Beckwith

THE

BEAUTIES

OF THE

CREATION.

VOLUME I.

INSECTS.

THE BEAUTIES OF THE CREATION:

OR, A NEW MORAL SYSTEM OF NATURAL HISTORY:

IN FIVE VOLUMES:

Conſiſting of

QUADRUPEDS,	INSECTS,
BIRDS,	TREES AND FLOWERS,
FISHES AND REPTILES,	&c. &c.

Deſigned to inſpire Youth with Humanity towards the Brute Creation, and bring them early acquainted with the wonderful Works of the Creator.

Who can this field of miracles ſurvey,
And not with Galen, *all in rapture, ſay,*
Behold a GOD! *adore him, and obey.*

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PRELIMINARY DISCOURSE

ON

INSECTS IN GENERAL;

PARTICULARLY ADDRESSED TO

OUR YOUNG READERS.

AMONG the various ſubjects which Nature offers to the inſpection of natural hiſtorians, no object whatever ſeems more to claim their attention than INSECTS. Though their minuteneſs may, at firſt view, ſeem a juſt argument for that contemptible idea which the vulgar entertain of them—though the unthinking part of mankind may look on them as the reſult of chance, or as the refuſe of nature—yet he that views them with due attention, and reflects on the art and mechaniſm of their ſtructure, which collects ſuch a number of veſſels, fluids and movements, into one point, and that too frequently inviſible to the naked eye, cannot but

diſcover them to be the work of an all-wiſe Providence.

Thoſe animals which by their ſize chiefly attract our attention, are but the ſmalleſt part of animated nature; the whole earth ſwarms with living beings, every plant, every grain and leaf, ſupports the life of thouſands. Vegetables ſeem, at firſt ſight, to be the parts of organized nature, which are produced in the greateſt abundance; but, upon minuter inſpection, we ſhall find each ſupporting numberleſs minute creatures, who fill up the various gradations of youth, vigour, and old age, in the ſpace of a few days exiſtence.

Vegetables are generally produced but once in a ſeaſon; but among inſects, eſpecially of the ſmaller kinds, a ſingle ſummer ſuffices for ſeveral generations. Theſe therefore would multiply in greater abundance than the plants on which they ſubſiſt, but that they are deſtroyed by other animals, and often by each other; the ſpider feeds on the fly, the birds upon the ſpiders, and they in turn make the food of man, and of every beaſt of prey.

An

The firſt kind, we commonly call Worms or Grubs, as alſo Caterpillars. Theſe humble animals move forward but ſlowly: when they advance from one place to another, they ſtretch the muſculous ſkin, which ſeparates the firſt ring from thoſe that follow, and thruſt it forwards to a certain diſtance; then they contract and wrinkle the ſkin on the ſame ſide, bringing forwards the ſecond ring, and ſo on.

The ſecond ſort of inſects are flies of various kinds, whoſe bodies are covered by ſmall plates, not unlike our ancient armour, the pieces of which are lengthened by unfolding, and ſhortened by running over each other. Theſe lead a more luxurious life, transfer themſelves from place to place with rapidity, and ſpend their little exiſtence in feaſting and propagating their kind.

The third ſort are ants, ſpiders, and others, whoſe bodies are divided into two or three portions, joined by a ſort of ligament. Of all the race of reptiles theſe ſeem to be endowed with the greateſt ſhare of ſagacity. The wiſdom of the ant (ſee our diſcuſſion of this curious little creature in p. 181) is conſpicuous in their forming them-

ſelves into a kind of little republic, and therein obſerving, if we may be allowed the expreſſion, their own peculiar laws and policies; but the cunning of the ſpider ſeems to exceed that of moſt other inſects: its various artifices to enſnare its prey, is no leſs remarkable than its contrivance of a cell or retreat behind its web, where it feaſts upon its game with all the ſafety imaginable, and conceals the fragments of thoſe carcaſes which it has picked, without expoſing to public view the leaſt remains of its barbarity, which might diſtinguiſh its place of abode, or create the leaſt jealouſy in any inſects, that their enemy is near them.

When we compare the elephant with the ant, how contemptible, at firſt view, does the latter appear? But, when we ſurvey that little animal through a microſcope, as we have repreſented it, conſider the art and mechaniſm of its ſtructure, and the fluids circulating in veſſels ſo ſmall, as almoſt to eſcape the niceſt obſervation, we are loſt in wonder and aſtoniſhment, and are led to conclude, what a little difference there is between the great and little things of this life.

Some

Some inſects are richly adorned with robes of various colours, as blue, green, red, gold and ſilver, and many other embelliſhments. We need only look upon ſhining flies, Cantharides, Butterflies and Caterpillars, to be convinced of this truth, The ſame wiſdom which has given them theſe ornaments, has armed them from head to foot, and has enabled them to fight, and to defend themſelves. Though they do not always catch what they lie in wait for, or ſhun what is hurtful; yet they are provided with what will beſt ſerve them for thoſe purpoſes. The common leech has long teeth, the waſp and the bee have a powerful ſting, and the ſnail, of one claſs, is covered with a ſtrong ſhell, which is ſo hard as to defend it from external injuries, and ſo light, as to enable it to carry it with it wherever it goes. The moſt delicate, ſuch as Caterpillars, are furniſhed with hairs, which ſerve to break the ſhocks they may receive, and to weaken the blows, or to preſerve them from the rubs that might hurt them. The generality of inſects are quick in their flight, to get out of the way of danger; ſome by the help of of their wings, of which there are numberleſs inſtances; and others, ſuch as moſt of the inhabitants of trees,

by the aſſiſtance of threads, which they can throw out, and hang by them under the leaves, on which they live. Others again, like the graſshopper, can leap to a great diſtance, and ſo get out of danger.

It is alſo wonderful to conſider the various organs by which ſome inſects are aſſiſted to live, and the inſtruments they make uſe of, each according to their profeſſion. The ſilk-worm is ſkilful in ſpinning, having two diſtaffs and fingers to draw out the thread; the ſpider can make nets and webs, and is therefore provided by nature with implements for that purpoſe; the waſp, by means of two ſmall ſaws, which hang one on each ſide his mouth, procures from the rails and poſts, which he meets with in the fields, and elſewhere, ſuch wood as is neceſſary in the erection of their common habitation; bees have ſcrapers, ſpoons, and trowels, if we may be allowed to give them thoſe names, which they uſe in the formation of their combs, and for other purpoſes: the trunk of this little animal is more wonderful than that of the elephant; for this uſes his only for his own convenience, but the trunk of the bee extracts the healing balſam even from poiſonous herbs, if we may credit the writings of ſome highly-eſteemed authors:

the

the method in which they perform this operation is beyond human comprehenſion; for all the art of man has never yet been able to extract liquor from plants with that ſkill. Let not the youthful part of our readers, while they pride themſelves in human accompliſhments, think too meanly of inſects formed for their uſe, ſince nature has beſtowed on the very loweſt of them ſomething which it has denied to mankind.

