoft, and thin, which are named eſpecially, wings.

(Linnæus determines the claſſes according to the wings.)

The Elytra ſometimes coaleſce, and then the lower wings and ſcutellum are wanting.

Deflexed wings, have the inner margin the higher.

Membranaceous, nervoſe wings differ in number, proportion, figure, ſurface, margin, &c.

Reverſed wings, have the outer margin of the under pair, prominent, when the inſect is at reſt; as in the ſilk-worm moth.

HALTERES.

HALTERES

Are rudiments of poſterior wings, and conſiſt of a foot-ſtalk, with a little knob, or of a membranaceous arched ſcale ; they are peculiar to the claſs Diptera.

PECTINES

Are two ; adhering between the abdomen and breaſt, toothed on one ſide ; they are peculiar to the genus Scorpio ; the ſpecies of which are readily diſtinguiſhed, according to the number of teeth in each pecten. *Uſe unknown.*

1

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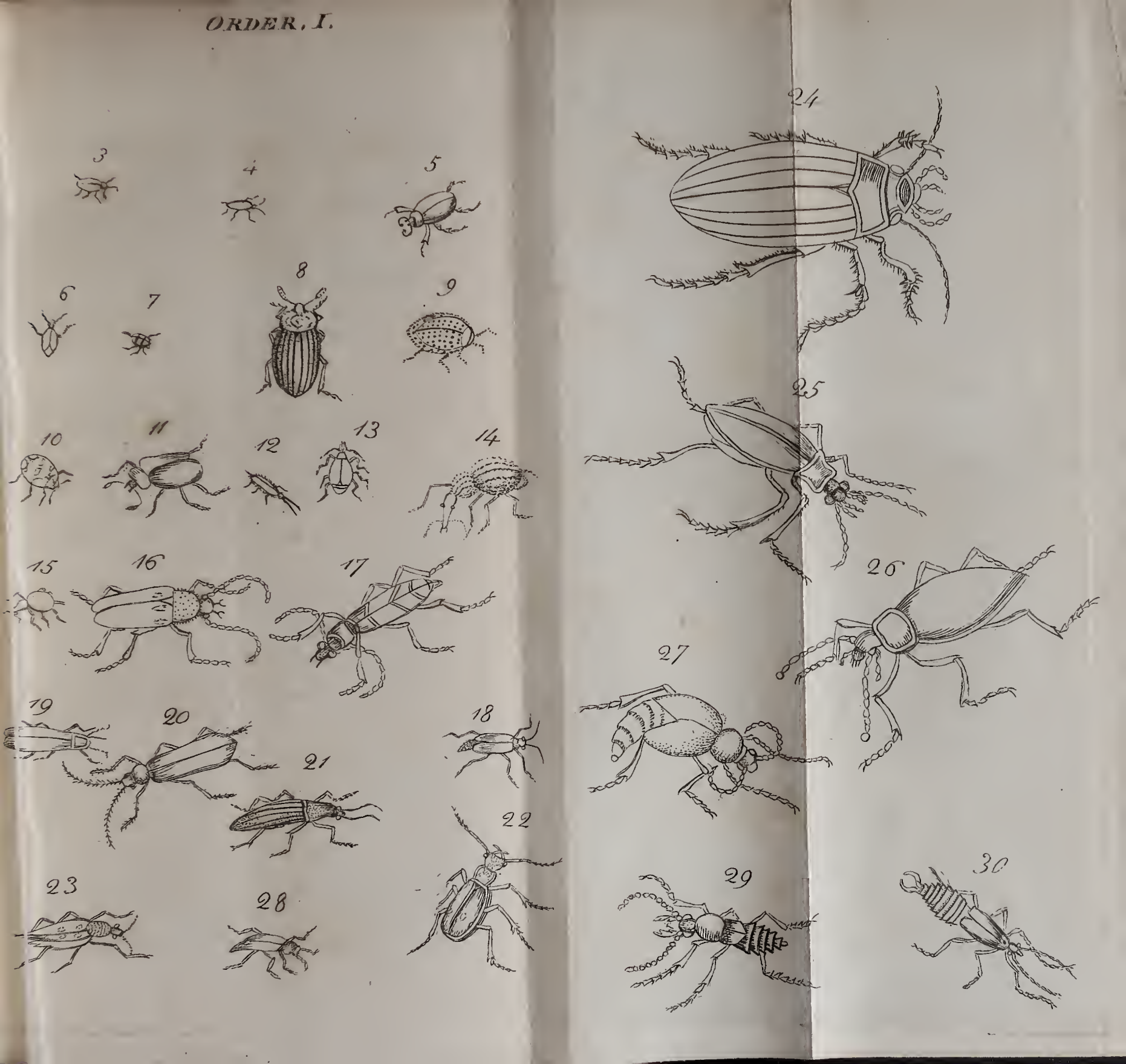
G Quinton fecit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I.

Order—COLEOPTERA.

Wing cases like horn.

GENUS 1.—SCARABEUS BEETLE.

THE larvæ, grubs or caterpillars, of many beetles, lead a ſedentary life under ground; moſt of them delight in and feed upon dung: ſome (ſuch as the garden beetle and cock chafer) live under, and conſume the roots of plants; and, in ſome parts of England, the latter, commonly called *Dor*, will ſtrip the oaks almoſt entirely of their leaves; theſe are the trees which they moſt affect; but in ſeaſons when the Dors abound, many other trees are deſpoiled.

Dor, or Cockchafer.

The grub of the chafer is three years under ground; and when it is nearly full grown, makes dreadful havock among the roots of graſs and corn.

The rooks and ſea-mews deſtroy many of theſe deſtructive larvæ, by which they render eſſential ſervice to mankind, as famine muſt enſue if the grubs were to abound a few years in ſucceſſion.

It is difficult to deſtroy the grubs, except by plowing the ground, to expoſe them to the birds. Some farmers take the pains to dig deep wherever the rooks point them out by their attempts to reach them. In the winged ſtate, to ſhake the trees at noon (when the inſects are aſleep under the leaves) and gather them up, is the beſt method.

The fore legs, which are very ſhort, are calculated for burrowing in the ground, where the female depoſits her eggs.

The antennæ are very curious; folding like a fan, or the leaves of a book.

Moſt animals will eat them with avidity in the grub, and in the perfect ſtate; a providential circumſtance, as they are ſo hurtful.

Roſe Chafer, or Green Beetle.

This is one of the moſt beautiful in England; it is green, gilded, (*auratus*) and met with upon flowers; particularly the roſe and piony. The larva injures the roots of plants.

Dung Beetle.

This makes pellets of excrement, in which it depoſits its eggs, and is thence called *pilularius*; as the round balls reſemble pills.

Aſparagus

Asparagus Beetle.

This is a very beautiful minute inſect, found upon that plant when in ſeed: in ſome places it injures the plants exceedingly.

There are many more species.

GENUS 2.—LUCANUS STAG BEETLE.

This inſect, the largeſt of any in this country, has two large moveable maxillæ (jaws) which have the appearance of ſtags horns: the French call it *cerf volant.*

It is found upon the oak.

The jaws are ſometimes as red as coral, the female has them ſhorter.

A ſecond ſpecies is ſmaller, and reſembles the female.

The lucani feed upon the liquor which oozes from oaks; their larvæ lodge under the bark, and in the hollow of old trees which they eat into, and reduce to powder, and there turn to chryſalids.

The porrected jaws of the inſect are uſed in ſtripping the bark and fixing themſelves whilſt they ſuck. The great ſtag pinches with his horns, and is ſaid to hold by a ſmall branch, and twirl himſelf round, probably to procure the juice, upon which he feeds.

The ſmaller ſpecies are common in Kent, and ſometimes met with in other parts of England.

GENUS 3.—DERMESTES.

The larvæ, or maggots, of the Dermeſtides, feed upon the carcaſes of dead animals, every kind of victuals, dried ſkins, the bark of trees, wood and ſeeds; ſome of them make terrible havock in collections of birds, inſects, herbs, &c. theſe laſt reſiſt the uſual drugs, green wax, camphor, &c. &c. but are killed by arſenic.

Dermestes Lardarius.

This is produced from the Bacon maggot, and is but too common for thoſe who make collections of dried and preſerved animals; its larva gnaws and deſtroys preparations of animals in collections, and even feeds upon the inſects: it is alſo found in old bacon.

Dermestes Domesticus.

This little animal, when touched, draws in its head under its thorax; and its feet beneath the abdomen; remaining ſo motionleſs, that one would think him dead: it is the ſame which makes the little round holes in furniture, which reduce it to powder: and ſome ſay it is that which makes the ſound called *death-watch*.

GENUS

GENUS 4.—PTINUS.

The larvæ, or maggots of the Ptini, are found in the trunks of decayed trees, in old tables, chairs, &c. ſome live and undergo their change among hay, dried leaves, collections of dried plants, &c.

Ptinus Pectinicornis.

This little inſect is diſtinguiſhed by its antennæ pectinated on one ſide, whence ſome call it feathered.

It is produced from a worm that is lodged in wood and the trunks of trees, ſuch as the willow; where it makes deep round holes, turns to a winged inſect, takes flight, and reſts upon flowers.

Ptinus Pertinax.

Of a ſoot colour; the antennæ are ſiliform.

This attacks houſehold furniture, cloaths, furs, and eſpecially animals dried and preſerved in collections of natural hiſtory; where it makes great havoc.

When caught, this inſect bends back its legs, draws back its head, and ſhams death till it thinks itſelf out of danger: no force can make it move, nothing but a great degree of heat.

Linnæus accuſes this inſect of deſtroying his chairs.

GENUS 5.—HISTER.

The inſects belonging to this genus, as well as their larvæ

larvæ are frequently met with in the dung of horſes, cows, &c.

GENUS 6.—GYRINUS.

Gyrinus Natator.

The *water-flea*, belonging to this genus, is of a ſhining black colour, is frequently ſeen in ſtanding water; it deſcribes circles on the ſurface, by running on it with great ſwiftneſs; is difficult to catch, plunging into the water when attempted to be taken.

The larvæ are to be met with together with thoſe of the dytiſcus, which they reſemble in form, though much leſs.

GENUS 7.—BYRRHUS.

The larvæ are found upon plants, or in the bodies of half-decayed animals; they often undergo their metamorphoſis in the bodies of preſerved inſects, which they reduce to powder.

The inſect is generally found upon flowers; hence is called *anthrenus*.

GENUS 8.—SYLPHA.

Many of the ſylphæ are found early in the ſpring under the looſe bark of trees; and they, as well as their larvæ feed chiefly on the half-decayed carcaſes of animals.

GENUS

GENUS 9.—CASSIDA.

The larvæ of the caſſidæ eat the under ſide of the leaves of plants, and often, as it were, hide themſelves under a cover of their own excrement, ſupported in the air above their bodies, by means of their forked tail.

Barbut ſays, this genus is called caſſida, or *helmet* beetle, becauſe it conceals its head under the margin of its thorax, in form of a helmet. Foreign countries afford many fine ſpecies of them. Thoſe we meet with in theſe parts have that ſingular habit; the larva, by the help of the two prongs at its hinder extremity, makes itſelf, with its excrement, a kind of umbrella, that ſhelters it from the ſun and rain: when this umbrella grows over dry, it parts with it for a new one.

Thiſtles and verticiliated plants are inhabited by theſe inſects. There is one ſpecies of which, the chryſalis, reſembles an armorial eſcutcheon: it is that which produces our variegated caſſida; numbers of them are found on the ſides of ponds on the wild elecampane.

Cassidi Viridis.

This looks like a little tortoiſe.

GENUS 10.—COCCINELLA.

The larvæ of the Coccinellæ devour the aphides, and

and by that means contribute to cure plants, which thoſe inſects infeſt, of the louſy diſeaſe.

GENUS 11.—CHRYSOMELA.

The larvæ of the Chryſomelæ conſume the pulp of leaves, rejecting the fibres. This genus contains a great variety of beautiful inſects. They are to be found in woods, gardens, &c. are ſlow in motion, and ſome emit an oily liquor of a diſagreeable ſmell, ſome of them leap.

GENUS 12.—HISPA.

The larva ſeems to be yet unknown. There are but two ſpecies of the perfect inſect found in Europe, and they are to be met with at the roots, or on the blades of different kinds of graſs.

Hispa Atra.

Port-épine noir reſembles a hedgehog in miniature: it is hard to catch, letting itſelf fall on the ground as ſoon as approached; it bears its antennæ upright before it.

GENUS 13.—BRUCHUS.

Bruchus piſi is found upon pea bloſſoms. The thighs of the inſect have each an appendage in form of a tooth or ſpire.

GENUS 14.—CURCULIO.

The larvæ of the Curculiones differ not from thoſe

thoſe of moſt coleopterous inſects; they have a reſemblance to oblong ſoft worms; are provided anteriorly with ſix ſcaly legs, and their head is likewiſe ſcaly.

The Curculio is a ſluggiſh inſect, and endeavours to eſcape its foes by contracting its members and letting itſelf fall to the ground.

The larvæ of long-beaked Curculiones live in fruits, ſeeds of plants, and corn: of this tribe the weevil, which makes ſuch havoc in granaries, is one.

Beans, peaſe, and lentiles that are preſerved dry, are often ſpoiled by theſe little animals. The larvæ of ſhort-beaked Curculiones live on leaves of plants; many pierce and lodge in ſtalks.

Weevil Curculio Granarius.

(See Noxious Inſects.) This inſect lives in and conſumes corn, and comes forth a perfect inſect.

Artichokes and thiſtles are eaten by ſome, and a ſmall ſpecies conſumes inwardly the leaves of elms, which appear yellow and dead at one edge, the inſects conſuming the Parenchyma. This ſpecies is brown, ſmall, and hard to catch, by reaſon of the nimbleneſs with which it eſcapes; called, therefore, Leaping Curculio.

GENUS 15.—ATTELABUS.

Many of the inſects belonging to this genus, as well

well as their larvæ, ſo nearly reſemble thoſe of the preceding genus, as ſcarcely to be diſtinguiſhed.

In their manner, way of life, &c. they exactly reſemble the preceding genus, and are to be found upon many plants.

GENUS 16.—CERAMBYX CAPRICORN.

The larvæ of the Cerambyces nouriſh themſelves with the interior ſubſtance of trees, into which they penetrate, and where they live and perform their metamorphoſis.

The inſect called *goat-chafer*, or *muſk-beetle*, is a cerambyx, and is found in the willow, in the Autumn; it ſmells of muſk, ſome ſay like a roſe.

Some cerambyces utter a cry.

GENUS 17.—LEPTURA.

Their larvæ are found with thoſe of the cerambyces, and much reſemble them in outward appearance and way of life.

Berkenhout has called ſome of the Linnæan Lepturæ, waſp-beetles. Some of them fly well, and are found in Kent in bean and pea fields, on currant buſhes, and on fern.

Barbut mentions one ſpecies on the bramble, another in the trunks of decayed trees, and on the elder-trees.

GENUS

GENUS 18.—NECYDALIS CARRION EATER.

This differs from all the insects of Order I. in the wings being extended their whole length, not folded up under the elytra, which on this account seem to be of less use to this insect than to the other genera.

Barbut found in Norwood a perfect insect upon an oak-tree the beginning of August, the larva is unknown.

GENUS 19.—LAMPYRIS FIRE-FLY.

The larvæ of those lampyrides we are acquainted with, perfectly resemble the female insect, and feed upon leaves.

Lampyris Noctiluca.

The male is a flying insect—the female is the glow-worm often seen in June. The perfect male insect flies during evening in autumn, and frequents the grassy plantations of juniper-trees, called *le ver-luisant de nuit.*

The male has four luminous spots.

GENUS 20.—CANTHARIS.

The metamorphosis of the cantharis resemble those of the cerambyx, and are found in the decayed trunk of a willow.

The insect frequents flowers.

GENUS

GENUS 21.—ELATER SKIPPER.

The larva lives and undergoes its change in the trunk of a decayed tree.

The complete insects are frequently found on flowers and plants; some of them frequent the banks of running waters, sandy banks, &c. and are pretty well known.

Laid on the back they spring a considerable height.

GENUS 22.—CICINDELA SPARKLER.

The larvæ live chiefly with those of the carabi in deep holes under ground, and as well as the perfect insects devour weaker animals for their food.

Cicindela Campestris.