They are formed for motion, rather to provide ſuſtenance, than to avoid danger. As from their natural weakneſs they are the prey of every ſuperior order of animals, they ſeem to find ſafety only in their minuteneſs or retirement; but even with every precaution they furniſh out a repaſt to birds, who, while to us they ſeem ſporting in the air, are then employed in procuring their neceſſary ſubſiſtance. The inſect itſelf, however, is at the ſame time in purſuit of ſome inferior order of inſects, for there are the ſame hoſtilities among the ſmalleſt as there are among the largeſt animals.

It was formerly the common opinion, that all ſorts of inſects proceeded from corruption; but this has been long exploded, eſpecially ſince the invention of

microſcopes. And indeed, it would be abſurd to ſuppoſe, that theſe animals, which are perfect in their kind, ſhould be the effect of chance. The motions of theſe creatures may ſeem to us without any deſign; and yet, it is certain, that they tend to a certain end, even thoſe of the ſmalleſt as well as the largeſt. No inſect abandons its eggs to chance; for they are never miſtaken in laying them in places where they may receive proper nouriſhment, as ſoon as they are hatched. The Caterpillars, that feed upon cabbages, are never found upon willows, nor thoſe of willows upon cabbages. The moth delights to be among curtains, woollen ſtuffs, or papers, but never upon plants, nor in mud, nor yet in corrupted aliments; and yet the contrary happens to flies, who lay their eggs in fleſh; and therefore it is plain, it is inſtinct, and not chance, that directs their choice. That this does not ariſe from the corruption of the fleſh is plain from experiment; ſince beef freſh killed, and put into an open veſſel, covered over with a piece of ſilk, ſo thin as to let in the air, and yet thick enough to hinder the eggs of the fly from paſſing through it, will be found to produce no maggots. However, the flies being attracted by the ſmell, will come in crowds to the covering, and endea-

vour to enter in, and perhaps lay ſome of their eggs upon the ſilk, but they will penetrate no farther; from whence it is plain, that corruption produces nothing.

Summer is the ſeaſon of their pleaſures: many of them never live above a ſingle ſeaſon, while the ephemera continues but a few hours. Such however as are more long-lived, take the proper precautions to provide for their ſafety in winter, and fix upon the moſt convenient ſituations for ſpending that interval; and ſuch as want food, lay in the proper ſtores for ſubſiſtence. But the greateſt number want no ſuch neceſſary ſtock, for they ſleep during the continuance of the winter. Some caterpillars, for inſtance, having fed during the ſummer, retire, at the approach of cold, to a place of ſafety, and there, by ſpinning a thread like a cobweb, hang themſelves in ſome commodious place, covered with a factitious coat, which at once ſerves to keep them warm, and guard them from external injuries. Here they continue in this torpid ſtate till the returning ſun calls them to new life; then they expand new wings, become butterflies, and ſeem employed ſcarce in any other manner than that of reproducing their kinds. Thus we ſee among inſects thoſe different offi-

ces of eating, ſleeping, and generation, make different ſeaſons in their lives. Were we to compare them with other animals, we ſhould find, that while thoſe purſue ſuch pleaſures by frequent returns, theſe experience each but once in their lives, and die.

There are ſome inſects, however, which lay up proviſions for the winter; of which the bee and the foreign ant are remarkable inſtances. The waſp, the hornet, and the wild bee, are not leſs aſſiduous in laying in a proper ſtock of food, and fitting up commodious apartments; but this is wholly for the ſake of their young; for they forſake their neſts in winter, leave their young furniſhed with every convenience, and retire themſelves to other places.

In general, all inſects are equally careful for poſterity, and find out proper places wherein to lay their eggs, that, when they are hatched and produce young ones, there may be ſufficient food to maintain them; whether they chooſe trees, plants, or animal ſubſtances, ſtill the paſcent creature finds a bed, which at once ſupplies food and protection. The plumb and the pea, each ſeem to give birth to inſects peculiarly formed for re-

ſiding in them. The pear and apple produce a white moth; on the oak leaf are hatched ſeveral, of beautiful colours, white, green, yellow, brown, and variegated. The manner in which thoſe inſects lay their eggs is ſufficiently curious; they wound the leaf half through, and then depoſit their eggs in the little cavity. As the inſect encreaſes, its nidus, or bed, encreaſes alſo, ſo that we often ſee the leaves of trees with round ſwellings on the ſurface, upon opening of which we may diſcover numberleſs inſects, not yet come to maturity. On oak trees, as we elſewhere obſerve, theſe neſts appear like little buds, and are in fact only gems, or buds, which are increaſed in thickneſs, when they ought to have been puſhed out in length. Among theſe caſes, formed by inſects, the Aleppo galls may be reckoned as the moſt uſeful; the inſects of which, when come to maturity, gnaw their way out, as may be ſeen by the little holes in every nut. But all theſe are formed by the ichneumon kinds of flies, namely, of thoſe kinds which are vulgarly called the Blue-bottle fly.

Thoſe kinds, however, which do not wound the leaf, take great pains to lay their eggs on the ſurface, in the exacteſt and moſt curious manner. When thus depoſited,

they

they are always faſtened thereto with a glue, and conſtantly at the ſame end. Thoſe which lay them in the waters, place them in beautiful rows, and generally in a ſizy ſubſtance, to prevent their being carried away with the motion of the water. Upon poſts, and on the ſides of windows in country villages, little round eggs have been ſeen reſembling pearls, which produced ſmall hairy caterpillars, and thoſe, like the reſt, are all laid in very regular order. The gnat, though ſo very ſmall, is yet very curious in the manner of depoſiting her eggs, or ſpawn. It lays them on the water, but fixes them to ſome floating ſubſtance by means of a ſtalk, which prevents them from ſinking. The eggs are contained in a ſort of tranſparent jelly, and very neatly laid: when hatched by the warmth of the ſeaſon, they ſink to the bottom, where they become ſmall maggots, ſtick to the ſtones, and provide themſelves caſes, or cells, which they creep into or get out of at pleaſure, and thus continue till they take the uſual change into that of a fly.

There are reckoned no leſs than three hundred kinds of Caterpillars which are already known, and the curious are ſtill making new diſcoveries: their ſhape, their

their colour, their inclinations, and their manner of living, diſtinguiſhes the ſeveral ſorts from each other; and yet they are all perfect in their kind.

There is an animal lately diſcovered, whoſe powers of generation are ſtill more extraordinary than any thing hitherto taken notice of. The animal is called the Polypus, a ſmall reptile found on aquatic plants, and in muddy ditches. This ſurprizing creature, though cut into ever ſo many parts, ſtill continues to live in every diviſion, and each, in leſs than three days, becomes in every reſpect a perfect Polypus, like that which was at firſt divided. This, I think, may be juſtly eſteemed the loweſt of animated beings, and ſcarce to be ranked above the ſenſitive plant, except by being endowed with a locomotive faculty, or a power of moving from one leaf to another. It is thus that Nature chuſes to mix the kinds of beings by imperceptible gradation, ſo that it becomes hard to determine where animals end, or vegetables begin. In this there are evident marks of her wiſdom in filling up every chaſm in the great ſcale of being, ſo that no poſſible exiſtence may be wantiug in her uni-

verſal

verſal plan. Were we to aſk why theſe minute creatures, in general little regarded by men, except from the prejudice they are to his labours, were formed in ſuch great abundance, it would be no eaſy taſk to find a reply. For man's uſe they were not made, as they are allowed to be noxious to him; nor for the ſuſtenance of other animals that may be of uſe to him, ſince the advantages of the latter cannot compenſate for the damage done by the former; perhaps the wiſeſt anſwer would be, that every creature was formed for itſelf, and each allowed to ſeize as great a quantity of happineſs from the univerſal ſtock, as it was able: thus each was formed to make the happineſs of each; the weak of the ſtrong, and the ſtrong of the weak; but ſtill every order found happineſs in proportion to its abilities. Thus we ſhall find, that though man may be reciprocally uſeful to other animals, yet in ſome meaſure they were formed for his uſe, becauſe he has been endowed with every power of rendering them ſubſervient, and enjoying their ſubmiſſion.

Having thus taken a general view of what we intend particularly to deſcribe in the following pages of

of this volume, it remains only to admoniſh the youthful reader, not to conſider thoſe matters as dry, trifling, or tedious, which, if properly attended to, will enlarge his ideas of the infinity of creation, and inſpire him with that juſt ſenſe of gratitude, which is due to the great Author of the univerſe. If nature has given him a genius, that prompts him to admire the beauties of human mechaniſm, to what a pitch muſt his admiration and aſtoniſhment be raiſed, when he beholds only the wonders diſplayed in a common inſect, which he, perhaps, before looked on with the utmoſt contempt and indifference! He will ſoon be induced to believe, that the moſt ſumptuous and voluptuous dreſſes, which art has manufactured to add a luſtre to pomp and power, fall infinitely ſhort of that magnificent garb, which Nature has beſtowed on the beautiful butterfly. Into what hiſtory will he look, to find thoſe people, who are governed by laws equal to what he will obſerve in the republic of Bees? From the indefatigable Ant he will learn leſſons of frugality and induſtry; and by the cunning Spider, he will be taught to guard againſt the artifices of thoſe who lay ſnares to catch the thoughtleſs

leſs and inexperienced. In ſhort, he will here ſee the boſom of Nature laid open to his view, her wonderful operations explained, and the care ſhe takes in the increaſe and preſervation of the minuteſt parts of her works.

NATURAL HISTORY.

INSECTS.

THEIR GENERAL NATURE.

INTRODUCTION.

DEFINITION.---Insects are small animals, breathing through vent-holes, arranged along their sides, and provided with a skin, of a bony nature. Their body is composed of a head, trunk, limbs, and abdomen.

FORM AND STRUCTURE.---Not having occaſion to fly far, they are not made ſo ſharp before as birds: but their wings have ſufficient ſtrength and activity to conquer all the reſiſtance they meet with, in their ſhort paſſages through the air. Having neither bones, fleſh, nor ſkin, as in other animals, they are covered with a curious coat of mail, which both guards and ſtrengthens the body, while it renders the Inſect more adapted to the purpoſes of ſeeking its food, and performing every other function of its being.

EYES AND ANTENNÆ.---The eyes of the Fly-tribes are two little creſcents, or immoveable caps, round the head of the Inſect; and contain a great number of minute eyes, croſſing each other in the form of lattice-work. Curious obſervers relate they have counted ſeveral thouſands in each combination. Lewenhoek calculated as many as 8000. The cauſe of their eyes being ſo numerous, is to ſupply the defect of viſion ariſing from their eyes being immoveable. Thus Inſects have eyes in every direction. How admirable muſt their ſight be, which enables them to diſcern objects, with their innumerable quantity of eyes, with as little confuſion

confuſion as other animals do with only two! Their antennæ are ſmall horns, projecting from their head, in ſuch a manner as to preſerve the ſight of ſo many fixed eyes from being injured.

MOTION.—The admirable mechaniſm in thoſe that creep, the curious oars of thoſe that ſwim, the incomparably formed feet of thoſe that walk, the ſtrength and elaſtic force of thoſe that leap, and the talons of thoſe that dig, afford the moſt ample matter for contemplating the endleſs wiſdom of the Creator. Each is particularly adapted to the kind of motion peculiar to the reſpective Inſect: which is exemplified in the Graſshopper, Water-Beetles, Crickets, &c. To render their progreſs through the air as eaſy as poſſible, Inſects are provided with wings, formed of the lighteſt membranes, and the fineſt articulations. To poiſe the body, ſome have four wings; while ſuch as have only two, have pointels, or poiſes, under each wing.

PARTS.—Inſects are compoſed of joints, muſcles, tendons, and nerves; with eyes, brain, ſtomach, entrails; and with every other part of an animal body.

How is the mind abſorbed in wonder, when it conſiders that the ſmalleſt Animalcula, which the microſcope can only render viſible, is poſſeſſed of all the above-related parts! May we not, therefore, ſay with Galen, when ſuch exquiſite workmanſhip appears in the minuteſt Inſect—What muſt be the wiſdom employed by the Almighty in forming the more noble parts of the Creation!

SAGACITY.—Whether by inſtinct, or actual ſagacity, Inſects are ſecured againſt winter, our admiration is equally raiſed. When cold and wet oblige them to retire, ſome entomb themſelves, as in their Aurelia, or Chryſalis ſtate; others provide themſelves in ſummer with ſufficient proviſions for their winter ſubſiſtance; and ſome of the Inſect-tribe exiſt in a ſleeping ſtate, without changing their nature, or being under the neceſſity of requiring that food which is denied them by the change of ſeaſon. This cauſed Solomon moſt wiſely to ſay, "Go to the Ant, thou Sluggard, conſider her ways, and be wiſe; which, having no guide, overſeer, or ruler, provideth her meat in the ſummer, and gathereth her food in the harveſt."