This insect runs with great swiftness, and flies easily: it is found in dry sandy places in the beginning of spring, and its larva, resembling a long, soft, whitish worm, with six legs, and a brown scaly head. It makes a perpendicular round hole in the ground, and keeps its head at the entrance of the hole to catch the insects that fall into it: a spot of ground is sometimes entirely perforated in this manner. The larva and compleat insects are perfect tigers.

GENUS 23.—BUPRESTIS COW-BURNER.

Buprestis and elater resemble one another very much

much, and are beſt diſtinguiſhed by the ſpines which terminate the breaſt and thorax of the latter.

There are but few ſpecies in Europe.

They are generally of bright ſhining colours, ſaid to be noxious to cattle; who, in feeding happen to ſwallow them.

Buprestis Guttata.

This has been found in timber-yards.

The larva has not been diſcovered, it is ſuppoſed it may reſemble that of the Elater. Each of theſe inſects are found among timber and decayed trees.

GENUS 24.—DYTISCUS PLUNGER; OR, DIVER.

This is a dull ſluggiſh inſect, yet ſwims well; uſing its hinder legs as oars.

The larva is frequently met with in ditches. Many ſpecies of the compleat inſect are common in ſtagnated waters, which they quit in the evening and fly about.

Some call them *water beetles.*

If two or three are kept they devour each other.

The eggs are encloſed in a kind of ſilky cod.

The inſect is nimble to eſcape, and will exerciſe its weapons,

weapons, griping ſeverely with its jaws, and driving a long ſharp ſpire into the fingers.

GENUS 25.—CARABUS BULL-HEAD.

The larvæ live in the ground, or in decayed wood, where they perform their metamorphoſis: they, themſelves, live chiefly upon weaker inſects, or ſmall larvæ. They are called *ground beetle, and blaine worm.*

One ſpecies *(carabus granulatus)* has no wings beneath the elytra, but runs very ſwiftly; it is large and beautiful, of a coppery green, or of a fine purple; commonly to be met with in damp places and gardens; under ſtones, and heaps of rotten plants.

GENUS 26.—TENEBRIO DARKLING.

The larvæ of the tenebriones are frequently met with under heaps of weeds, branches of trees, and other refuſe of gardens; ſome of them live under ground, others in neglected meal and dry bread, &c. The compleat inſects are found in houſes, gardens, and ſandy places; they run with great ſwiftneſs; and generally emit a very fœtid ſmell, on that account ſome call them ſtinking beetles.

One ſpecies frequently found in houſes, is called the ſlow-legged beetle.

They eat bread, meal, &c. and ſhun the light; their appearance is gloomy and dark.

GENUS

GENUS 27.—MELOE BLOSSOM-EATER.

Many of them want wings. The larvæ feed chiefly on the leaves of plants; on which the compleat inſects are likewiſe to be met with.

Meloe Proſcarabæus

Black—it makes its abode on the ſide of wet roads, and in woods; its food, inſects, violet leaves, and delicate herbs. There oozes from its body a fat unctuous matter, of an agreeable ſmell. Oil, in which theſe inſects have been infuſed is uſed medicinally. Its eggs are depoſited in the ground; the larvæ feed chiefly on the leaves of plants.

Meloe veſicatorius, commonly called Cantharis, or Spaniſh Fly, is foreign.

GENUS 28.—MORDELLA NIBBLER.

The larvæ are unknown.

The perfect inſect is found upon flowers.

GENUS 29.—STAPHILINUS.

The ſtaphilini are voracious, devouring every kind of weaker inſects, and even their own ſpecies.

Some of them are found upon flowers; but they chiefly inhabit the dung of cows: their larvæ can hardly be diſtinguiſhed from them, and live in humid places under ground; ſome call them *rove-beetles*.

Theſe inſects turn up their tail as if they meant to ſting, but their weapon is of another kind; they bite and pinch with their jaws; which project, and are of uſe in catching prey.

The wings are large, curiouſly folded, and concealed under the elytra, tho' they are ſmall. The inſect unfolds and expands his wings when he chooſes to fly, which he does very lightly. Several of the ſmall ſpecies have beautiful colours.

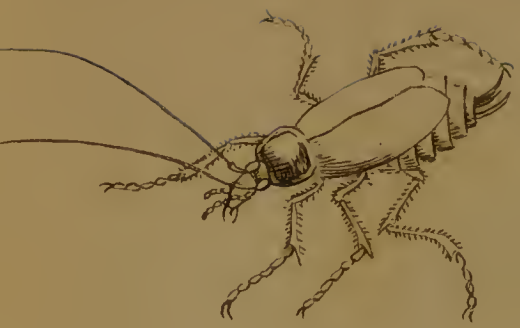
GENUS 30.—FORFICULA EARWIG.

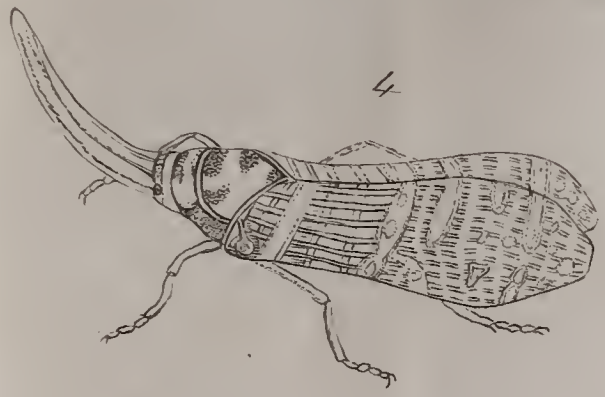
This inſect is found every where in the fields, woods and gardens.

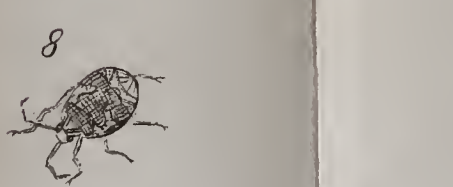
The larva differs very little from the compleat inſect, and is very lively, running with great agility: from the inſtant it leaves the egg, it continues to eat, move, leap, and purſue its prey; a ſkin which incloſed a part of its body and limbs burſts behind, and gives full play to the wings.

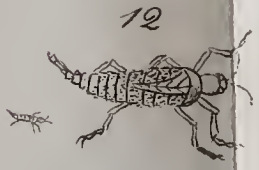
They are falſely accuſed of injuring mankind by entering the ear; but our gardeners have room for complaint; they live among flowers and deſtroy them, and they ſeize the fruit which other animals have begun.

The Earwig exiſts in its winged ſtate but a ſhort time.









G. Quinton. sculp ...

II.

Order—HEMIPTERA.

Wing cases like vellum.

GENUS 1.—BLATTA COCKROACH.

THIS is one of thoſe domeſtic inſects, well known in kitchens and bake-houſes ; it is broad, flat, and ſmooth ; it runs pretty quick : of ſome ſpecies the males fly.

The larva differs little from the perfect inſect, except the want of wings and caſes.

The larva feeds on meal, of which it is very voracious; in the fields it will eat roots.

The Kakkerlak of the American Iſles is of this genus.

They all ſhun the light. Ours are met with in kitchens and baker's ſhops ; about ovens, eating meal and dough. Smoke of charcoal deſtroys them.

GENUS

GENUS 2.—MANTIS SOOTHSAYER.

There are none in Britain; yet Barbut gives an account of the genus.

By ſome it is called Camel-Cricket; by others Creeping Leaf.

The French peaſants eſteem it ſacred, on account of its aſſuming a ſupplicating poſture. The Africans likewiſe revere it.

GENUS 3.—GRYLLUS CRICKET.

The larvæ very much reſemble the perfect inſects; and, in general, live under-ground. The chryſalids very much reſemble and accompany their parents, many of which feed upon the leaves of plants; others, which live in houſes, prefer bread, meal, and every kind of farinaceous ſubſtance.

They are called locuſts, graſshoppers, and crickets.

The crickets are ſo called on account of the noiſe. Towards ſun-ſet, they like beſt to appear out of their ſubterraneous habitations, making the fields ring with their cry, eſpecially in fine ſummer weather.

The domeſtic grylli are very troubleſome; but a ſuperſtitious notion, that they bring good luck, preſerves them.

The ſmoke of charcoal will deſtroy them. Loud ſounds will drive them away.

Gryllo-Talpa

Gryllo-Talpa, Mole-Cricket.

The fore-feet are ſtrong and placed like thoſe of the mole, ſo as to be uſeful in burrowing; it generally, however, moves backward. It commonly reſides under ground, into which it penetrates more expeditiouſly than the mole.

The female forms a cell of clammy earth, about the ſize of a hen's egg, cloſed up on every ſide, the inſide capable of receiving two hazle nuts; the eggs, amounting to about 150, are white, and about the ſize of caraway comfits; they are carefully covered, as well to defend them from the injuries of the weather, as from the attacks of the black beetle. The female places herſelf near the entrance of the neſt, and whenever the beetle attempts to ſeize its prey, the guardian inſect catches it behind, and bites it aſunder. Nothing can exceed the care of theſe animals in the preſervation of their young; wherever a neſt is ſituated, fortifications, avenues, and entrenchments ſurround it; there are alſo numerous meanders which lead to it, and a ditch encompaſſes the whole, which few other inſects are capable of paſſing.

The mole-cricket removes the neſt higher or lower, according to the weather.

This creature makes great havoc in hot-beds, hacking and gnawing the roots: its fore-feet, which are armed with teeth, like a ſaw, are employed for that uſe.

Grasshopper.

Grasshopper.

The male only is vocal. Two of these little animals will vie with each other, and after a long contention in singing, meet and fight desperately.

The female has an instrument, with which she pierces the ground to deposit her eggs.

Grasshoppers have several stomachs: some authors think that they chew the cud.

The domestic and the field gryllus are the same species; the colours are different: the former being of a rusty brown, live chiefly in the dark, and those who would take them need only to light a candle suddenly, by which they will be so dazzled and bewildered, as to be incapable of finding their retreat; they are fond of sugar, never drink, love warmth, and eat bread, flour, &c.

Locusts.

These are only occasional visitors in our happy country, therefore their history cannot be properly admitted at any length; yet,

They are so frequently mentioned in Holy Scripture, that we feel peculiarly interested about them. They are compared to an army, whose numbers are almost infinite, and described as rising out of the earth, and pursuing a settled march, purposely to destroy

deſtroy the fruits of the earth, and co-operate with the Divine Vengeance.

They fly in ſuch multitudes, as to appear like a cloud and darken the ſun; they ravage the meadows and paſture-grounds, ſtrip the trees of their leaves, and even bark them.

In 1748, the great brown locuſt viſited England. They are a moſt formidable ſpecies, and multiply exceedingly: happily for us, the coldneſs of our climate, and humidity of our ſoil, are by no means favourable to their production; and as they are the creatures of but one year, they viſit us and die at the end of the ſeaſon.

GENUS 4.—FULGORA LANTERN-FLY.

Two different ſpecies have been caught in this country; but as Barbut was not able to procure one, he gave the figure of a foreign one.

The foreheads of many (eſpecially thoſe found in China) emit a very lively ſhining light in the night; ſome ſay ſufficient to read by: it is not known that the European fulgoræ poſſeſs that quality.

The larvæ are not known.

GENUS 5.—CICADA. FROGHOPPER: OR, FLEA-LOCUST.

The pupæ or chryſalids of many of theſe, differ from the perfect inſect only in the ſhortneſs of their elytra

elytra and wings: they run and leap upon plants and flowers with great agility.

They are divided into five families.

The larvæ of one ſet *(ranatræ)* diſcharge from their bodies a kind of froth, under which they conceal themſelves from the rapacity of ſuch ſtronger inſects as prey upon them, and from the ſcorching heat. Another ſet *(maniferæ)* paſs a year under ground: theſe make a noiſe like crickets.

GENUS 6.—NOTONECTA. BOAT-FLY.

This inſect is not uncommon in ſtanding waters: when it ſwims on its back, the hinder feet, longer than the reſt, ſerving it as paddles; it is very nimble, and dives when you go to take hold of it, after which it riſes again to the ſurface. It muſt be cautiouſly handled, for the point of its roſtrum is very ſharp.

The larva very much reſembles the perfect inſect.

GENUS 7.—NEPA. WATER-SCORPION.

We have but three ſpecies of this genus; all found in the water, as well as their larvæ and chryſalids.

The inſect ſinks its eggs into the ſtalk of a bull-ruſh, or ſome other water-plant, ſo that the egg lies concealed, and only the hairs or briſtles at the end ſtick out. One may perceive in water theſe ſtalks loaded

loaded with eggs, and ſee the larvæ hatched under one's roof.

Theſe inſects are voracious, and feed on other aquatic animals, which they pierce and tear with their ſharp roſtrum, while they hold them with the forceps of their forefeet, which, ſome ſay, are their antennæ. They fly well, and remove in the night, when the pool begins to dry.

GENUS 8.—CIMEX. BUG.

The larvæ of the cimices run about, and, like the complete inſect, ſuck in their food through their beak: many of them live upon the juices of plants; others upon the blood of animals; ſome are found in the waters; and others frequent houſes, among which is the *bed-bug*.

They differ from other inſects in their ſoftneſs, and moſt of them emit a very fœtid ſmell.

The bed-bug is ſaid ſometimes to have wings.

Spiders are fond of bed-bugs.

GENUS 9.—APHIS. PLANT-LOUSE.

Theſe inſects bring forth live young in ſummer; in autumn lay eggs. They have either four erect wings, or are without wings. They have two beaks, one in the breaſt, and one in the head; ſome are provided with two horns on their hinder parts:

ſmall

ſmall drops of ſweet water iſſue from them, which attracts the ants. Many are covered with a white powder.

The larva, chryſalis, and perfect inſect, cannot be diſtinguiſhed.

Aphides are devoured by the larvæ of the myrmeleon formicarium of Linnæus. Ants are very fond of them. The beſt way of deſtroying them is, to put on the trees larvæ of the plant-louſe lion; or, aphidivorous flies.

GENUS 16.—CHERMES.

The larvæ of the chermes have ſix feet; reſemble the perfect inſect; and are generally covered with a hairy or wooly ſubſtance.

The winged inſects leap and ſpring with great agility; and infeſt a great number of different trees and plants.

The females inſert their eggs under the ſurface of the leaves by means of a tube, and cauſe the little tubercles, or galls, with which the leaves of the aſh, the fir, and other trees, are ſometimes almoſt wholly covered; the largeſt infeſt the fig: it is brown above, greeniſh beneath, the wings large, and placed ſo as to form together an acute roof.

The fir-tree chermes produces that enormous ſcaly protuberance that is to be found at the ſummit of the

the branches of that tree: the young larvæ ſhelter themſelves in cells contained in the tumour. The white down, under which the larvæ of the pine-chermes is found, ſeems to be produced much in the ſame manner. That of the box-tree produces no tubercules, but its punctures make the leaves bend and grow hollow, in the ſhape of a cap. Both larva and chryſalis eject a white ſweet-taſted matter, not unlike manna: it is found in ſmall white grains.

The plate is magnified.

GENUS 11.—COCCUS. COCHINEAL.

The males have two erect wings; the females are without.

The females fix themſelves and adhere almoſt immovably to the roots, and ſometimes to the branches of plants; ſome of them having thus fixed themſelves, loſe entirely the form and appearance of inſects; their bodies ſwell, their ſkin ſtretches and becomes ſmooth, and they ſo much reſemble ſome kinds of galls or excreſcences found frequently on the leaves and branches of plants, that, in general, they are miſtaken for ſuch; after which changement, the abdomen ſerves only for a kind of covering or ſhell, under which the eggs are concealed. Geoffroy calls theſe *chermes*.

Others again (though they likewiſe fix themſelves, and adhere immovably to the leaves of plants) pre-

ſerve the form of inſects till they have laid their eggs, and periſh. (Theſe he calls *cocci.*)

A kind of down or cotton grows out of their belly, which ſerves as a neſt, in which they depoſit their eggs.

The coccus of the phalaris contrives along the ſtalks of the dog-graſs little neſts, of a white cottonny ſubſtance, in which ſhe lays her eggs.

Moſt of the cochineals found in hot-houſes have been brought over with exotic plants.

The green-houſe bug, found on orange trees, &c. is probably a coccus; it ſticks cloſe and ſucks the juice; it can thruſt out its legs and move. The male is a winged inſect.

Cochineal, which is ſo uſeful in dying, and to the painters as carmine, is found on the Racket, otherwiſe called Nopal, Cardaſſia, Indian Fig, and Opuntia.

The drug might be prepared from the Indian Fig, or Coccus, purer than what the inſect itſelf, which feeds upon it, affords.