CARE

CARE OF THEIR YOUNG.—Inſects, with the greateſt care and affection, carry their young in their mouths, which is particularly obſerved in the Ant tribe. But their care, in general, deſerves the greateſt admiration. They depoſit their eggs in ſuch places as ſecure, produce, and ſubſiſt their offspring. According to the ſpecies, their eggs are laid in waters, on woods, or on vegetables, where the young find a ſubſiſtance agreeable to their nature. Particular woods, herbs, and plants, are choſen by the parent-inſect to foſter their future offspring. Thus Nettles, Ragwort, Cabbage-leaves, Oak-leaves, Currant and Gooſeberry buſhes, &c. have their peculiar Inſects. Some, whoſe eggs requiring more warmth, depoſit them in the hair of animals, the feathers of birds, and even in the ſcales of fiſhes. Others make their neſts by perforating earth and wood, where they depoſit their eggs with ſuch neatneſs as to gratify the moſt curious obſerver. And, to prevent their eggs being injured, they incloſe them in the leaves of vegetables, curiouſly glued together.

FOOD.—Every ſpecies of Inſect has a food peculiar to itſelf. Caterpillars, for inſtance, are not only limited

to herbage, but, likewiſe, to a peculiar kind. Sooner than diſobey this ordinance of Nature, they will periſh with hunger, unleſs they meet with a plant ſimilar to that to which they are attached. To this general rule, we admit there are ſome few exceptions in Caterpillars, that will ſubſiſt on any vegetable. This ſeems to be wiſely regulated, in order to prevent the moſt uſeful parts of vegetation being deſtroyed by Caterpillars feeding, for inſtance, on Apple-trees only.

Use.—Let no perſon conſider the Inſect part of the Creation, as only worthy to be cruſhed to death by the foot, or to be made the cruel ſport of thoughtleſs childhood: for, in the words of the ingenious and immortal Shakeſpear, "The poor Beetle, cruſh'd beneath the foot, feels a pang as great as when a Monarch falls." Surely their weakneſs ought to be their ſureſt protection againſt ſuch treatment. But, when it is conſidered that we derive the greateſt embelliſhments, and medicinal aids, from their virtue, ſelf-intereſt, if not gratitude, ſhould protect their defenceleſs lives from being deſtroyed by Man. To them we are indebted for our ſilk, honey, cochineal, and ſeveral medicines that are indiſpenſibly

indiſpenſibly neceſſary to preſerve our lives from being the prey of maladies that might, otherwiſe, prove incurable. Added to this, Caterpillars are indiſpenſible food for birds, in their infancy, which have then their cries heard and relieved by the Creator, producing this ſubſiſtance, ſo admirably adapted to their tender texture. But ſometimes it muſt be allowed, that the Almighty puniſhes the ingratitude of Man, by ſending hoſts of Flies, Locuſts, and Caterpillars, in array againſt him. This ſhould teach us not to deſpiſe even a worm, which has been too frequently rendered one of our moſt powerful and dreadful enemies. Let us not think ourſelves rich, great, or independent, while the Almighty can puniſh our preſumption with ſo inconſiderable an inſtrument.

TOMBS.---The Caterpillar, ſatiated with verdure, retires voluntarily from life, and ſeeks the grave. Previous to their retreat, they change their ſkins, ceaſe to feed, while they build themſelves a tomb, or ſepulchre. A few days conduct ſome of them into a new ſtate, of ſuperior exiſtence. Inſtead of crawling the earth, they wing the air. The intermediate ſtate between the

Worm and the Fly, and which is ſo ſtriking a picture of diſſolution, is called the Chryſalis ſtate. What appears the tomb of the Worm, is the embryo of the Butterfly; which, here acquiring a perfect form, burſts the barriers of the grave, and ſpeeds its flight into another world of enjoyment. What a contraſt of being is there between its laſt and former ſtate! The Caterpillar is terreſtrial, and crawls heavily along the ground. The Butterfly is agility itſelf, and ſeems almoſt to diſdain repoſing on the earth, from whence it derived its being. The firſt is ſhaggy, and of hideous aſpect; the latter is arranged in the greateſt ſplendor and beauty of glowing colours. The former was obliged to confine itſelf to a groſs food; but this imbibes the eſſence of flowers, regales on dews and honey; and perpetually varies its pleaſure, in the full enjoyment of Nature, which it moſt delightfully embelliſhes.

A collection of theſe beautiful and variegated Inſects is a ſplendid ſpectacle, where the richeſt and moſt diverſified colours delight and aſtoniſh the eye with their ſhade and diſpoſition. The ſight alone enraptures. But, what a ſublimity of reflection they afford to the Contemplator

templator of Nature! The period of the Caterpillar's reptile exiſtence being accompliſhed, it entombs itſelf, for the purpoſe of riſing again a ſuperior being. The Chryſalis is, at once, the tomb of the Caterpillar, and the cradle of the Butterfly. Under a tranſparent veil, this miracle of Nature is effected; from whence, like the ſons of Man riſing from the tomb at the day of reſurrection, the Butterfly breaks the barriers of its grave, and wafts itſelf into the air of heaven. Here it enjoys the effulgence of light, and reſpires the breeze, embalmed with the ſweets of Nature. Succeſsful in his rifling every nectareous flower, his reſt is the harbinger of enjoyment. His airy wings convey him from pleaſure to pleaſure, while they captivate Man with their beauteous and variegated ſplendor. And in this revelling from eſſence to eſſence, he is not to be caught but by a ſmall net of gauze, or ſilk, upon a wire, placed at the end of a light wooden handle.

What a ſcene of wonders does not the Butterfly diſplay! Its eyes of net-work; its wings beſprinkled with a farinaceous duſt, of which every grain is a tile laid over a fine net of gauze; and the infinite variety of form, colour, richneſs, and beauty, of its embelliſh-

ments, render it ſo wonderful, that the Ladies of China are ſaid to ſpend their whole lives in the ſtudy of this incomparable Inſect. They incloſe, in a box filled with ſmall ſticks, a number of Caterpillars, ready to ſpin their bag; and when they hear the fluttering of the Butterfly's wings, they releaſe them into a glazed apartment filled with flowers. We have alſo, in England, Ladies diſtinguiſhed by their taſte and knowledge in Natural Hiſtory. May their amiable example, and our reſpectful attention, baniſh the modern attachment to faſhion and frivolity!

This beautiful tribe of inſects has been divided into Diurnal and Nocturnal flies; or, more properly ſpeaking, into Butterflies and Moths; the one only flying by day, the other moſt uſually on the wing in the night. They may be eaſily diſtinguiſhed from each other by their horns or feelers; thoſe of the butterfly being clubbed, or knobbed at the end; thoſe of the moth, tapering finer and finer to a point.