We might, perhaps, make ſomething of our European cochineal, which bears great reſemblance to the American.

It

It is computed that there are imported yearly into Europe, in the courſe of trade, eight hundred and eighty thouſand pounds of cochineal.

The plate is magnified.

GENUS 12.—THRIPS.

Theſe inſects are very common on flowers, upon which they run, or rather leap, with great vivacity, often bending their bodies upwards. Their habitation is often under the bark of trees.

The larvæ run as briſkly as themſelves, and are often of a red colour.

The thrips are ſo diminutive, that Barbut draws them as they appear in a microſcope, the animals themſelves would be rather taken for atoms.

Gardiners aſſert that they are hurtful.

III.

Order—LEPIDOPTERA.

With four tiled Wings.—Mouth with a Spiral Tongue.

GENUS 1.—PAPILIO, BUTTERFLY.

THE antennæ are thicker towards their extremity, and moſtly terminated by a head; their wings, when at reſt, erect: they fly in the day.

The pupæ of all butterflies are obtectæ and naked, and except thoſe of the Danai Candidi, are ſuſpended perpendicularly in the open air, being attached by their tail to the under-ſides of branches of trees, leaves of plants, &c. The caterpillars of ſome of the equites have two horns in their necks, which they ſhoot out or draw in at pleaſure.

GENUS 2.—SPHINX.

Antennæ thickeſt in the middle, wings deflected, flight ſlow and heavy; they fly either early in the morning, or after ſun-ſet; often emit a ſound.

They

ORDER III.

1

2

3

G Quinton. sculp.

They ſuck the nectar of flowers with their tongues, though they ſeldom ſettle upon them.

Moſt of them undergo their metamorphoſis in the earth; their chryſalids are obtectæ, but encloſed in a kind of covering or web, compoſed of coarſe materials, in which particular they differ entirely from the preceding genus.

The bodies of moſt of the caterpillars are ſmooth, or without hair, and have a horn or ſpine on the hinder parts. *Hawk-moths.*

GENUS 3.—PHALENA, MOTH.

Antennæ leſſen towards the point, wings generally deflected when at reſt; they fly in the night.

The chryſalids are either concealed in the ground, or protected from the inclemency of the weather by a covering, which ſome of them, as the ſilk-worm, compoſe of the richeſt materials; they are either ſimple, or have a kind of hook at their extremity.

Phalena ſarcitella, or cloaths-moth. *Phalena tapetzella* are very deſtructive to woollen cloths, forming for themſelves a covering, in the aurelia ſtate, from them.

CATERPILLARS;

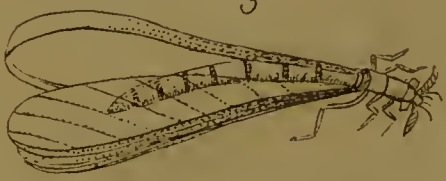
CATERPILLARS:

Or LARVÆ of the Lepidoptera Order.

Thoſe of the tincæ keep always under ſome kind of covering, where they live and feed in ſecurity; ſome of them roll up the leaves of plants for their habitation; others, which feed only upon the interior ſurface of leaves, lodge themſelves under the epidermis or exterior ſkin; others again in woollen cloths, ſkins of beaſts and birds, &c. Theſe all undergo their metamorphoſis in the places, and under the coverings in which they had lived; ſome few live in ſociety, under a kind of web formed by their joint induſtry; the moths which are produced from theſe laſt, have generally expanded wings.

Thoſe of the tortrices roll up and faſten together by a thread the leaves of the plants upon which they feed, thus ſecuring to themſelves a kind of retreat.

Caterpillars which live on leaves, have many of them the power of ſpinning threads, which enables them to remove and prevents falling. Others have hairs, which ſerve to break the force of the ſhocks they are liable to receive; they ſerve too, perhaps, to give them timely notice of the approach of danger, that they may remove from it. Their colours often reſemble that of their habitation; thoſe which feed on the apple tree, are brown, like the wood; on any alarm, they quit the leaves, and trail to the branches for concealment from the birds, &c.



IV.

Order—NEUROPTERA.

Naked wings, &c. no sting.

GENUS 1.—LIBELLULA DRAGON-FLY.

THE largeſt is produced from a water-worm that has ſix feet; which, whilſt yet young, and very ſmall, is transformed to a chryſalis, that has its dwelling in the water, it wears a maſk, and this faſtened to the inſect's neck, and which it moves at will, ſerves to hold his prey while he devours it.

The libellulæ which have wings extended horizontally when at reſt, live chiefly upon moths, &c. Thoſe which have their wings placed at a diſtance from each other, the wings erect, and the eyes very prominent, upon muſcæ or flies.

They are all exceedingly voracious. Linnæus calls them the hawks of gymnopterous inſects. The larvæ of both live and run, rather than ſwim, in the water; they devour aquatic inſects weaker than themſelves, and are not leſs voracious than the compleat inſects; they are likewiſe cruel, killing and tearing other inſects,

insects, when not pressed by hunger; since they leave the carcase entire.

The chrysalis differs very little from the larva, and like it runs with great agility in the water, devouring smaller insects. It generally quits the water before it undergoes its final changement. Called by some *adderbolts*.—*See part* 1. JAWS.

GENUS 2.—EPHEMERA, DAY-FLY.

These differ in many particulars from all other insects; their caterpillars live in the water, where earth and clay seem to be their only nourishment, for three whole years, the time they consume in preparing for their metamorphosis, which they undergo and perform in a few moments. The larva, when ready to quit that state, arises to the surface of the water, and getting instantaneously rid of his skin, becomes a chrysalis. This chrysalis is furnished with wings, which it makes use of to fly to the first tree or wall it meets, and there settling, in the same moment quits a second skin, and becomes a perfect ephemera; in which state they live a very short time, some not above half an hour. Their flight is slow and heavy, which renders them an easy prey to swallows, &c. The antennæ resemble hairs.

When at rest the forelegs are advanced before the head.

The

The ephemeræ are very frequent near waters; they multiply amazingly in ſome places; about Laſs, in Carniole, a province in Germany, they are ſo numerous in the month of June, that they are uſed as manure, and the peaſants think leſs than 20 cart loads a bad harveſt.

It is thoſe ſpecies which live ſome days, that fly to a tree where they ſometimes are employed 24 hours in the operation of diveſting themſelves of a ſlough.

The ephemeræ in the larva and chryſalis ſtate, have fringes of hair, which, when put into motion, ſerve them as fins. Nothing can be more curious than the plying of theſe little oars in the water. Their abdomen is terminated as well as in their ſtate of flies, by three threads. Theſe larvæ ſcoop themſelves out dwellings in the banks of rivers, and they are ſmall tubes made like ſiphons, the one ſerving for an entrance, the other affording them an outlet. The banks of ſome rivers are often full of them. When the waters decreaſe they dig freſh holes lower down, in order to enjoy their element the water.

The ephemeræ of the Rhine appear in the air two hours before ſun-ſet.

Theſe flies are hatched almoſt all at the ſame inſtant, in ſuch numbers as to darken the air.

The moſt early of thoſe on the Marne and Seine, in France, do not begin to fly till two hours after the

the ſetting of the ſun, towards the middle of Auguſt.

The females, by the help of the threads of their tail, and the flapping of their wings, ſupport themſelves on the ſurface of the water, and in that almoſt upright ſituation, drop their eggs in cluſters: one will lay ſeven or eight hundred, which ſink to the bottom. The larvæ ſupply food for fiſh.

They are called with us *May-flies*.

GENUS 3.—PHRYGANEA.

The leſſer Phryganeæ reſemble the Tinex ſo much as not to be diſtinguiſhed without difficulty; but the wings of the former are covered with hairs, inſtead of the ſcales which adorn the wings of the Tineæ.

The larvæ belonging to this genus, live in the water in tubes of ſilk, covered on the outſide with ſmall pieces of wood, ſand, gravel, leaves of plants, &c. nay, ſometimes the larva attaches to its tube the ſmaller teſtaceous animals, yet alive, with their ſhells, and drags them about with it: they contrive to make their habitations nearly in equilibrium with the water, when too heavy they add a bit of wood or ſtraw, when too light a bit of gravel; when the hexapod is about to change to a chryſalis, he ſtops up the opening of his tube, with threads of a looſe texture, through which the water makes its way, but the approach of voracious inſects is prevented. The chryſalis

chryſalis is covered with a thin gauze, through which the new form of the inſect is eaſily diſcerned. The Phryganea, on the point of changing its element, riſes to the ſurface of the water, leaves its tube, riſes into the air, and flutters upon flowers and trees; but generally ſettles on the ſides of walls, branches of trees, &c. which are leaſt expoſed to the ſun: whoſe influence they ſeem to dread, ſeldom flying in the day-time.

Swallows feed upon them.

Some larvæ are found in ſtagnating waters, where they wrap themſelves up in the water lentil, cut out into regular ſquares, and fitted one to another. Trouts are very greedy of theſe larvæ; they are often ſtripped of their coats, and uſed as baits. The common ones are much ſought after by fiſhermen, and called *ſtone* or *cod-bait*.

The *Phryganea bicauda* carries its eggs in a cluſter as ſome ſpiders do.

The perfect inſect is called *ſpring-fly*.

GENUS 4.—HEMEROBIUS.

This inſect takes its name from the ſhortneſs of its life; which, however, continues ſeveral days.

In the ſtate of larva it is a great devourer of plant-lice, for which it has had the appellation of *Lion of the plant-lice* beſtowed upon it. The hemerobii, even

even after their transformation, preſerve their carnivorous inclination; not ſatisfied with making war upon the plant-lice, they do not ſpare each other.

The eggs of this inſect are borne upon ſmall pedicles, which are nothing but a gum ſpun out by the hemerobius; the egg remaining faſtened to the upper part of the thread: theſe eggs are depoſited upon leaves, and ſet in the form of bunches; they have been taken for paraſitic plants. The larva when hatched, finds there its food, in the midſt of plant-lice: in fifteen or ſixteen days it has attained to its full growth. With its ſpinning-wheel at its tail it makes itſelf a ſmall, round, white, ſilky cod, of a cloſe texture. In ſummer, at the end of three weeks, the hemerobius iſſues forth with its wings; but when the cod has not been ſpun till autumn, the chryſalis remains in it the whole winter; and does not undergo its final metamorphoſis till the enſuing ſpring.

The flight of this inſect is heavy: ſome ſpecies have an excrementitious ſmell.

One goes by the name of water-hemerobius, becauſe it lives moſtly at the water-ſide.

Theſe inſects have been known to ſpin their ſilky ſubſtance ſo as to cover a large ſhrub; and the ſilk has been ſtrong enough to bear winding upon a bottom of card.

One

One ſpecies goes by the name of *hemerobius perla*, or *golden-eye*. Its wings reſemble green gauze.

GENUS V.—MYRMELEON ANT-EATER.

The larva feeds chiefly upon ants: the perfect inſect is very rare; but is ſometimes met with in ſandy places, and near rivulets.

This is called *Formica-leo*, or *lion-ant*.

Few inſects have ſtratagems and little wiles that afford greater entertainment, or ſubject of curioſity.

The larva is hatched in a fine dry ſand, in a place ſheltered from rain, either within a cleft of a wall, or of the ground, or at the foot of a wall, generally expoſed to the ſouth-ſun. There the larvæ of the ant-eaters are hatched, and make their uſual abode. Their colour is grey, and their body, which is covered with ſmall protuberances, is of an oval form: its poſterior extremity terminates in a point, and is of uſe to the inſect to ſink itſelf down into the ſand, for they only walk retrogreſſively, though furniſhed with ſix feet. Before the head is placed a dentated forceps, ſharp and hollow within, with which this larva catches and ſucks flies and other inſects, but eſpecially ants. This forceps ſerves as a mouth or roſtrum, as well as for an offenſive weapon; in the ſame manner as that of the hemerobius. The animal's

animal's retrogade motion does not allow it to run after the inſects on which it feeds; but it uſes ſtratagem.

It dives down into the ſand, and turning about in a circle, hollows out concentric furrows, and gradually deeper and deeper, caſting at a diſtance with its horns the ſand it takes from that place. At length it manages to dig a hole in ſhape like a funnel, at the bottom of which it takes its ſtation, concealed in the ſand, nothing but the open expanded forceps appearing above it. Miſchief overtakes every inſect that happens to fall into that hole: the myrmeleon, who is apprized of it by the grains of ſand rolling down to the bottom, overwhelms him with a ſhower of duſt, which it ejects with its horns, then drags the inſect to the bottom of the hole, where it ſeizes him with its forceps, and ſucks his vitals. It does not even ſpare other myrmeleons, who chance to fall in. When the larva is come to its full growth; it ſpins itſelf a cod, ſhaped like a ball; ſilky within and ſand without; within it turns to a chryſalis.

GENUS 6.—PANORPA.

The compleat inſect is very common in the fields during the ſummer ſeaſon; but the larva and chryſalis are unknown.

The end of its tail turned up in a threatening manner, terminating in a kind of forceps, and appearing

pearing like a ſcorpion's ſting; does no miſchief; but has gained it the name of *ſcorpion-fly*.

Barbut ſays it is found in meadows, by the ſide of ditches.

GENUS 7.– RHAPHIDIA.

This is rarely to be met with; it is chiefly found in woods and hedges.

The larva has not been deſcribed. Barbut knows but one ſpecies. *Serpent-headed.*

It has an oblong head, ſhaped like a heart; it reſembles a ſnake.

V.

Order—HYMENOPTERA.

Naked Wings, and a Sting.

GENUS 1.—CYNIPS GALL-FLY.

Cynips Quercus Folii.

IT is in the little ſmooth, round, hard galls, found under the oak leaves, generally faſtened to the fibres, that this inſect is produced; a ſingle one in each gall.

Theſe latter are ligneous, of a hard, compact ſubſtance, formed like the neſt, by the extravaſation of the ſap of the leaf, occaſioned by the puncture of the gall-fly, when it depoſits its eggs.

(Sometimes an ichneumon lays its egg in the tender gall; and the larva devours that of the cynips.)

Cynips

ORDER, V.

G. Quinton fecit

Cynips quercus gemmæ.

It depoſits its eggs in the oak buds, which produces one of the fineſt galls, leafed like a roſe-bud beginning to blow. When the gall is ſmall, that great quantity of leaves is compreſſed, and they are ſet one upon another, like the tiles of a roof. In the centre of the gall there is a kind of ligneous kernel, in the middle of which is a cavity; and in that is found the little larva, who feeds there, takes its growth, undergoes its metamorphoſis, and breaks through the incloſure of that kind of cod, in order to get out. The whole gall is often near an inch in diameter, ſometimes more when dried and diſplayed; and it holds to the branch by a pedicle.

Our oaks give food and lodging to a multitude of inſects. Not leſs than fifty creatures of this tribe live in and on it.

The round balls we ſee upon the oak leaves in June, on our woods, as big as nutmegs, green, with a bluſh of red, and ſoft to the touch, are the ſame kind of leaf galls with which the Norway ink, which excels that of the whole world in colour, clearneſs, and permanency, is made: and we have nearly the ſame inſect that produced them; it has been caught in Buſhy Park.

The

The gall inſect penetrates the bark or ſpot which begins to bud, and there ſheds a drop of corroſive fluid, lays its egg and dies; the heart of the bud being thus wounded, the circulation of the nutritive juices is interrupted, and the fermentation thereof, with the poiſon injected by the fly, burns the adjacent parts, and alters the natural colour of the plant; the juice or ſap turned back from its natural courſe, gives riſe to what we call the gall-nut.

GENUS 2.—TENTHREDO, SAW-FLY.

Numerous are the ſpecies of the tenthredines; they are not very ſhy. Some, by mean of their ſaw, depoſit in the buds of flowers, others on the twigs of trees or ſhrubs, eggs, from which are produced falſe caterpillars. The implement with which they are armed is not very formidable, as it appears deſtined only to the purpoſe of depoſiting their eggs.

Falſe caterpillars are diſtinguiſhed by the number of feet, being generally from eighteen to twenty-two; thoſe of the true never exceed ſixteen, and are ſeldom ſo numerous.

The larvæ of the tenthredines feed chiefly upon the roſe and willow tree, and undergo their laſt changement in the earth; their ſhroud or web reſembles net-work, being compoſed of large ſilken threads, between each of which great ſpaces are left, perhaps, to let the humidity of the earth pierce to the chryſalis: *it is very difficult to keep them in a proper*

proper state in boxes. Geoffroy reared but five or six, out of three hundred.