The butterflies, as well as the moths, employ the ſhort life aſſigned them in a variety of enjoyments. Their whole time is ſpent either in queſt of food, which every

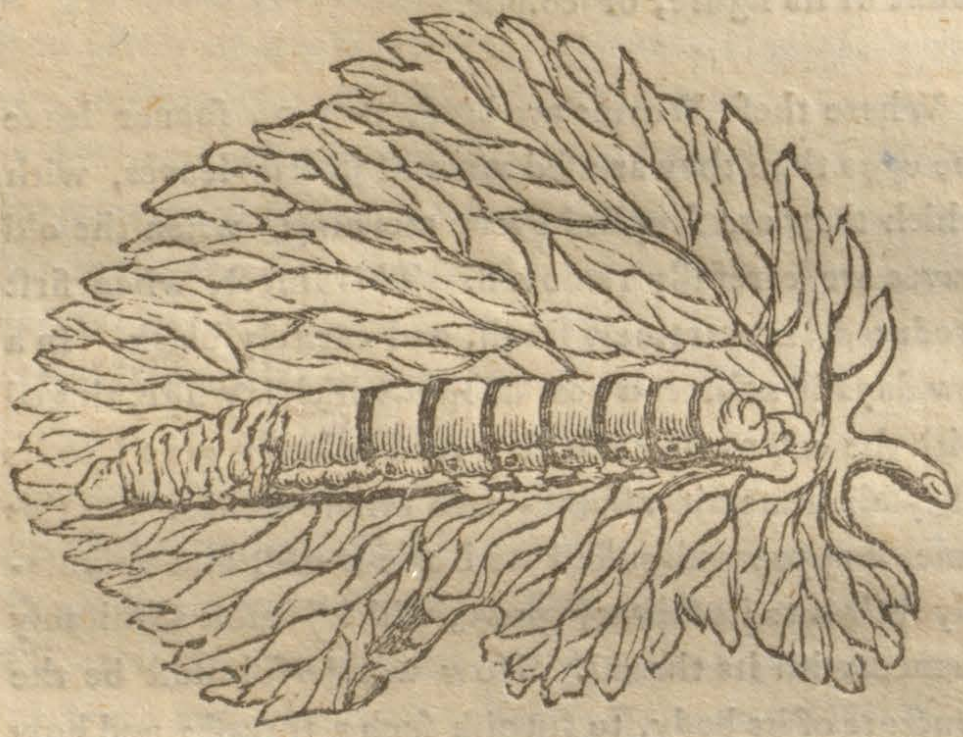
every flower offers; or in purſuit of the female, whoſe approach they can often perceive at above two miles diſtance. Their ſagacity in this particular is not leſs aſtoniſhing than true; but by what ſenſe they are thus capable of diſtinguiſhing each other at ſuch diſtances is not eaſy to conceive.

The eggs of the female butterflies are diſpoſed in the body like a bed of chaplets; which, when excluded, are are uſually oval, and of a whitiſh colour: ſome, however, are quite round; and others flatted, like a turnip. The covering or ſhell of the egg, though ſolid, is thin and tranſparent; and in proportion as the caterpillar grows within the egg, the colours change, and are diſtributed differently. The butterfly ſeems very well inſtructed by nature in its choice of the plant, or the leaf, where it ſhall depoſit its burthen. Each egg contains but one caterpillar; and it is requiſite that this little animal, when excluded, ſhould be near its peculiar proviſion. All the eggs of butterflies are attached to the leaves of the favourite plant, by a ſort of ſize or glue; where they continue, unobſerved, unleſs carefully ſought after. The eggs are ſometimes placed round the tender ſhoots of plants, in the form of bracelets,

conſiſting of above two hundred in each, and generally ſurrounding the ſhoot, like a ring upon a finger. Some butterflies ſecure their eggs from the injuries of air, by covering them with hair, plucked from thier own bodies, as birds ſometimes are ſeen to make their neſts; ſo that their eggs are thus kept warm, and alſo entirely concealed.

Some of the caterpillar kind in particular, that ſeem fitted only to live upon leaves and plants, will, however, eat each other; and the ſtrongeſt will devour the weak, in preference to their vegetable food. That which lives upon the oak, is found to ſeize any of its companions, which it conveniently can, by the firſt rings, and inflict a deadly wound: it then feaſts in tranquillity on its prey, and leaves nothing of the animal but the huſk.

In order to give our Young Readers as clear an idea of Inſects, in their Worm and Caterpillar ſtate, as the limits of our plan will allow, we have ſelected the following ſubjects, as the moſt beautiful and curious we could find, in Dr. Liſter's Latin Treatiſe, and others, on this part of Animal Nature, in the Vermicular or Worm part of their being, &c.



SERICARIA.—The SILKWORM.

WITHOUT entering into the deſcription of a Naturaliſt of this Worm, we ſhall confine ourſelves to that which we think will be more uſeful, pleaſing, and intereſting. It being more an object of univerſal ſervice, than of ſingular beauty, induces us to prefer

giving an account of its utility, than any elaborate account of its figure, or colour.

Where theſe Worms are bred, they no ſooner leave the eggs than they are ſed with Mulberry-leaves, with which they are ſupplied every morning, when the old leaves are carefully removed. This Inſect, when firſt produced, is extremely ſmall, and entirely black. In a few days it aſſumes a new habit; which is white, tinged with the colour of its food. And before it goes into its Chryſalis ſtate, it aſſumes two other dreſſes. At this time, it appears diſguſted with the world, and voluntarily retires to its ſolitary grave, which is moſt admirably formed with its thread. How wonderful muſt be the ſtructure of its body, to furniſh ſuch a thread; and how aſtoniſhing the inſtinct which teaches it to make, of this ſelf-produced material, its own tomb! And how muſt it diminiſh the pride of Man, to conſider that he is indebted, for his moſt gaudy array, to a ſubſtance, of which a Worm forms its ſepulchre! Reflect on this, ye Potentates of the Earth! and acknowledge, with humble gratitude, your debt to the Silkworm; and diveſt yourſelves of the vain arrogance you aſſume, when arrayed in the robes of majeſty!

When

When the Chryſalis ſtate begins, the Inſect proceeds to ſpin its ſilk, in which it is buried. Like the pierced iron plates of a wire-drawer, this Worm produces the thread through a pair of holes in an inſtrument placed under its mouth. Two drops of gum ſerve it as diſtaffs, ſupplying the ſubſtance of which ſhe ſpins the thread; for the gum is no ſooner in the air, than it loſes its fluidity, and changes to the ſilk, in the due ſize of which the Worm is never deceived. She always proportions the thread to the weight of her body. The cone of ſilk being formed, and opened, is found to conſiſt of the Worm, changed to a Nymph, and buried in its centre, a down or flue, which is the bad part of the ſilk, and the perfect part, all ranged with great compactneſs and propriety. It may be a matter of wonder how ſo ſmall a Moth as this little Worm muſt neceſſarily produce, ſhould be able to burſt the million-fold barriers of her place of regeneration.