From the formation of its ſting, which differs from that of all other inſects, (thoſe of the following genus only excepted) ſome Engliſh authors name this inſect *saw-fly*.

GENUS 3.—SIREX, TAILED WASP.

The female lays her eggs in the interior of decayed trees: the larvæ moſt probably feed upon the wood, and always undergo their laſt metamorphoſis in the place where they had lived while in the caterpillar ſtate.

The ſirex is rare to be met with, but ſeveral ſpecies have been caught in England.

Sirex Gigas.

This is the ſpecies which is deſcribed in Barbut.

GENUS 4.—ICHNEUMON.

One character of theſe flies is, the almoſt continual agitation of their antennæ; another, the abdomen being generally joined to the body by a ſtalk or pedicle.

The name of ichneumon has been applied to them from the ſervice they do us, by deſtroying caterpillars, plant-lice, and other inſects, as the ichneumon, or mangouſte, deſtroys the crocodiles.

The

The poſterior part of the female is armed with a whimble, viſible in ſome ſpecies, and that inſtrument, though ſo fine, is able to penetrate through mortar and plaſter; the ſtructure of it is more eaſily ſeen in the long-whimbled fly. The food of the family, to be produced by this fly, is the larva of waſps, or maſon-bees; for it no ſooner eſpies one of thoſe neſts, but it fixes on it with its whimble, and bores through the mortar of which it is built.

Some agglutinate their eggs upon caterpillars; others penetrate through the egg, though very hard, and depoſit their own in the inſide. When the larva is hatched, its head is ſo ſituated, that it pierces the caterpillar and penetrates to its very entrails. Theſe larvæ pump out the nutritious juices of the caterpillar, without attacking the vitals of the creature, who appears healthy, and even ſometimes transforms itſelf to a chryſalis.

The ichneumons performed ſpecial ſervice in the years 1731 and 1732, by multiplying in the ſame proportion as the caterpillars; their larvæ deſtroying more of them than could be effected by human induſtry.

The larvæ, when on the point of turning into chryſalids, ſpin a ſilken cod; theſe cods leap.

Plant-lice, the larvæ of the curculiones, and ſpider's eggs, are alſo ſometimes the cradle of the ichneumon.

Canares

Carcaſes of the plant-lice, void of motion, are often found on roſe-tree leaves; they are the habitation of a ſmall larva, which, after having eaten up the entrails, performs its metamorphoſis under ſhelter of the pellicule which unfolds it, contrives itſelf a ſmall circular outlet, and ſallies forth into the open air.

There are ichneumons in the woods, who dare attack ſpiders.

Others, deſtitute of wings, (females) depoſit their eggs in ſpider's neſts.

The ichneumon of the bedeguar, (or ſweet-briar ſpunge) and that of the roſe tree, perhaps, only depoſit their eggs in theſe places, becauſe they find other inſects on which they feed.

The genus might properly be termed cannibals.

In 1795 theſe inſects happened to abound; they entered rooms (allured by the light) in the evening, and frequently exerciſed their ſtings with great ſeverity, darting with ſuch celerity as ſcarcely to be perceived by the eye, and inflicting a wound inſtantaneouſly.

GENUS 5—SPHEX, SAVAGE.

Many ſpecies are common in England; they are chiefly found in woods and hedges. Their larvæ feed upon dead inſects, in the bodies of which they are produced from the egg. Some

Some ſpecies dig holes in the earth with their fore-feet, like dogs, in which holes they bury dead inſects, chiefly ſpiders or lepidopterous larvæ, and after having depoſited their eggs in the bodies of theſe inſects, they carefully cloſe the hole with earth. *See the account from Ray.*

No creature can diſplay more violent affection for its young than this, nor is any more ſavage.

They all agree in being the fierceſt of flies, for they will attack inſects much larger than themſelves; their ſtrength indeed is great, their jaws are hard and ſharp, and their ſtings are armed with a poiſon, which ſuddenly proves fatal to the creatures with which they engage.

The ſavage ſeizes boldly on the creature it attacks, giving a ſtroke with amazing force, then falling off to reſt from the fatigue of the exertion, and to enjoy the victory; it keeps, however, a ſteady eye on the object it has ſtruck till it dies, and then drags it to its neſt for the uſe of its young.

The number of inſects which this creature deſtroys is almoſt beyond conception, fifty ſcarcely ſerve for a meal; the mangled remains about the mouth of its retreat, ſufficiently betray the ſanguinary inhabitant—the eyes, the filament that ſerves as a brain, and a ſmall part of the contents of the body, are all the ſavage eats.

Sphex

Sphex Spirifex; or, Turner Savage.

This creature is terrible to ſmaller inſects: it lives in caverns of the earth, on the ſides of hills and cliffs, and in holes made in the mud walls of little villages.

In Peterborough, in Northamptonſhire, one was taken which had formed its cell in the mud wall of a cottage, which was wrought into the appearance of honey-comb, by the multitude of theſe creatures.

The eggs are laid in the back part of the cell, where the animal lives, evenly arranged, and when the time of their being hatched is near, the fly brings in a number of ſlaughtered inſects for food to the expected young, ſhe then cloſes up the mouth of the hole with mud, and her care is over. When the worms hatch, they find their food ready, and when they have eaten their fill, they reſt and take their change.

Sphex Hirta.

"I obſerved it dragging a green caterpillar thrice its own ſize; when it had brought it a good way, it laid it down near the mouth of a little burrow it had made in the ground, then removing a little ball of earth, with which it had covered the orifice, it firſt went down, and after ſtaying a ſhort time returned, and ſeizing the caterpillar again, drew it down with him; then leaving it there, came up and

and taking ſome ſmall globules of earth, rolled them one by one into the burrow; ſcraping the duſt in by intervals with its forefeet, in the manner of a dog; thus alternately rolling in pieces of earth, and ſcraping in duſt till the hole was full; ſometimes going down (as it ſeemed to me) to preſs down the earth; and once or twice flying to a fir-tree which grew near, perhaps to get turpentine to glew it down, and make it firm: the hole being filled and equalled with the ſuperficies of the earth, that its entrance might not be diſcovered, it took two fir-leaves, which were near, and laid them by the mouth; moſt probably to mark the place."

The ſphex is called by ſome the *ichneumon waſp*.

Sphex Cribaria.

This inſect has its fore-feet provided as it were with ſhields; it gathers the empty veſicles of the farina which has diſcharged its pollex, from the ſtigmata of plants; thus living upon bran.

GENUS 6.—CHRYSIS GOLDEN FLY.

This inſect lives chiefly in the holes of old walls; where it likewiſe lays its eggs: the larvæ reſemble thoſe of the waſp.

Chryſis Ignitis.

This dwells in holes of walls, between the ſtones, and in the mortar that cements them.

It

It is often ſeen iſſuing from ſuch holes, where it neſtles and performs its work: it is called *flaming chrysis*, from its ſplendor.

GENUS 7.—VESPA, WASP.

Many kinds of waſps live in ſocieties, after the manner of bees, and like them make combs, in which they depoſit their eggs; they likewiſe feed their larvæ with honey, but of a very inferior quality to that of the bee; others of them conſtruct a different ſeparate neſt for each egg.

The larvæ and chryſalids of all of them reſemble thoſe of the bee.

Vespa Crabro, the Hornet.

This large ſpecies of waſp makes its neſt in the trunks of hollow trees, and in the timber-work of lofts; its cakes or combs are compoſed of a ſubſtance like coarſe paper, or ruſty parchment. It is very voracious, devouring other inſects, and even bees.

A diſtinguiſhing character of this genus of flies, is their bodies being ſmooth and apparently without hairs; their upper wings, when at reſt, are folded in two, the whole length of them. At the riſe of each of thoſe wings is ſituated a ſcaly part, which performs the office of a ſpring, to hinder the upper wing from riſing too high in the flapping of their wings; a caution very important to thoſe carnivo-

rous inſects, who purſue their prey on full ſtretch of wing.

Vespa Vulgaris, Common Wasp.

The common, domeſtic, or ſubterraneous waſps, raiſe buildings, live in aſſociations, feed on plunder, and commit great outrages on our wall-fruit.

This numerous commonwealth is founded by a ſingle female, which has weathered out the ſeverity of the winter. She digs a hole in a dry ſoil, or takes up with the dwelling-place of a mole, where ſhe haſtily builds a few cells, and depoſits her eggs. In twenty days ſhe has a progeny of *neuter* (or working) waſps, ready to labour; theſe go to work, enlarge the hole, go about upon wood, lattice-work, and window-ſaſhes, in ſearch of materials for building; with their teeth they cut, hack, and tear off ſmall fibres of wood, which they moiſten with a liquor which they diſgorge, and then convey them to the workſhop.

Other labourers are in waiting for them, who, with thoſe materials, ſet about the conſtruction of the waſp-neſt: an edifice outwardly compoſed of ſheets of paper, which not being in contact with each other, dampneſs cannot penetrate to the inſide, which conſiſts of twelve or fifteen ſtories, and between each runs a colonade, formed by the faſtenings, which connect the cakes one to the other.

Every

Every ſtory is, as it were, a market-place, where the citizens may take their walks. The cells are hexagonal.

It is the cradle in which the mother goes on to lay eggs of neuter waſps, to the number of fifteen or ſixteen thouſand; after which, ſhe depoſits three hundred of females, and as many of males.

The firſt-hatched take great care of thoſe after-born, feeding them firſt with the juice of fruits and meats, afterwards with the carcaſes of inſects.

The caterers provide for the labourers. Each takes his own portion; there is no diſpute, nor fighting.

The waſps now live in peace among themſelves, like the bees, but they make war upon us, robbing us of our fruits, cutting the throats of our bees, to poſſeſs themſelves of their honey, plundering their hives, and living in plenty.

Towards October, when proviſions grow ſcarce, the waſps ſeem to be ſeized with rage, and the neſt is a ſcene of horror. They tear from their cradles eggs, larvæ, chryſalids, and the new-born inſects, without ſhewing mercy to any.

They next fight againſt one another.

Thus the greater part periſh: ſome few females eſcape, which out-live the winter, and, in the enſuing ſpring, become the founders of new republics.

Some butchers hang up before their ſhop a calf's liver, or any tender meat; the waſps come in queſt of this delicate food, and purſue the blue-bottle flies, from whoſe eggs are produced the maggots that ſpoil meat; the only advantage we can derive from waſps.

Veſpa in ramis arborum nidificans, Aerial Waſps.

Theſe are the ſmalleſt ſpecies.

Their neſt is faſtened to the branch of a tree with a kind of band, and is in bigneſs from the ſize of an orange down to that of an egg. Wood, reduced to paper, is the material part of it, which, if it were of a ruddy colour, might be taken for a large opening roſe. It is covered over with a varniſh, impenetrable by water. One of thoſe neſts was neither moiſtened nor impaired by that element.

GENUS 8.—APIS, BEE.

There are various ſpecies, which build in different manners. Some live in ſociety; others dwell and work in ſolitude, building the cradles of their family; as the *leaf-cutting* bee does with the roſe-leaf; the *upholsterer* with the gaudy tapeſtry of the corn-roſe; the *mason-bee* with a plaſter; the *wood-piercer* with ſaw-duſt.

The under-ſides of their hindmoſt thighs, which reſemble a kind of bruſh, ſerve to gather the fine powder

powder ſcattered from the antheræ of flowers, and from this the wax or comb is made.

Apis Muscorum. Humming Bee.

Theſe nearly all periſh in the winter; a few females ſurvive.

Each female haſtily puts together a little neſt of moſs, in the midſt of a meadow. The vaulted roof proves a ſecurity againſt rain, and the flooring, which is alſo of moſs, preſerves from dampneſs. The bee collects unwrought wax and honey, of which ſhe compoſes a ſmall lump, and therein depoſits a few eggs.

The bees produced aſſiſt in enlarging the neſt, which is exceedingly curious.

The humming bees, though armed with a dangerous ſting, are not haſty to uſe it, ſo that it is poſſible to enjoy the pleaſure of ſeeing them at work in building; but as it muſt be at the expence of much trouble and vexation to the poor inſects, (who have already conſtructed their habitation) it is better to read the deſcription given by a perſon, who removed a neſt for the purpoſe of obſerving the proceſs.

"The bees will be ſeen to form themſelves into a chain, from their neſt to the place where the moſs has been laid. The foremoſt lays hold of ſome with her teeth, clears it bit by bit with her feet,

(which has gained them the name of *carding* bees) then, by the help of her feet, ſhe drives the unravelled moſs under her belly; the ſecond, in like manner, paſſes it on to the third. Thus there is formed an uninterrupted chain of moſs, which is wrought and interwoven with the greateſt dexterity by thoſe that abide by the neſt; and that their neſt may not be the ſport of the winds, and may ſhelter them from rain, they throw an arch over it, which they compoſe with a kind of wax, tenacious, though thin in ſubſtance, which is neither the unwrought bees'-wax, nor the real wax. Diſſolved in oil of turpentine, it may be uſed in taking off impreſſions."

Wax-moths, the larva of a fly of the hornet kind, field-mice, pole-cats, and ants, plunder the little veſſels of honey, the ſtore of theſe induſtrious bees.

Apis Mellifica, Honey Bee.

One female is at once the mother and the ſovereign of the hive.

The neuter bees amount to the number of 16000 or 18000. They form the cakes of wax, collect the bee-glue, honey, and unwrought wax: theſe bees are armed with a ſting. The males, called *drones*, are killed in September by the working bees. Theſe collect from flowers their honey and unwrought wax, they roll themſelves over the ſtamina, the duſt of which adheres to their hairs, and bringing over their bodies their feet, armed with little bruſhes, fill with the

the powder two ſmall baſkets appended to their hind legs; each of theſe baſkets may contain about the ſize of a ſmall vetch; and this is the wax in its undigeſted ſtate.

As ſoon as any bee, thus laden, appears near the hive, others go out to meet it, and ſwallow down the un-wrought wax; their ſtomachs being the laboratory where it is converted into genuine wax. This operation being done, each individual diſgorges it in the form of dough, and then moulds it into cakes of an admirable ſtructure.

From the nectareous effluvia of flowers, the bees collect the honey by means of their proboſcis; an aſtoniſhing piece of mechaniſm, conſiſting of more than twenty parts.

Entering the hive, the inſect diſgorges the honey into the cells, that it may ſerve for winter ſubſiſtence; or elſe they ſtretch out their proboſcis, and preſent it to the labouring bees.

Heat is the life of theſe inſects; the leaſt degree of cold benumbs them; and unleſs they are all crouded together they periſh. Their enemies are the waſp, and the hornet, who with their teeth rip them open to ſuck out the honey contained in their bladder. Sparrows have been ſeen with one in their bill and another in each claw. The wax-moth, a ſpecies of grub, fixes itſelf, in their hives, and eats up their honey.

The

The queen bee has a ſting; but is not forward to uſe it. The bees treat their queen with great reſpect and affection: if ſhe happen to die, all their labours are at an end; and it is ſaid they would be ſtarved; but if a new queen be given them, joy ſprings up; the hopes of ſeeing one will ſupport them: this has been tried by giving the chryſalis of a queen to a ſwarm that had loſt its own.

The queen lays fifteen or eighteen thouſand eggs, from which are to be hatched ſeven or eight hundred drones, four or five queens, and the remainder are neuter or working bees.

The bees make different cells for theſe various kinds of young; the parent knows what ſhe is to lay, and depoſits each in its proper cell. The neuters are the nurſes, they feed the grubs with a compoſition of unwrought wax and honey, and bring them up with tenderneſs. The bees will follow their queen any where, which affords a method of removing bees to new hives. Only one queen is ſuffered to live; and it is ſaid that the bees have the power of nurſing up a ſucceſſor, on occaſion.

Mr. Williams' method of removing Bees.

Set the hive where there is only a glimmering light—turn it up—the queen firſt makes her appearance—once in poſſeſſion of her, you are maſter of all the reſt: put her into an empty hive, whither ſhe will be followed by the other bees.

The

The old queen goes off with the firſt ſwarm, which makes it ſo valuable.

Carpenter-Bees.

Theſe make a hole in rotten wood, into which they enter backwards, depoſit their eggs together with ſome honey, cloſe up the lodge, and there the larva undergoes its change.

Apis Centuncularis,

Leaf-cutting bee; of this there are ſeveral ſpecies, all equally induſtrious; they dig into the ground, build neſts that have the form and ſize of thimbles, inſerted one within another; others are no bigger than gooſe quills.