The ſame Omniſcent Being who taught it how to erect this place of reſt, taught it, at the ſame time, to find an eaſy acceſs to her aërial exiſtence. The new Animal, with its horns, head, and feet, directs its

efforts to that end of the cone it has left purpoſely light enough to admit its paſſage to another world of enjoyment.

Of breeding Silk-Worms.

There are two methods of breeding ſilkworms; for they may be left to grow, and remain at liberty upon the trees where they are hatched; or they may be kept in a place built for that purpoſe, and fed every day with freſh leaves. The firſt method is uſed in China, Tonquin, and other hot countries; but to breed them in Europe, they muſt be ſheltered and protected from every external injury. For this purpoſe, a room is choſen, with a ſouth aſpect; and the windows are ſo well glazed, as not to admit the leaſt air; the walls are well built, and the planks of the floor exceeding cloſe, ſo as to admit neither birds nor mice, nor even ſo much as an inſect. In the middle there ſhould be four pillars erected, or four wooden poſts, ſo placed as to form a pretty large ſquare. Between theſe are different ſtories made with ozier hurdles; and under each hurdle there ſhould be a floor, with an upright border all round. Theſe hurdles and floors muſt hang upon pulleys, ſo as to be placed, or taken down at pleaſure.

When

When the worms are hatched, ſome tender mulberry leaves are provided, and placed in the cloth or paper box in which the eggs were laid, and which are large enough to hold a great number. When they have acquired ſome ſtrength, they muſt be diſtributed on beds of mulberry leaves, in the different ſtories of the ſquare in the middle of the room, round which a perſon may freely paſs on every ſide. They will fix themſelves to the leaves, and afterwards to the ſticks of the hurdles, when the leaves are devoured. They have then a thread, by which they can ſuſpend themſelves on occaſion, to prevent any ſhock by a fall. Care muſt be taken that freſh leaves be brought every morning, which muſt be ſtrewed very gently and equally over them; upon which the ſilkworms will forſake the remainder of the old leaves, which muſt be carefully taken away, and every thing kept very clean; for nothing hurts theſe inſects ſo much as moiſture and uncleanlineſs. For this reaſon, the leaves muſt be gathered when the weather is dry, and kept in a dry place, if it be neceſſary to lay in a ſtore. As theſe animals have but a ſhort time to live, they make uſe of every moment, and almoſt continually are ſpinning, except at

thoſe intervals when they change their ſkins. If mulberry leaves be difficult to be obtained, the leaves of lettuce or holy-oak will ſuſtain them: but they do not thrive ſo well upon their new diet; and their ſilk will neither be ſo copious, nor of ſo good a quality.

Though the judicious choice, and careful management of their diet, is abſolutely neceſſary, yet there is another precaution of equal importance, which is, to give them air, and open their chamber windows, at ſuch times as the ſun ſhines warmeſt.

After ſome days it leaves off eating, and ſeems to ſleep for two days together: then it begins to ſtir, and puts itſelf into violent motions, till the ſkin falls off the ſecond time, and is thrown aſide by the animal's feet. All theſe changes are made in three weeks or a month's time; after which it begins to feed once more, ſtill in its caterpillar form, but a good deal differing from itſelf before its change. In a few days time it ſeems to ſleep again; and, when it awakes, it again changes its clothing, and continues feeding as before. When it has thus taken a ſufficiency of food, and its parts are diſpoſed

diſpoſed for aſſuming the aurelia form, the animal forſakes, for the laſt time, all food and ſociety, and prepares itſelf a retreat to defend it from external injuries, while it is ſeemingly deprived of life and motion.

This retreat is no other than its cone, or ball of ſilk, which Nature has taught it to compoſe with great art; and within which it buries itſelf, till it aſſumes its winged form. This cone or ball is ſpun from two little longiſh kinds of bags that lie above the inteſtines, and are filled with a gummy fluid, of a marigold colour. This is the ſubſtance of which the threads are formed; and the little animal is furniſhed with a ſurpriſing apparatus for ſpinning it to the degree of fineneſs which its occaſions may require. This inſtrument in ſome meaſure reſembles a wire-drawer's machine, in which gold or ſilver threads are drawn to any degree of minuteneſs; and through this the animal draws its thread with great aſſiduity. As every thread proceeds from two gum bags, it is probable that each ſupplies its own; which, however, are united, as they proceed from the animal's body. If we examine the thread with a microſcope, it will be found that it is flatted on each ſide, and grooved

along

along its length: whence we may infer, that it is doubled juſt upon leaving the body; and that the two threads ſtick to each other by that gummy quality of which they are poſſeſſed. Previous to ſpinning its web, the ſilkworm ſeeks out ſome convenient place to erect its cell, without any obſtruction. When it has found a leaf, or a chink fitted to its purpoſe, it begins to wreathe its head in every direction, and faſtens its thread on every ſide to the ſides of its retreat. Though all its firſt eſſays ſeem perfectly confuſed, yet they are not altogether without deſign; there appears indeed, no order or contrivance in the diſpoſal of its firſt threads; they are by no means laid artfully over each other, but are thrown out at random, to ſerve as an external ſhelter againſt rain; for nature having appointed the animal to work upon trees in the open air, its habits remain, though it is brought up in a warm apartment.

It is generally a fortnight or three weeks before the aurelia is changed into a moth; but no ſooner is the winged inſect completely formed, than having diveſted itſelf of its aurelia ſkin, it prepares to burſt through its

its cone, or outward priſon: for this purpoſe it extends its head towards the point of the cone, butts with its eyes, which are rough, againſt the lining of its cell, wears it away, and at laſt puſhes forward, through a paſſage which is ſmall at firſt, but which enlarges as the animal encreaſes its efforts for liberty.

The animal, when thus ſet free from its double confinement, appears exhauſted with fatigue, and ſeems produced for no other purpoſe but to tranſmit a future brood. It neither flies nor eats; there are few, however, of theſe animals ſuffered to come to a ſtate of maturity; for as their burſting through the cone deſtroys the ſilk, the manufacturers take care to kill the aurelia, by expoſing it to the ſun, before the moth comes to perfection. This done, they take off the floſs, and throw the cones into warm water, ſtirring them till the firſt thread offers them a clue for winding all off. They generally take eight of the ſilken threads together; the cones ſtill kept under water, till a proper quantity of the ſilk is wound off: however, they do not take all; for the latter parts grow weak, and are of a bad colour. As to the paper-like ſubſtance

which

which remains, ſome ſtain it with a variety of colours, to make artificial flowers; others let it lie in the water, till the glutinous matter which cements it is all diſſolved: it is then carded like wool, ſpun with a wheel, and converted into ſilk ſtnffs of an inferior kind.