There neſts are compoſed of pieces of leaves; each ſpecies of bee cuts into its own materials; ſome the roſe-leaf, others the horſe-cheſnut. A careful obſerver may diſcover roſe-tree leaves cut, as if with a pinking iron; a circular piece is cut out, fit to be either the bottom or the lid of one of theſe neſts: others it cuts out into ovals and ſemi-ovals, which form the ſides of the neſts; into each of which it depoſits an egg with ready prepared victuals. The Bee cuts the leaf as it were at a ſtroke.

I have ſeen the Malabar nut ſo cut.

Each ſingle neſt looks like a bale of cloth in miniature.

GENUS

GENUS 9.—FORMICA, THE ANT.

The males and females are winged; the neuters apterous; the females and neuters are armed with a ſting. The males are ſmaller than the females and neuters, and are diſtinguiſhable by the largeneſs of their eyes.

Ants are diſtinguiſhed by a little upright ſcale between the thorax and abdomen.

The working ants labour inceſſantly to ſupply the larvæ with proviſions, and are conſtantly employed in preſerving the chryſalids from humidity in wet ſeaſons, or expoſing them to the warmth of the ſun when it is fair. Theſe chryſalids are much larger than the perfect inſect, yet are carried about by them with eaſe.

With good reaſon, a neſt of ants is called a well regulated republic. Their peace, union, good underſtanding and mutual aſſiſtance deſerve the notice of an obſerver. The form of a neſt is that of an arched vault, leading into a cave contrived by their removing the mould with their jaws.

Great police in their little labours prevents diſorder and confuſion; each has its taſk; while one caſts out the particle of mould that it has looſened, another is returning home to work. All of them employed in forming themſelves a retreat of the depth of

of one foot or more; within this hollow den, ſupported by the roots of trees and plants; the ants come together, live in ſociety, ſhelter themſelves from ſummer ſtorms; from winter froſts; and take care of the eggs.

The *wood ants* are larger then the garden ones; armed with a ſmall ſting, they wound whatever offends them.

They are carnivorous; they diſſect frogs, lizards and birds.

It is curious to ſee with what care they carry the new-hatched larvæ in their jaws, to expoſe them to the early rays of the ſun: it is chiefly for them that the reſt go to and fro, bring home, and lay up; they ſhortly turn to chryſalids; in which ſtate they want no food; but new cares ariſe to ſuit their ſituation to their ſtate. The inſect in due time tears its white tranſparent veil; it is then a real ant.

Ants paſs the winter in a torpid ſtate till ſpring reſtores them, they have therefore no need of food for winter in this country.

Ants are very fond of the honey-like liquor emitted by plant-lice, and they both eat and carry home the leaf-lice themſelves, ſo that it appears they muſt do ſervice in gardens, by helping to deſtroy thoſe hurtful inſects, though it muſt be owned they claim a ſhare of the fruit.

In

In Switzerland, ants are made uſeful by hanging a pouch full upon a tree (the foot ſo ſmeered with clay or ſoft pitch that they cannot eſcape) thus compelling them to devour the caterpillars.

What are ſold for ants eggs are grubs newly hatched, of which pheaſants, partridges, and nightingales are fond.

GENUS 10.—MUTILA.

Mutilla Europæa.

Theſe beautiful inſects are inhabitants of the ground, and to be met with under the moſs, more eſpecially when there is a hollow ſpace between the moſs and the earth.

They are deſcribed as making a moſt beautiful appearance on turning up the earth. They are ſwift in motion; their wings ſhine like pearl; ſome are without wings; and they appear to live in ſociety like the ants.

ORDER VI.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VI.

Order—DIPTERA.

Two Wings, and two Poiſers.

GENUS 1.—ŒSTRUS GAD-FLY.

THE Œſtrus has no mouth, in the place of which three ſmall impreſſed points are found without any viſible proboſcis or roſtrum.

The larvæ of the œſtri lie hid in the bodies of cattle, where they are nouriſhed the whole winter; the perfect inſects are to be met with in the ſummer almoſt wherever horſes, cows, or ſheep are grazing; ſome of them lay their eggs under the ſkin of cows or oxen, which they pierce for that purpoſe; others, for the ſame end, enter the inteſtines of horſes; and others, again, depoſit them in the noſtrils of the ſheep; in theſe different habitations the larvæ reſide till full grown, when they let themſelves fall to the earth; and generally paſs the chryſalid ſtate under cover of the firſt ſtone they meet with.

From the hinder part of the body of the perfect inſect iſſues a whimble of wonderful ſtructure, it is a ſcaly cylinder compoſed of four tubes, which draw out like the pieces of a ſpying glaſs; the laſt is armed with three hooks; and is the gimblet with which the inſect bores through the tough hides of horned cattle. The animal ſeems to experience no pain, unleſs the inſect, plunging too deep, attacks ſome nervous fibre; in which caſe the beaſt runs about, and becomes furious. The egg being hatched, the grub feeds on the matter of the wound. The place of its abode forms upon the body of the quadrupeds a bunch ſometimes above an inch high. When full-grown the larva breaks through the tumour, and ſlides down to the ground in the cool of the morning. It then digs itſelf a burrow, into which it retires. Its ſkin grows hard, and turns to a very ſolid ſhell. There it is transformed to a chryſalis, and afterwards to a winged inſect.

Nature has provided for every exigence; the ſhell, wherein the œſtrus is encloſed, is of ſo ſtrong a texture, that it could not make its way out if there were not at one end a ſmall valve, faſtened only by a very ſlight filament; the firſt puſh the œſtrus makes the door opens.

Tar and milk, or tar, butter and ſalt, are ſaid to guard ſheep and cattle from this inconvenience.

The

The œſtrus which chooſes the inteſtines of horſes for the cradle of its young, Barbut calls a foreſt inſect; he adds, there is ſome reaſon to think this œſtrus is viviparous, and that the pain the quadruped feels is occaſioned by the action of the larva that grapples for its hold; for the grub is all over hooks and ſpines, which ſerve as ſo many anchors to prevent it being caſt out with the excrement.

When full grown, it lets itſelf down to the ground, turns to a chryſalis, &c.

In 1713, many horſes in Verona and Mantua periſhed by the quantities of thoſe larvæ depoſited within their entrails.

Oeſtrum Ovis.

The œſtrus of ſheep is of a lazy ſluggiſh diſpoſition. The female makes her way into the ſheep's noſtrils, depoſits its eggs within the frontal ſinus, and retires. The eggs turn to grubs, which feed on the mucous matter which they there meet with: whenever thoſe grubs, armed with hooks, ſtir, or change their ſituation, the ſheep is in pain. That creature, ſo gentle, ſo peaceable, falls then into a kind of phrenzy, expreſſing the keenneſs of its anguiſh by its leaping and bounding, and beating its head againſt the trees and ground. After a while, the full-fed larvæ drop from thoſe creatures noſes, together with the mucus which they eject, conceal themſelves in the ground, and there undergo their change.

One ſpecies lays its eggs in the throat of the ſtag. The inſect creeps into the noſe where it finds two iſſues; one of which leads to the frontal ſinus; the other to two bags ſituate at the root of the tongue; into which latter it unerringly enters, leaves a number of eggs, and departs. The grub finds lodging and food; comes after a while out of the ſtag's noſe, &c. &c.

GENUS 2.—TIPULA, CRANE-FLY.

This is often taken for the gnat, which it reſembles.

The larger tipulæ go by the name of ſempſtreſſes; the ſmall ones by that of culiciform; which latter, in fine ſummer evenings flutter about the water ſide in legions.

The ſhrill noiſe they make with their wings is not very diſcernible.

Tipulæ, before they become inhabitants of the air, creep under the form of grubs. Thoſe which turn to larger tipulæ, dwell in holes of decayed willows, in the dampeſt places, where they change into chryſalids, and in that ſtate have the faculty of breathing through two ſmall curve horns; beſides which, they are endued with progreſſive motion, but not retrogreſſive, being impeded by little ſpines placed on every ring of the abdomen. When the ſhroud is torn, the inſect, prettily apparelled, eſcapes from his gloomy

gloomy habitation by means of his wings, which often are variegated; and takes his paſtime in the fields. Its long legs and its wings mutually aſſiſt each other when it either walks or flies.

The larvæ and chryſalids of the little tipulæ are found in water; they are various in colour, form, and carriage; ſome, like the polypus, furniſhed with a pair of arms; ſeveral with cylindrical tubes that perform the office of vent-holes. Theſe ſwim with nimbleneſs; thoſe never leave the holes they have dug themſelves in the banks of rivulets. Laſtly, others make a ſilken cod that receives part of their body: all receive wings.

Their frame is then ſo weak, that a touch is enough to cruſh them.

In the ſtate of larva they were a prey to fiſhes—in their progreſs through the air they are equally a prey to birds.

One ſpecies has its forelegs extraordinarily long, but they do not touch the ground, but are moveable like antennæ.

Tipula Crocata.

The larva is long, yellowiſh, with 14 rings and has 6 little feet. It is found in the ſtumps of decayed trees, amongſt the kind of tan formed in thoſe ſtumps. The chryſalis is the colour of bark, and of a peculiar ſhape.

Each

Each of its wings is as it were crowned with ſmall ſpines towards the tail; and the head is adorned with two thin taper horns, rather long and curve.

The perfect inſect is often met with in meadows. The larvæ generally live under and conſume the roots of vegetables, which larvæ prove dainty food to the crows, in whom, nature has ſeemingly ordained this inſtinct, to the end the larvæ might not exiſt in too great numbers; ſo as to deſtroy the produce of the earth.

GENUS 3.—MUSCA, FLY.

The mouth of the muſca is formed by a ſoft, fleſhy proboſcis, with two lateral lips; it wants palpi.

The muſca is the moſt common of all inſects, the name of *Fly* is particularly applied to them.

Of ſome, the larvæ live in the water, and devour aquatic inſects.

Of ſome, the larvæ devour the aphides: Theſe larvæ ſeem to want eyes; and lengthen or ſtretch out their head as if to feel for their prey. Others live in and conſume all kind of putrid fleſh; others are found in cheeſe; others in the excrement of different animals; many live in the water, and prefer the moſt putrid and muddy. One is found on the roſe.

Muſca Chamæleon.

Its head greatly reſembles that of the œſtrus; and the

the eyes occupy the greateſt part of it: the larva of this fly dwells in freſh water: the perfect inſect is wont to walk upon the ſurface.

It is one of the moſt common two-winged inſects we have. The female depoſits her eggs in the hollow ſtalk of aquatic plants, or broken reeds; or ſo provides for them that they cannot, but by ſome unforeſeen accident, be carried away. The egg in due time ripening, produces a larva no way reſembling the parent, but rather a worm of a ſingular ſtructure. They may be ſeen crawling on the graſs and plants near ſhallow ſtanding waters; or floating on the ſurface.

The tail has a verge of hairs, which, when expanded, ſupport it on the ſurface, with its head downward; if it wiſh to deſcend, it contracts the hairs in the form of a wine glaſs, or entirely cloſes them at the end; and when again it is riſing to the ſurface, it forces a bubble from a ſmall aperture in the centre, which immediately makes a paſſage for its aſcenſion. It changes to the pupa ſtate, and about the middle of July to the fly. It ſubſiſts at that time on the nectar, and other juices, which it extracts from the bottom of the corolla in flowers.

Musca Pendula.

The habits nearly correſpond with thoſe of the laſt deſcribed. It is found in June.

The

The vapour of ſulphur and arſenic deſtroys flies; or they may be taken in phials of honeyed water.

It is ſaid, that agaricus muſcarius and milk will invite them, and that the moment they taſte it they die.

GENUS 4.—TABANUS.

The tabani nouriſh themſelves with the blood of horſes and cattle. As they are moſt frequent near watery places, it is probable that their larvæ are aquatic; though ſome aſſert that they live under the earth.

Tabanus Bovinus.

The great horſe-fly—length, an inch.

This inſect is the terror of horned cattle, of horſes, &c. Its mouth, armed with two ſharp hooks, penetrates through their hide. Its proboſcis, ſhaped like a ſting, ſucks out their blood, of which it is greedy.

Theſe flies are ſeen in ſummer to harraſs the cattle, which are ſometimes ſo moleſted by their ſtings, that they go mad, agitate themſelves, run down precipices, tear themſelves againſt the ſtumps of trees.

The puncture of the tabanus is keen and painful. It is very common in damp woods and meadows, eſpecially during the great heats, when it is moſt troubleſome.

Tabanus

Tabanus Pluvialis.

The moſt common ſpecies; length, 4 lines, of an aſhen grey, has very fine eyes.

All the genus accord in their way of life, but differ in ſize and colour.

They have been named *burrel* or *whame-flies*, by ſome Engliſh authors.

GENUS 5.—CULEX, GNAT.

The larvæ of the culices are very frequent in ſtanding waters; their bodies are compoſed of nine ſegments, which diminiſh in ſize and length from the head towards the extremity of the body; the laſt of theſe ſections is furniſhed with a kind of ſtigmata, through which the larva breathes, frequently riſing for that purpoſe to the top of the water.

The head of the chryſalis is ſo much bent under the breaſt, that the thorax appears to be the moſt advanced part of the body; the ſtigmatæ are placed upon the back of the thorax, the ſegments of the abdomen diminiſh in ſize towards the extremity, the laſt terminates in a kind of flat tail or fin, by mean of which the inſect ſwims or moves itſelf in the water.

The culices generally frequent woods and watery places; they are known by the name of *midges*.

It

It is aſſerted, that where large quantities of them are found, the ſoil is generally marſhy, and the air unwholeſome.

(From Barbut) Culex Pipiens.

Theſe inſects, too well known by the ſeveral punctures they inflict, and the itchings thence ariſing, afford a moſt intereſting hiſtory. Before they turn to flying inſects, they have been in ſome manner fiſhes, under two different forms. From the beginning of May till winter, ſmall grubs may be ſeen with their heads downward, their hinder parts on the ſurface of the water, from which part ariſes ſideways a kind of vent-hole, or ſmall hollow tube, like a funnel, and this is the organ of reſpiration. The head is armed with hooks, that ſerve to ſeize on inſects and bits of graſs, on which it feeds: on the ſides are placed four ſmall fins, by the help of which the inſect ſwims about, and dives to the bottom. Theſe larvæ retain their form during a fortnight or three weeks, after which period they turn to chryſalids. All the parts of the winged inſect are diſtinguiſhable through the outward robe that ſhrouds them. The chryſalids are rolled up into ſpirals. The ſituation and ſhape of the wind-pipe is then altered; it conſiſts of two tubes, near the head, which occupy the place of the ſtigmata, through which the inſect is one day to breathe. It is a pleaſing ſight to obſerve in a tub or glaſs of water the motions of theſe inſects.

The

The chryſalids, conſtantly on the ſurface of the water, in order to draw breath, abſtain now from eating, but, upon the leaſt motion, are ſeen to unroll themſelves, and plunge to the bottom, by mean of little paddles ſituate at their hinder part. After three or four days ſtrict faſting, they paſs to the ſtate of gnats. A moment before, water was the element of the little creature; but now become a winged inſect, he can no longer ſubſiſt in it. He ſwells his head, and burſts his incloſure; the robe he lately wore turns to a ſhip, of which the inſect is the maſt and the ſail. If, at the inſtant the gnat diſplays his wings, there ariſe a breeze, it proves to him a dreadful hurricane, the water gets into the ſhip, and the inſect, who is not yet looſened from it, ſinks and is loſt. But in calm weather the gnat forſakes his ſlough, dries himſelf, flies into the air, ſeeks to pump the alimentary juice of leaves, or the blood of man and beaſts. It is impoſſible to behold and not admire the amazing ſtructure of its ſting; what the naked eye diſcovers is but a tube, containing five or ſix ſpicula of exquiſite minuteneſs, ſome dentated at their extremity, like the head of an arrow, others ſharp edged, like razors. Theſe ſpicula, introduced into the veins, act as pump-ſuckers, into which the blood aſcends, by reaſon of the ſmallneſs of the capillary tubes. The inſect injects a ſmall quantity of liquor into the wound, by which the blood becomes more fluid, and is ſeen through the microſcope paſſing through thoſe ſpicula.

The

The animal ſwells, grows red, and does not quit its hold till it has gorged itſelf. The liquor it has injected cauſes, by its fermenting, that diſagreeable itching, which may be removed by volatile alkali, or immediately rubbing and waſhing with cold water.

At night, to rub with fuller's earth and water, leſſens the inflammation.