By calculation, one of theſe Worms will produce between nine hundred and a thouſand feet of ſilk at one ſpinning: and ſo thin and light is its texture, that the whole weighs no more than 2 $\frac{1}{2}$ grains. And as they were particularly formed to furniſh Mankind with a ſubſtance for dreſs, that might render us more agreeable to each other, and thus enhance the few pleaſures of our exiſtence, Nature has cauſed one Fly to lay as many as 500 eggs. How grateful, then, ought we to be to the Creator who thus forms, yearly, ſuch an infinity of theſe manufacturers of the moſt agreeable and beautiful ſubſtance the world affords, for our uſe and embelliſhment!

PHALÆNA

PHALÆNA PAVONIA.—EMPEROR MOTH.

Lepidoptera.

Insects of the Lepidoptera Order are divided into three genera, *Papilio*, *Sphinx*, and *Phalæna*, Butterflies, Hawk Moths, and Moths.

Generic Character. The antennæ ſetaceous, decreaſing in ſize from the baſe to the apex. The wings, when at reſt, are generally deflected. They fly in the night.

Specific

SPECIFIC CHARACTER. Antennæ feathered. No trunk. Wings expanded, horizontal, rounded, entire, with a large eye in the centre of each; the firſt red-brown waved; the ſecond orange. The antennæ of the male are broader, and the wings of the female larger, waved with black and white, and bordered with yellow. Caterpillar green or yellow, ſpinous, on thorns and brambles. Length of the moth one inch.

ALBIN has given a figure of the male and female Emperor Moth, and deſcribes a male to have changed to the aurelia ſtate as above repreſented July 16, and March 18 following to have produced the Fly. But the time of their appearance depends on the proportion of heat and cold; what the author mentions was preſerved from the ſeverity of the winter, in a warm room; the uſual time to find them in the caterpillar ſtate is Auguſt, and in April the fly.

The ſingular proviſion which nature makes for the protection of this Fly deſerves particular notice; when the time of its continuation in the caterpillar ſtate is expired, like all others, it refuſes to eat; it then, by much labour, forms a kind of bag or purſe, of a very tough ſubſtance; this it fixes againſt the trunks of trees, &c.

&c. by a number of hairs or filaments, which remain on the external ſurface. It lines the outer caſe by one of a finer texture, the top of which is cloſed by ſeveral briſtles that unite in the centre, exactly repreſenting a cap, and excludes almoſt the poſſibility of its receiving an injury during this defenceleſs ſtate. In this bag it paſſes to the aurelia, and remains until the birth of the perfect inſect.—Our figure repreſents the chryſalis or aurelia as in the bag.

Were we to unite the ſeveral accounts of authors reſpecting its food it would appear a general feeder; it will however live on the roſe, the elm, and the willow; and on thorns and brambles particularly.

PHALÆNA

PHALÆNA BUCEPHALA,—BUFF-TIP MOTH.

LEPIDOPTERA.

GENERIC CHARACTER. ANTENNÆ taper from the baſe to the apex, and are ſetaceous. Wings in general deflected when at reſt. Fly by night. No Trunk. Wings reverſed, firſt Wings horizontal and ſecond erect.

Specific Character. Antennæ feathered. First Wings grey, with two double tranſverſe brown waves, and a large yellowiſh brown ſpot at the extreme angle. Second Wings plain, light yellow, length ſcarce one inch. Caterpillar hairy, yellow with black ſpots. Feeds on Oaks, Aſh, &c.

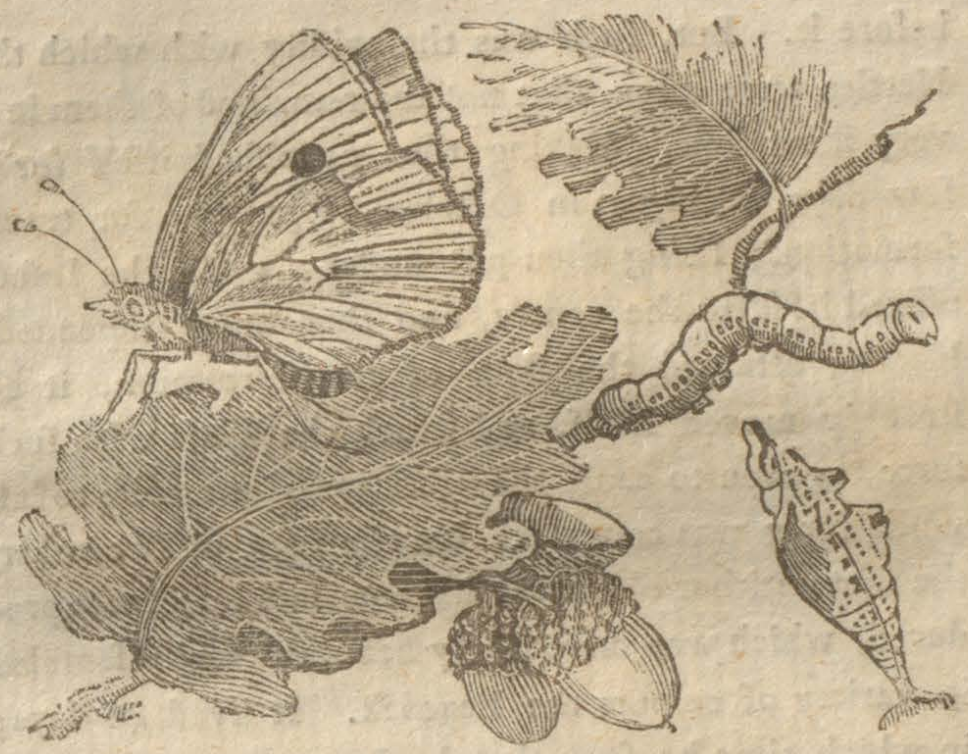
The delicate aſſemblage of beautiful down which cloath the upper wings of the Buff-tip Moth is its chief recommendation; the hiſtory affords but little for obſervation, it is hatched from the egg in Auguſt, and in June following the fly is perfect.

Whilſt happy in its apparent ſecurity, ranging the plain to experience the pleaſures of liberty, to banquet in the nectareous profuſion of the vegetable kingdom, or catch the dew-drop from the humid air, to inſpirit and refreſh his parched ſyſtem from the mid-day heat, he becomes an unreſiſting victim to the feathered tribe.

THE AMERICAN EMPEROR.