The female depoſits her eggs on the water, placing them in the form of a little boat, compoſed of two or three hundred eggs, it ſwims on the water two or three days, after which they hatch. If ſtorms ariſe, they ſink. There are freſh ones every month. Were they not devoured by fiſh, water-fowl, and ſwallows, the air would be darkened.

GENUS 6.—EMPIS.

The perfect inſect is common upon flowers.

The larvæ and chryſalis are unknown.

GENUS 7.—CONOPS.

The conops is chiefly found in meadows and fields, where the different ſpecies are very troubleſome to cattle: they draw blood from horſes. The larvæ and chryſalids are unknown.

One of theſe inſects *(conops calcitrans)* is found every where, in autumn eſpecially; it differs from the

the common fly in having a hard sharp trunk, "with which it pricks our legs in autumn."

Another species resembles a wasp: it is half an inch in length, beautiful, and found in meadows.

GENUS 8.—ASILUS.

This is called by some authors the *wasp* fly, and not improperly, as, like the wasp, it stings severely whatever offends it, though with a different instrument, namely, its proboscis (for which reason it ought not to be taken without precaution). They sting with this instrument different animals, and draw out their blood, which they suck through their trunk. They are very troublesome to cattle in low meadows, where they are frequently met with.—The larvæ and chrysalids are not known. This insect was caught in Hyde-park. *Asilus Crabroniformis;* or Hornet-fly.

GENUS 9.—BOMBYLIUS, BUZZ-FLY

Several species of the bombylii are very common in the spring, about the months of March and April; they are generally found upon flowers in woods and marshy grounds.

Their larvæ are probably aquatic; the perfect insect being most common in gardens or marshy grounds; it hovers about flowers and sips the nectareous dew with its proboscis without settling.

It may be safely handled—*The plate* is *B. medius*—said to hover in the air like a hawk; and dart with great celerity. *B. major* is called *Humble Bee-Fly*.

GENUS 10.—HIPPOBOSCA, HORSE-LEECH.

The Hippoboscæ have been called by some authors *spider-flies*, from the resemblance which some of them bear to that insect, others have called them *horse-flies*; by which name they are more generally known.

They are found frequently in woods and marshy places; but most commonly on the bodies of birds; those of horses and other quadrupeds; sucking their blood, upon which alone they subsist.

Their larvæ are unknown. One species is known to be pupiparous; the egg being larger than the mother; and is rather a pupa or chrysalis, than a real egg, since the compleat or winged insect is produced from it.

Hippobosca Equina.

Received from the New Forest, in Hampshire, where numbers of them live, and riot upon horses and cattle. They are very hard to kill, being covered with a hard crustaceous shell; and they fix so close and fast to the poor animals, with their claws, that they

they cannot rub or bite them off without wounding themſelves.

The feet are armed with many talons in this genus.

There is a ſmall ſpecies in ſwallows neſts.

VII.

Order—A P T E R A.

Without Wings.

GENUS 1.—LEPISMA.

THE inſects belonging to this genus are very frequent under old floors, wainſcots, &c. eſpecially in damp houſes. They run with great ſwiftneſs, and are generally of bright ſhining colors; they are ſuppoſed to live upon wood-lice; or by ſucking the humidity of the wood, under which they live.

Lepiſma Saccharina.

Silvery lead colour like a fiſh; in the joints of ſaſh-windows that are wet and ſeldom opened; and among old papers.

GENUS


1
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6
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G. Quinton fculp

GENUS 2.—PODURA SPRING-TAIL.

The Poduræ are generally found upon the ground in ſand or gravel-pits; or under branches of trees, ſtones, &c. in humid places. One ſpecies is found upon the water, upon the ſurface of which it leaps with great agility. It is not known upon what any of them feed. The inſect leaps by means of its tail.

Podura Villoſa.

The largeſt we have—the length 2 lines, commonly found under ſtones.

The poduræ are diſtinguiſhed into ſeveral ſpecies. Thoſe which inhabit ſtill waters aſſemble in troops in the morning on the banks of pools, fiſh-ponds, and reſervoirs. Others are found in damp places, under leaves, bark, and ſtones, heaps of rotten wood, muſh-rooms and in melon-beds. It eludes the graſp by its elaſticity: its hard, forky tail is a kind of ſpring by means of which the inſect is thrown into the air.

GENUS 3.—TERMES.

They are generally called *wood-lice.*

The inſect is found in old wood, decayed tables, and books not often opened.

Termes

Termes Pulſatorium.

Leſs than a common louſe.

It runs, and even leaps a little when touched.

This inſect has been thought by ſome to imitate the ticking of a watch, by ſtriking its head againſt the wainſcot; which occaſioned Linnæus to give it this name. But this noiſe is cauſed by one of the ptini; and is a call to others of the ſpecies; miſtakenly, by ſome ſuperſtitious perſons, called the death-watch.

GENUS 4.—PEDICULUS, LOUSE.

There are various ſpecies.

Few of the pediculi of birds have been obſerved; though it is pretty certain that almoſt every different animal is infeſted with a different ſpecies of them.

The plate is *Pediculus humanus Common, Louſe.*

GENUS 5.—PULEX, FLEA.

The Flea is the only inſect belonging to this order 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 pupa; which has feet; of which, however, it

it can make no uſe, they being immoveable. The larva may be nouriſhed in boxes, and fed with flies, of which they are fond. They are ſmall, lively, and creep like caterpillars, they paſs 14 or 15 days in the larva ſtate, and feed on greaſy down.

Remedies againſt Fleas.

Brimſtone, fumigation of penny royal, or the freſh leaves ſewed in a bag and laid in the bed.

GENUS 6.—ACARUS, TICK.

The acari live chiefly upon other animals; quadrupeds, birds, and inſects: ſome of the latter are often quite covered with them, others of them live in the water, others upon trees, plants, &c.

They are oviparous:

The diſeaſe called the itch is ſuppoſed to be owing to ſmall ticks or mites as ſome call them.

Acarus coleoptratum, Beetle-Tick.

This is one of thoſe animals whoſe minuteneſs ſecures it from danger, whilſt it draws nutriment from the blood, and frequently from the vitals of larger inſects. Every animal is tormented by theſe beings, diſtinguiſhed by the name of lice, bugs, fleas, mites, &c.

Beetles are in general infeſted with, and ſeverely injured by theſe creatures.

The

The Scarabæus Stercorarius (the common dor, or clock) is ſometimes found almoſt devoured by them; little except the ſhell remaining; and in this ſtate they will live ſome days.

The Beetle-Tick is given magnified as it appeared upon the leg of a beetle placed in a microſcope. Two or three hundred have been found on a beetle.

The Sheep-Tick is found alive in wool a long time after it is cut off.

Acarius Telarius.

According to Geoffroy, this inſect ſpins a web on the bark of trees, generally on the north ſide, from top to bottom of the trunk; which web being diſperſed by the wind, covers the fields with thoſe innumerable threads, which ſome naturaliſts have miſtaken for condenſed vapour.

They are called *virgin's threads*: ſome think that theſe threads, floating in the air, waft the inſect about; and ſerve as a net to entrap other inſects on the wing.

GENUS 7.—PHALANGIUM.

Only one ſpecies is common in Europe. The feet of this inſect are very ſlender, weak, and liable to be broken—ſome think that they grow again (one having been found with ſeven legs of the uſual length, and one ſhorter.)

They

They are in general nocturnal insects; flying the light; and searching for their prey in the night time. Many of them devour the acari, wood-lice, spiders, &c. Some of them live in the sea, attached to the bodies of the large aquatic animals; others in the trunks of decayed trees.

It is called *Shepherd Spider* and *Harvest-man.*

GENUS 8.—ARANEA SPIDER.

The eyes of spiders are immoveable, and their structure is different from that of the eyes of most other insects, consisting each of only one lense, which deprives them of the faculty of multiplying objects; as that of their immobility does of seeing such objects as are placed otherwise than exactly before each eye.

See Eyes of Insects.

Spiders prey upon all weaker insects; even those of their own species; and are themselves destroyed by spheges and ichneumons.

They change their skin.

The thread so fine consists of 6000 threads; which issue from six passages. Gloves and stockings have been manufactured from the ball of silk which the garden-spider carries about her; (containing her eggs) which is their strongest thread; being five times finer than what the silk-worm spins. They were of a beautiful

tiful natural grey colour; and almoſt as handſome and ſtrong as thoſe made with common ſilk.

But to obtain one pound of the ſpiders ſilk would have required twenty-eight thouſand cods; and as none but the females ſpin thoſe cods, a much greater number of ſpiders muſt have been bred. The main difficulty ariſes from the carnivorous diſpoſition of ſpiders, who devour each other.

A proper food had been found for them in the ſoft ſubſtance of freſh quills. Some foreign ſpiders ſpin ſtronger ſilk than ours, and in larger quantities. Had the ſilk of ſpiders anſwered, we ſhould have had ſeveral genuine colours in ſilk; ſuch as grey, white, ſky-blue, coffee-colour; whereas ſilk-worms only yield white and orange colour.

The wandering Spider.

This does not lie in wait for its prey, like the reſt; it is a lively, active, hunter; its head is furniſhed with immoveable eyes; without any motion of the head the inſect perceives all the flies that hover round about, does not ſcare them, but ſtretches over them its arms furniſhed with feathers, which prove nets, in which their wings entangle. The ſpider ſeizes them with its mercileſs claws, and ſucks their blood.

Birds are very fond of the egg-bag of ſpiders, and of the young ſpiders often found in it; they frequently

frequently rob the female of this and fly away to the next eminence, to regale themſelves with the delicious morſel.

Some perhaps eſcape; which accounts for finding ſpiders on the top of ſteeples and other high buildings.

The Solitary Spider.

This ſpecies ſpins looſe irregular webs, in uninhabited parts of houſes.

The *cellar ſpider* is armed with ſtrong pincers; they ſometimes gripe, but the wound is not dangerous in this country. They dig a hole in the ſand, line it with ſilk to keep it from falling in; lie in ambuſh, and ſeize the moment when they ſpy prey even at the diſtance of two feet, and dart upon it with rapidity.

Aranea Aquatica?

Lives and hunts at the bottom of the water, devouring its food within a globule of air formed by itſelf. St. Pierre, in *Studies of Nature*, deſcribes poetically, its reſidence and the ſociety it enjoys.

GENUS 9.—SCORPIO, SCORPION.

This inſect has a ſharp crooked ſting in its tail. The venom of the ſcorpion is accounted more dangerous than that of any other inſect; it has been frequently

quently attended with the loſs of life in hot countries.

In Batavia they are ſaid to grow to the length of twelve inches; and along the gold coaſt to a greater ſize.

Heat probably gives activity to the poiſon, and a great degree of rage in the creature, which inflicts the wound may encreaſe the danger: an inſtance of of ſpeedy death even in our temperate climate occurred, a few years ſince; a dog dying in half an hour after being bitten by a viper. But happily ſuch events are very rare in our favoured country; which has no claim to rank the ſcorpion amongſt the inſects of the iſland; except from an aſſertion, that a diminutive inſect of that genus (no bigger than a flea) was once ſeen amongſt ſome ſeeds.

Scorpions bring forth their young alive.

Their food is chiefly worms and inſects.

GENUS 10.—CANCER, CRAB.

Crabs are long lived, and change their cruſtaceous ſkin every year. They feed equally upon plants, dead and live animals; and frequently the ſtrong and healthy ones devour ſuch as have juſt changed their ſkin, at which time they are weak and languiſhing; and their new ſkin is ſoft; at this time they fall a prey to many other animals, and chiefly to different

rent ſpecies of the marine polypus. Some authors aſſert that the crab changes its ſtomach and inteſtines at the ſame time with its ſkin; and that the firſt food it takes is that ſtomach when it recovers ſo as to begin again to eat. *Darwin* ſays that a hard-ſhelled crab always ſtands centinel to prevent the ſea inſects from injuring the reſt in their defenceleſs ſtate; and that the fiſhermen from his appearance know where to find the ſoft ones, which they uſe for fiſh-bait: *adding*—"and though the hard-ſhelled crab, when he is on this duty, advances boldly to meet the foe, and will with difficulty quit the field; yet at other times he ſhews great timidity, and has a wonderful ſpeed in making his eſcape; and if often interrupted, will pretend death and watch an opportunity to ſink himſelf into the ſand, keeping only his eyes above."

There are ſeveral ſpecies.

The *lobſter* is well known, and the circumſtance of loſing its claws at thunder claps, or the ſound of cannon; ſo that fiſhermen are jeſtingly threatened with a ſalute by the ſea-men; the reſtoration of their claws is likewiſe to be obſerved, as they never grow quite to the ſame ſize.

The Cancer Paraſiticus,

Of this there are ſeveral ſpecies. They are very ſmall, and their ſhells ſo tender as to be very liable to injury: inſtinct directs them to ſhelter themſelves in muſſels,

muſſels, oyſters, &c. Pennant calls one of them the *Pea Crab*, and reprobates the vulgar idea of their being poiſonous.

Hermit Crab.

This ſpecies of crab has a naked tail; and it takes up its abode in an empty ſhell, moſt commonly that of a whelk. It feeds on fiſh and inſects.

It goes by the different names of *Hermit*, *Soldier*, *and Bernardine*. Upon the leaſt noiſe it retreats to its ſhell; when caught it emits a faint cry; but pinches forcibly with its claws; nor is there any way of getting diſengaged but by heating the ſhell.

GENUS 11.—MONOCULUS.

The monoculi are both oviparous and viviparous; they live in ſtagnated waters; ſome of them feed upon plants, others attach themſelves firmly to the bodies of fiſh, whoſe blood they ſuck for their nouriſhment; they ſwim, or rather ſpring upon the water with great agility; they are in general very ſmall, but lay an amazing number of eggs: they loſe all motion, and ſeem to ceaſe to live in ſummer, when the great droughts have deprived them of water, but revive when reſtored to their proper element.

Linnæus relates that one ſpecies of them (which is red) is ſometimes ſo numerous as to make the water look as if it were tinged with blood.

This

This inſect is particularly curious on account of the formation of its arms, and the motion it makes with them in the water. By means of theſe, the little creature can move in any direction, waving them as a bird does its wings. They ſometimes remain ſeveral days on the ſurface of the water, at other times are ſeen only at the bottom; but whether at the bottom or the ſurface they are conſtantly in motion. The motions are very rapid, ſo that the little animal appears as if jumping in the water; its head always tending to the ſurface, and its tail ſtretched downwards. Some call it the *Water-Flea*, but that name is likewiſe applied to the gyrinus, a black inſect of the firſt order.

Monoculus Quadricornis.

Leſs than half a line in length; its antennæ appear like a branch: the animal carries its eggs on the two ſides of its tail; the feet are placed under the body, but it makes little uſe of them; the antennæ being of more ſervice toward the leaping and ſkipping, which it performs in the water with great nimbleneſs.

Found in ſtanding pools: other inſects and polypi feed upon them.

Monoculus Conchaceus.

The ſhell monoculus.

This is provided with a bivalvular ſhell; within which he ſhuts himſelf up if drawn out of the water.

The ſhell opens underneath ; the inſect puts forth its antennæ, by means of which it ſwims very expeditiouſly in various directions, ſeeking a ſolid body to adhere to; and then it is it uſes its feet in walking, by ſtretching them out through the aperture of the ſhell.

Their encreaſe is prodigious and rapid ; a glaſs full of water became in a fortnight a maſs of animated matter of various colours ; and this from a ſingle pair.

GENUS 12.—ONISCUS.

The oniſci change their ſkins like many other apterous inſects ; it is compoſed of ſeveral cruſtaceous plates.

They are found in houſes, gardens, and woods ; ſome ſpecies live in the water ; they are ſometimes called *hog-lice*, and one ſpecies is made uſe of in medicine *(oniſcus aſellus)* ; one is called armadillo, becauſe it rolls up.

Oniſcus Aquaticus.

This is found in pools, ſmall rivulets, and eſpecially in ſprings, ſome in the ſea. They ſwim well; are viviparous, the land ones oviparous.

GENUS 13.—SCOLOPENDRA.

The body of the Scolopendra is flat ; and compoſed of a great many rings or ſegments, which augment as the inſect advances in age, till it is fully grown ;

grown ; it changes its ſkin in the ſame manner as the two preceding genera.

Some ſpecies are frequent in gardens, and all humid places, under ſtones, &c.

Scolopendra Forficata.

The largeſt in this country ; it is found under ſtones, on the ground under flower pots, and garden boxes. Feet 30.

Some call theſe inſects millepedes. Some live in decayed wood ; ſome in ſalt water, ſome in freſh.

The *darting milleped* is a nimble ſwimmer, retires to aquatic plants, and falls a prey to the polypi ; it will encreaſe by cutting like the polypus.

The *marine ſcolopendra*, like a leach extended and depreſſed, builds itſelf little cells with great ſkilfulneſs. They are ſeen in ſome parts lying on the ſeaſhore at low water. They are maſſes compoſed of a multitude of little funnels of a brittle and porous texture. The aperture of the funnel is cloſed up with a ſmall lid of ſand, contrived by the animal to ſhelter himſelf within his tube from all danger.

Scolopendra Electrica.

Shines in the dark,---140 feet.

GENUS 14.—IULUS.

The iuli differ from the ſcolopendræ in the ſhape

of their body, and number of their feet; which laſt are likewiſe very ſhort.

The ſkin is exceedingly hard, and is changed like that of the ſcolopendra, &c.

They are frequent in humid places.

Iulus Terreſtris.

This ſmall inſect, 5 lines only in length, has on each ſide one hundred very ſhort feet, cloſe ſet.

It is met with under ſtones, and in the earth.

Iulus Sabuloſus

Larger; with one hundred and twenty feet on each ſide.

When touched, rolls into a ſpiral, ſo that its feet are outward, but yet turned towards the ground.

It is found with the preceding one; to which it bears a great reſemblance, though it is much larger.

ARRANGEMENT

OF

INSECTS.

Orders.

INSECTS are divided into Orders from the circumſtance of their having or wanting wings; and from the number or ſubſtance of which thoſe parts are compoſed.

THERE ARE SEVEN ORDERS:

I. COLEOPTERA.
II. HEMIPTERA.
III. LEPIDOPTERA.
IV. NEUROPTERA.
V. HYMENOPTERA.
VI. DIPTERA.
VII. APTERA.

I. COLEOPTERA.

Which have four wings; the upper ones are called *Elytra*, or wing-caſes; they are of a hard horny ſubſtance, and meet on the upper part of the body in a direct line. *Beetles, &c.*

II.

II. HEMIPTERA.

Which have four wings; the upper ones *(elytra)* reſemble ſtrong vellum or parchment; they cover the body horizontally; the inner margins extend the one over the other, not meeting in a direct line, as in the coleoptera. *Cricket, &c.*

III. LEPIDOPTERA.

Which have four wings; all membranaceous, and imbricated, or covered with ſcales, fixed upon them like tiles upon the roof of an houſe; theſe when magnified appear like feathers.

Butter-Fly. Sphingr. Moth.

IV. NEUROPTERA.

Four wings; membranaceous, but naked; they appear like net-work.

No ſting.

Dragon-Fly, &c.

V. HYMENOPTERA.

Four membranaceous wings, which are naked.

The tails of the females are armed with a ſting.

Bee, &c.

VI. DIPTERA.

Which have only two wings; being furniſhed with poiſers or balancers, (called *halteres)* inſtead of under wings. *Fly, &c.*

VII. APTERA.

This order of Inſects never have wings in either ſex, or at any period. *Spiders, &c.*

GENERA.

Theſe ſeven Orders are again divided into Genera.

I. COLEOPTERA.

This order is know by the cruſtaceous Elytra which cover and protect the wings, and contains the following genera.

II. HEMIPTERA.

The wing-caſes are of a ſubſtance leſs hard than thoſe of the foregoing order; ſome part of their inner margins are croſſed or laid over the other above the abdomen.

The

The mouth and proboſcis of the inſects which compoſe this order are inflected and bent inwards towards the breaſt.

This order contains the following genera:

III. LEPIDOPTERA.

Four wings covered with a mealy powder, or a kind of ſcales lying like tiles; when theſe ſcales are rubbed off the wings are a naked membrane.

This order contains the following genera:

IV. NEUROPTERA.

Four membranaceous wings; naked; reticulated with veins, or in which the membranes croſs one another, ſo as to appear like net-work.

Their tail is unarmed, or without a ſting; but is frequently furniſhed with appendices like pincers, by which the males are diſtinguiſhed.

V. HYMENOPTERA.

The insects belonging to this order have generally four membranaceous naked wings; the neuters however, in some of the genera; and in others the males or females want wings.

The bodies are shorter than those of the fourth order, and the wings are not so much like net-work.

The tail (except in the male) is armed with a sting.

This order contains the following genera:

VI. DIPTERA.

The insects belonging to this order have two wings.

They are furnished with a poiser or balancer *(haltere)* under each wing; which is terminated by a *capitulum* or knob: the base is concealed under a little scale, by which it is covered as by a shed.

This

This order contains the following genera:

VII. APTERA.

This order contains all ſuch inſects as want wings in both ſexes.

It contains the following genera:

Class.

INSECTS.

ANTENNÆ 2. Legs 6 or more. They breathe through lateral ſpiraculæ.

I. *Order—COLEOPTERA.*

Wings 2. Covered by 2 ſhells; divided by a longitudinal ſuture.

GENERA.

1. GENUS.—SCARABÆUS, BEETLE.

Antennæ clavated; their extremities fiſſile; five joints in each foot.

2. LUCANUS, STAG-BEETLE.

Antennæ clavated, compreſſed; pectinato-fiſſile. Maxillæ extended ſo as to reſemble horns. Five joints in each foot.

3. DERMESTES.

Antennæ of three joints, clavated, perfoliated. Thorax convex. Head concealed under the Thorax.

4. PTINUS.

Antennæ ſub-filiform, the joints toward the end longeſt. Thorax roundiſh, concealing the head.

5. HISTER.

Antennæ broken in the middle with a ſolid bulb at the end. Head retractile.

6. GYRINUS.

Antennæ clavated, ſtiff, ſhorter than the head. Eyes 4.

7. BYRRHUS.

Antennæ clavated, ſolid, compreſſed.

8. SILPHA.

Antennæ clavated, foliated. Head prominent. Thorax margined.

9. CASSIDA, HELMET-BEETLE.

Antennæ knotted, enlarging towards the end. Shells and thorax bordered.

10. COCCINELLA.

Antennæ knotted, truncated. Palpi longer than the Antennæ. Body hemiſpheric. Shells and thorax bordered. In each foot 3 joints.

11. CHRYSOMELA.

Antennæ knotted, enlarging towards the ends. Corſelet margined. 12. HISPA.

Antennæ fuſiform enlarging from each point to the middle; ſituate between the eyes, and placed ſo near at their baſe, as to ſeem to ariſe from the ſame point.

Thorax and elytra in general covered with protuberances or ſpines.

13. BRUCHUS.

Antennæ nearly filiform, the tip of each joint a little prominent in the inſide.

14. CURCULIO.

Antennæ clavated, elbowed in the middle, and fixed in the ſnout, which is prominent and horny.

15. ATTELABUS.

Antennæ thicker towards the extremity. Head narrow behind. Four joints in each foot.

16. CERAMBYX.

Antennæ articulated, and tapering to the end.

Shells long and narrow. Four joints in each foot.

17. LEPTURA.

Antennæ tapering to the end.

Shells narrower towards their extremity. Thorax of a roundiſh and ſlender make.

18. NECYDALIS, CARRION-EATER.

Antennæ ſetaceous, as in the foregoing genus.

Elytra

Elytra either ſhorter than the abdomen, or narrower, and of the ſame length with that part.

19. LAMPYRIS, FIRE-FLY.

Antennæ filiform.

Elytra weak and flexible.

Thorax flat, and of a ſemiorbicular form, ſurrounding and concealing the head.

Sides of the abdomen papillous and folded upwards towards the elytra.

Females, in general, want wings.

20. CANTHARIS.

Antennæ taper.

Thorax margined, and ſhorter than the head.

Shells flexible.

Sides of the abdomen edged with papillæ, or appendices, folded upwards, as in the preceding genus.

21. ELATER, SKIPPER.

Antennæ taper, lodged in a groove under the head and thorax; *(probably to preſerve them from the violence of the fall; when it makes the ſingular leap which diſtinguiſhes it from all other inſects.*

22. CICINDELA, SPARKLER.

Antennæ taper. Jaws prominent, denticulated. Eyes prominent. Thorax roundiſh and margined.

In each foot 5 joints.

23. BUPRESTIS, COW-BURNER.

Antennæ taper, length of the thorax. Head half concealed.

24. DYTISCUS, DIVER.

Antennæ either taper; or encreaſe in ſize towards the end, and have a perfoliated capitulum or head.

Hind feet hairy, made for ſwimming, and armed with ſmall claws.

25. CARABUS, BULL-HEAD.

Antennæ taper. Thorax and ſhells margined, the former is ſhaped ſomewhat like a heart, the point of which is cut off.

26. TENEBRIO, DARKLING.

Antennæ moniliform, or reſemble a ſtring of beads; the laſt joint rounder than the others. Thorax margined.

gined. Head porrected or ſtretched forwards. Elytra rather ſtiff. Some want wings.

27. MELOE, BLOSSOM-EATER.

Antennæ globular; the laſt globule oval. Thorax roundiſh. Shells ſoft. Head gibbous and bent downwards. Many want wings.

28. MORDELLA, NIBBLER.

Antennæ filiform, ſerrated, joints triangular. Head bent downwards. Palpi compreſſed, clubbed, and obliquely truncated. Elytra curved downwards towards their point.

29. STAPHILINUS, ROVE-BEETLE.

Antennæ globular.

Elytra not above half the length of the abdomen. Wings folded up and conccaled. Tail defenceleſs; but has 2 veſicles which can be ſhot out at pleaſure.

30. FORFICULA, EAR-WIG.

Antennæ tapering.

Elytra much ſhorter than the Abdomen. Wings folded and covered.

II. *Order—HEMIPTERA.*

Shells, or upper wings ſemi-cruſtaceous; not divided by a ſtraight ſuture; but incumbent on each other.

Beak curved downwards.

GENERA.

1. GENUS.—BLATTA, COCK-ROACH.

Antennæ taper.

Thorax orbicular, margined.

2. MANTIS, SOOTH-SAYER.

Head unſteady, appears to be ſlightly attached to the thorax.

Antennæ ſetaceous.

3. GRYLLUS, CRICKET.

Antennæ in ſome taper, others filiform. Head inflected;

inflected, armed with jaws, and furnished with Palpi. Wings folded, and concealed.

Feet armed with two nails, hind ones formed for leaping.

4. FULGORA, LANTERN-FLY.

Front drawn out, extended, and empty.

Antennæ seated below the eyes.

Roſtrum inflected, or bent inwards under the body.

5. CICADA, FROG-HOPPER.

Antennæ taper.

Shells membranaceous, declining along the ſides of the body.

Roſtrum bent inwards, under the breaſt.

6. NOTONECTA, BOAT-FLY.

Antennæ beneath the eyes, and ſhorter than the thorax. Feet formed for ſwimming, and hind feet hairy. Wings folded together croſswiſe.

7. NEPA, WATER SCORPION.

Antennæ, or forelegs cheliform. Wings folded together croſswiſe; fore part coriaceous; as in the laſt genus. 8. CIMEX, BUG.

Antennæ longer than the thorax. Roſtrum inflected.

Wings folded together croſswiſe. Back flat. Some are without wings.

9. APHIS, LEAF-LOUSE.

Antennæ longer than the thorax. Beak inflexed. Wings 4 erect, or none. Extremity of the Abdomen generally forked.

10. CHERMES.

Antennæ longer than the thorax; which is gibbous. Roſtrum placed in the breaſt. Wings 4, deflexed. Skip.

11. COCCUS, COCHINEAL.

Trunk proceeding from the breaſt. Wings in the male 2 erect—females none. Four or ſix white briſtles at the extremity of the abdomen.

12. THRIPS.

Antennæ as long as the thorax. Beak obſcure. Body narrow. Wings 4. ſtraight, narrow.

III. *Order—LEPIDOPTERA.*

Wings 4, imbricated with very minute ſcales.
Tongue or trunk ſpiral.
Body hairy.

GENERA.

1 GENUS.—PAPILIO, BUTTER-FLY.

Antennæ clavated. Wings, when at reſt, erect.
Diurnal.

2. SPHINX.

Antennæ thickeſt in the middle. Wings, when at reſt, deflected.
Fly morning and evening only.
Flight ſlow and heavy.

3. PHALÆNA, MOTH.

Antennæ taper from the baſe. Wings in general deflected when at reſt. Fly by night.

IV. *Order—NEUROPTERA.*

Wings 4, naked, tranſparent, reticulated with veins or nerves. Tail without ſting.

GENERA.

1. GENUS.—LIBELLULA, DRAGON-FLY.

Antennæ ſhort.
Mouth armed with 2 long lateral jaws. Wings extended. Tail of the male forked.

2. EPHEMERA, DAY-FLY.

Antennæ very ſhort.
Mouth has neither teeth nor palpi. Two protuberances before the eyes. Wings erect; ſecond pair very ſmall. Two or three tails like briſtles.
Short-lived.

3. PHRYGANEA.

Antennæ longer than the thorax. Wings croſſing each other; ſecond pair folded ſo as to be concealed under the upper ones. Protuberances before the eyes 3. Palpi 4. No teeth. 4.

4. HEMEROBIUS.

Antennæ longer than the thorax, taper, extended. Mouth prominent. Palpi 4. Teeth 2. Wings deflected, and not folded. Stemmata wanting.

5. MYRMELEON, ANT-EATER.

Antennæ club-formed, and as long as the thorax. Wings deflected. No ſtemmata. Mouth armed with jaws, 2 teeth, and 4 long palpi. Tail in the male has 2 ſtraight filaments like forceps.

6. PANORPA.

Antennæ longer than the thorax. Stemmata 3. Proboſcis horny, cylindrical, 2 palpi at the end. Tail in the male furniſhed with a chela or weapon, reſembling the claw of a crab, or the dart of a ſcorpion.

7. RHAPHIDIA.

Antennæ as long as the thorax; the anterior part of which is lengthened out, and of a cylindrical form. Head of a horny ſubſtance, and depreſſed, or flattened. Mouth armed with 2 teeth, and furniſhed with 4 palpi. Wings deflected. Stemmata 3.

V. *Order—HYMENOPTERA.*

Wings 4, generally membranaceous. Tail of the females armed with a ſting.

GENERA.

1 GENUS.—CYNIPS, GALL-FLY.

Mouth armed with jaws, but no proboſcis. Sting, ſpiral, and moſtly concealed within the body.

2. TENTHREDO, SAW-FLY.

Antennæ differing.

Wings extended, and look as if fwelled, or of a bulky conſiſtence.

Sting, ferrated, between two valves. Some are ſeparated and termed *Crabro*.

Jaws but no proboſcis.

3.

3. SIREX, TAILED WASP.

Antennæ filiform above 20 joints. Two ſtrong jaws. Palpi 2. Sting rigid, ſerrated, projected. Abdomen united to the thorax.

4. ICHNEUMON.

Antennæ of more than 30 joints; long, filiform, vibrating, ſting within a bivalve ſheath. Mouth armed with jaws, without tongue. Abdomen generally joined to the body by a pedicle.

5. SPHEX, SAVAGE.

Antennæ of 10 joints.

Mouth armed with jaws; no tongue. Wings extended, not folded, tail horizontally. Sting ſharp and pointed, concealed.

6. CHRYSIS, GOLDEN FLY.

Antennæ filiform of one long and 11 ſhort joints. Thorax joined to the abdomen by a ſhort pedicle. Sting ſingle. Wings not folded. Mouth armed with jaws; but no proboſcis.

Body appears as if gilt.

7. VESPA, WASP.

Mouth armed with jaws. Wings, upper ones folded. Body ſmooth. Sting concealed.

8. APIS, BEE.

Mouth armed with jaws, and furniſhed with a proboſcis incloſed in a bivalve ſheath, and inclined downwards under the body.

Body hairy. Sting concealed.

9. FORMICA, ANT.

An erect ſcale between the thorax and abdomen.

Sting concealed. Males without. Males and females winged.

10. MUTILLA.

For the moſt part want wings. Body covered with a kind of down. Thorax ſtrikes off bluntly at its baſe, or riſes perpendicularly from the part where joined to the abdomen. Sting pointed and concealed.

VI. *Order—DIPTERA.*

Wings two.

GENERA.

1 GENUS.—OESTRUS, GAD-FLY.

Antennæ taper growing from a ſmall point or button. No mouth but 3 punctures, without trunk or beak. Stemmata 3.

2. TIPULA, CRANE FLY.

Head long. Palpi curved. Proboſcis ſhort, and bent inward. Upper jaw like an arch.

3. MUSCA, FLY

Antennæ vary and mark the families. Mouth formed by a ſoft fleſhy proboſcis, with two lateral lips. No palpi.

4. TABANUS.

Antennæ conic, of 4 ſegments. Trunk fleſhy, terminated by 2 lips. Palpi one on each ſide of the trunk.

5. CULEX, GNAT.

Antennæ of males feathered. Trunk a long ſlender ſyphon, or flexible ſheath, encloſing ſetæ, or briſtles, pointed like ſtings.

6. EMPIS.

Proboſcis of a ſtrong horny ſubſtance, bivalve, long and bent inwards.

7. CONOPS.

Trunk long, jointed.

8. ASILUS.

Roſtrum hard, or horny, porrected, extended out its whole length, and bivalve.

9. BOMBYLIUS, BUZZ-FLY.

Trunk taper, very long, ſharp, between two horizontal valves; in which are contained ſtings or briſtles.

10. HIPPOBOSCA, HORSE-LEECH.

Antennæ like a ſingle hair.

Roſtrum bivalve, cylindrical, obtuſe, and wavering or ſhaking, as if ill fixed. Feet armed with nails. Body flat, hard, and as it were ſcaly; hard to cruſh.

VII.

VII. *Order—APTERA.*

No wings.

GENERA.

1. GENUS—LEPISMA.

Legs 6. Palpi moveable.
Tails 3. Body ſcaly.

2. PODURA, SPRING-TAIL.

Antennæ long, taper.
Legs 6. Eyes 2, compoſed of 8 ſmall ones. Tail forked, bent inwards under the body; elaſtic, and acts like a ſpring, by which the inſect leaps.

3. TERMES.

Antennæ taper. Legs 6. Eyes 2. Mouth with 2 jaws.

4. PEDICULUS, LOUSE.

Antennæ length of the thorax. Legs 6. Eyes 2. Mouth producing a ſting. Abdomen depreſſed, and as it were formed of different lobes.

5. PULEX, FLEA.

Antennæ filiform. Legs 6. Eyes 2. Trunk taper, inflexed, concealing a ſting. Abdomen compreſſed.

6. ACARUS, TICK.

Antennæ (2 articulated tentacula) made like feet. Feet 8. Eyes 2, placed on the ſides of the head, remote from each other. Roſtrum pointed.

7. PHALANGIUM.

Antennæ, fixed to the fore part of the head; and made like the feet. Eight feet. Eyes two on the ſummit of the head, near each other; and 2 others on the ſide. Abdomen round.

8. ARANEA, SPIDER.

Feet 8. Eyes 8. Palpi 2, jointed. It is furniſhed with inſtruments for ſpinning.

9. SCORPIO, SCORPION.

Antennæ or palpi, claws on the head. Feet 8. Eyes 8. On the under ſide 2 inſtruments like a comb.

10. CANCER, CRAB.

Antennæ 4, beneath the eyes. Palpi 6, unequal; the 4 longer covering the mouth. Eyes 2, moveable, generally projecting from the head, or placed upon a ſtalk. Feet 8 (or 10 or 6) beſides 2 *hands* terminated byclaws.

11. MONOCULUS.

Antennæ uſed in ſwimming and leaping. Feet made for ſwimming. Body covered with a cruſt, or ſhell. Eyes fixed in the ſhell, very near one another.

12. ONISCUS.

Antennæ taper, and bent. Body oval. Feet 14.

13. SCOLOPENDRA.

Antennæ taper.

Feet as many on each ſide as the ſegments of the body; not leſs than 24. Palpi 2, jointed. Body depreſſed.

14. IULUS.

Antennæ beaded. Palpi 2, jointed. Feet numerous, twice as many as the ſegments of the body; which is ſemi-cylindrical.

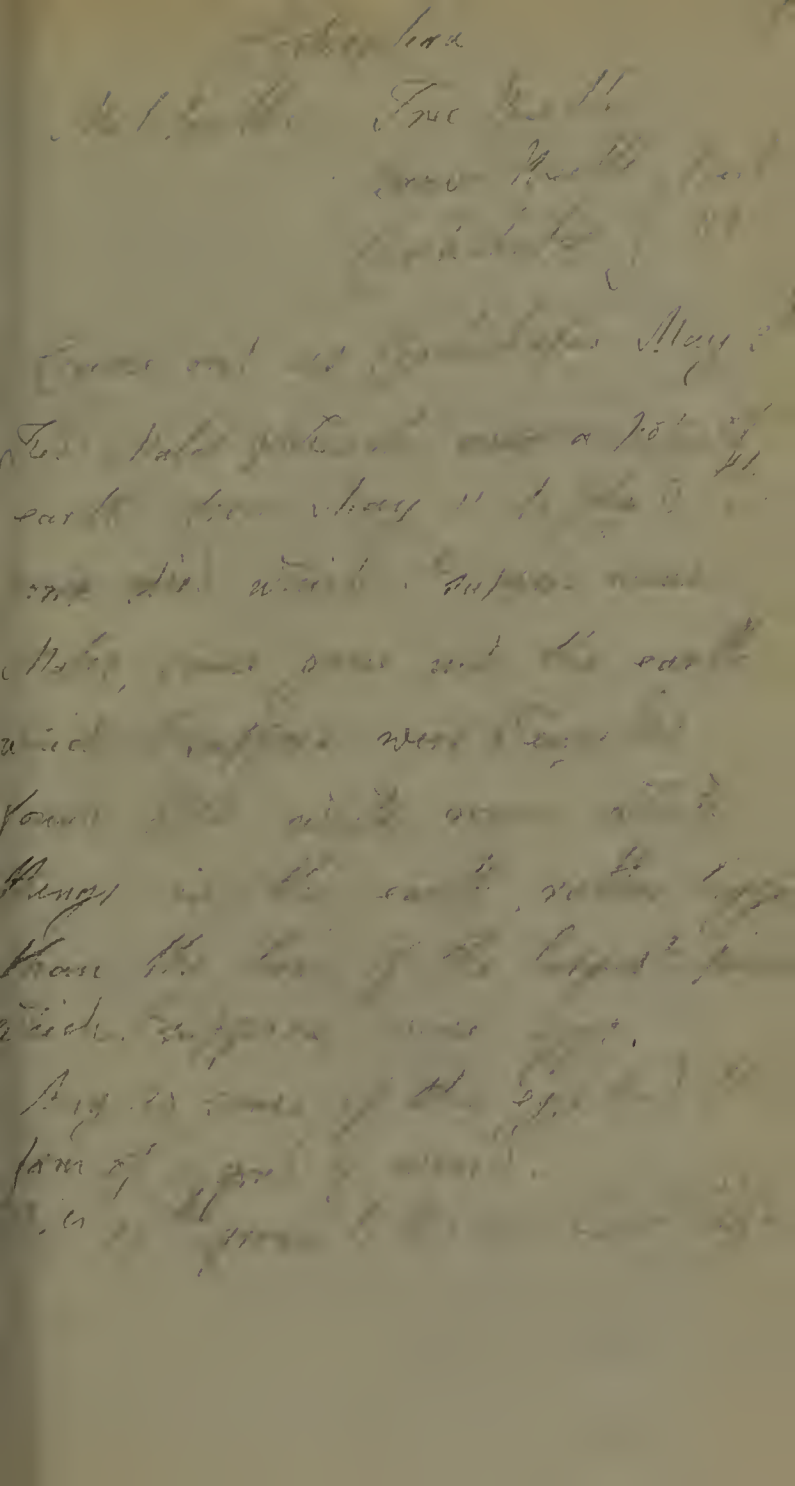
Species.

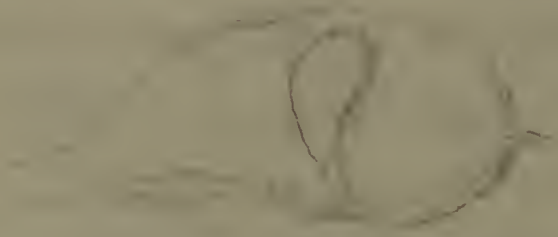
The next diviſion is into ſpecies, which are numerous beyond all calculation: to inſtance only in one genus, namely Ichneumon: we are told that it contains 27 ſpecies.

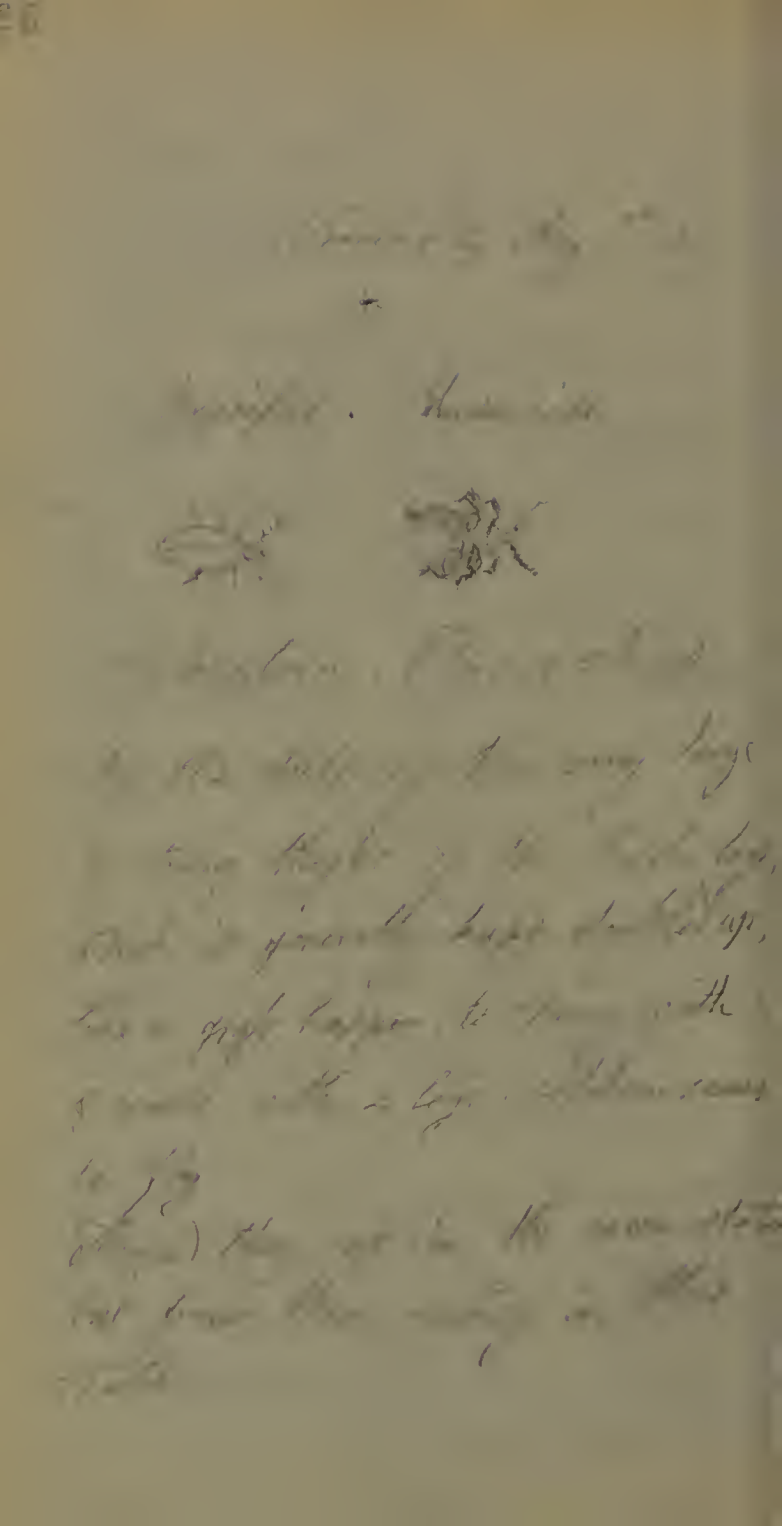
The Lepidoptera Order contains only three genera; and Harris gives above four hundred ſpecies of Britiſh Inſects in theſe three.

FINIS.

My Cousin the 2d D. Hebsorter sat with several







Natural size Magnified

Black or rather. bottle green
Aphides found on Geraniums.
[illegible] head. 6 Legs, 2 short stiff
Tain from the back [illegible]
body [illegible]

[illegible]

on [illegible]

[illegible]

[illegible] 170

Blatta gigantea see page 55 of Wakefield's introduction to the natural history of insects.

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See Drummond Vol V 160

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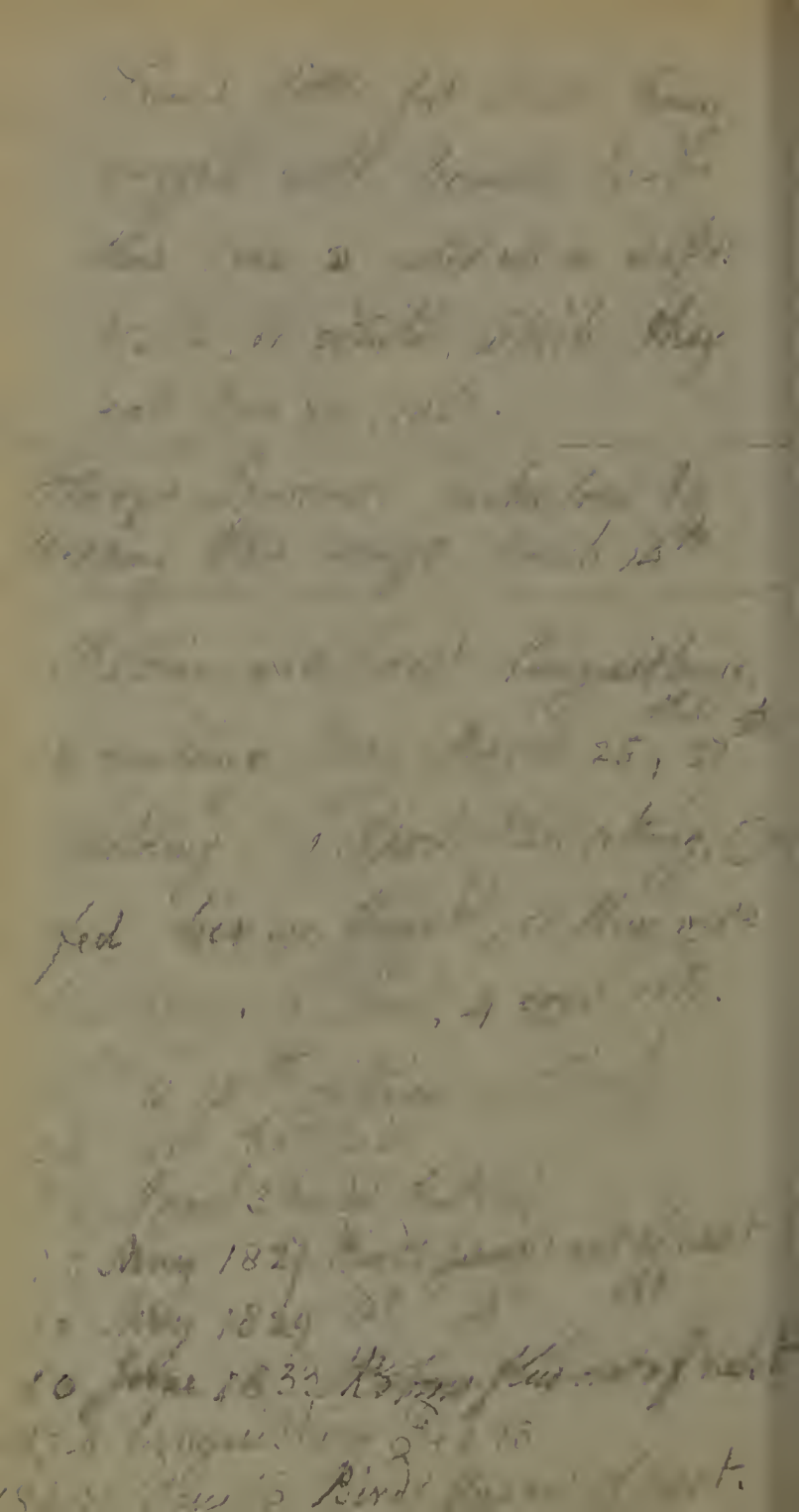

Caterpillar found on hor-
Greenish with purple
stripes at edges, and light
whitish underneath. A
looper, that is had 6 legs
near head, 3 on each side,
none in middle, 2 at tail
at bottom of the hind part