THE ingenious Mr. Liſter ſays that, after he had ſupplied this Caterpillar with various kinds of herbs, which it was tired of eating, he has placed before it ſome Nettles; ſuppoſing it might be pleaſed with a different kind of food. He ſaw, with great admiration, that the Inſect became ſo joyous as to ſeem, by its motion, to congratulate itſelf on ſuch a repaſt being ſet before

before it. But, ſuch was the avidity with which the Nettles were eaten, that not any remained of them in a very ſhort time. Having thus nouriſhed itſelf for a few days, it began in October to prepare for tranſformation. Being then put under a glaſs, the Inſect affixed itſelf to the centre, and thus hung ſuſpended. Having attained the ſtate of transformation, it ſo ſtrongly moved itſelf, and ſtruck the glaſs with ſuch force, as even to cauſe the vibration of the noiſe to laſt while forty was counted. On the 12th of December, the ſame Author obſerves, that a perfect Inſect was produced, which was exceedingly beautiful, and reſembled in variety of colours the Peacock. It lived 40 days; in which time he ſays that he knew not any food on which it ſubſiſted.



THE MEADOW BUTTERFLY.

WHEN the Coleworts and Cauliflowers begin to heart, the perfect Inſect of this Caterpillar is chiefly found depoſiting her eggs upon the leaves. The heat of the ſun ſoon vivifies the eggs, and brings forth the ſaid Caterpillars, which immediately begin to conſume the vegetables above mentioned. They bear the heat of the ſun very eaſily: but they cannot endure long rains,

rains, and frequent ſhowers; for in ſuch weather they waſte ſo faſt as, in a very ſhort time, to have no more remaining of their being, but the ſkin. This Worm begins to purge itſelf, and prepare for its transformation, about the 3d of Auguſt; and on the 17th of the ſame month the Butterfly is produced. This perfect Inſect is very inactive, and ſlow in its motion. It however generally exiſts during the winter; and ſometimes it has been found alive when the ſpring has been far advanced.

THE

THE MAGPYE OR CURRANT MOTH.

THIS kind of Inſect is of all the moſt difficult to be obtained. Liſter ſought in vain, a conſiderable time, to find in what place and manner it depoſited the eggs. After many trials and enquiries, he placed one upon a leaf, which he had no ſooner done, than it began to cover itſelf with a woolly ſubſtance, ſeemingly as a preſervation

preſervation againſt wet or cold. The leaf being in a little time opened, he found a green ſeed: and he found that the Inſect fed on gooſe-berry leaves, or curling vines; and alſo the leaves of white, black, and red currants. It began about the end of June to prepare for its ſtate of transformation, in which it remained until the 13th of July, when a Butterfly, ſpotted with black and white, ſprung forth, to enjoy its new ſtate of perfect being. When touched, or ſuffered to fall, it remained ſo motionleſs as to appear entirely dead.

The NUT-TREE MOTH.

THIS Worm, or Caterpillar, delights in Roſe-leaves; but they are not ſo ravenous as others; for they have long intervals between their meals. They ſeldom change their leaf until it is entirely conſumed. Their colour is very elegant. The upper part of the body is of a beautiful yellow. But they are not ſo beautiful after

after as before feeding; for their ſkin is ſo thin as to be tinged by the colour of whatever food they eat. Before it diſpoſes itſelf for transformation, the body aſſumes a red colour. This Inſect was found to commence its Aurelia ſtate about the beginning of June; and on the 5th of December a perfect Inſect was brought forth, as above delineated.

THE TIGER MOTH.

THESE Caterpillars feed on the leaves of red Roſes, and red Gooſeberry-buſhes. Some have their feet in the middle of their body, and others at the extremities. When they change place from one ſituation to another, they aſcend by attaching themſelves to the bough with their feet, by which they raiſe the body like a ſerpent, and,

and, thus, gain their desired situation. They hold themselves so fast by their feet, that they can scarcely be taken from the part to which they adhere. They prepare for transformation by cleaning their bodies; which being done, they commence their Chrysalis state about the 1st of April, and on the 24th of July the perfect Insect is produced.

The name of this Caterpillar, in Greek, is

PHOBERAN.

THIS Caterpillar is found near a village called Groed, in Flanders. It is generally ſeen ſitting on a branch of Willow, in the form we have deſcribed it. It feeds on the leaves of the ſame tree. It eats very leiſurely, and, when ſatisfied, it forms itſelf as we have repreſented.

The

The hinder part of the body reſembles the beard, face, and head of a Goat. When you take it, it ſtrikes as if in the greateſt anger. It has two hooks on the back, with which it guards and preſerves itſelf from the attacks of other creatures. It is therefore called by Liſter, the Phoberan. When it eats, the head appears tied to the body, with a ſlight thread, or filament, not unlike the joining of the head and body of a Spider.

On the 1ſt of September, it reſigns itſelf to its approaching transformation. Twenty-two days after, appears a beautiful Butterfly, diſtinguiſhed for its beauty and variety of colours. Before the perfect Inſect, it depoſits its eggs, which are coloured with different green hues.

THE FIRST ORDER.

Insects with Crustaceous Elytra covering the Wings.

SCARABÆUS.—The Beetle.

ALL Insects having wings covered with the elytra, or cases of the wings, were usually called in Latin, Scarabæus; until Linnæus discriminated them, and confined the term to particular Beetles, distinguished by the horns on their head, and thorax or breast.

Of the Beetle there are various kinds; all, however, concurring in one common formation of having cases to their wings, which are the more necessary to those insects, as they often live under the surface of the earth, in holes which they dig out by their own industry. These cases prevent the various injuries their real wings might

might ſuſtain, by rubbing or cruſhing againſt the ſides of their abode. Theſe, though they do not aſſiſt flight, yet keep the internal wings clean and even, and produce a loud buzzing noiſe, when the animal riſes in the air.

If we examine the formation of all animals of the beetle kind, we ſhall find, as in the ſhell-fiſh, that their bones are placed externally, and their muſcles within. Theſe muſcles are formed very much like thoſe of quadrupedes, and are endued with ſuch ſurprizing ſtrength, that, bulk for bulk, they are a thouſand times ſtronger than thoſe of a man. The ſtrength of theſe muſcles is of uſe in digging the animal's ſubterraneous abode, where it is moſt uſually hatched, and to which it moſt frequently returns, even after it becomes a winged inſect, capable of flying.

Beſide the difference which reſults from the ſhape and colour of theſe animals, the ſize alſo makes a conſiderable one; ſome beetles being not larger than the head of a pin, while others, ſuch as the elephant beetle, are as big as one's fiſt: But the greateſt difference among them is, that ſome are produced in a month, and in a ſingle ſeaſon go through all the ſtages of their exiſtence, while others take near four years to their production; and live as winged inſects a year more.

THE STAG, AND GOLDEN BEETLE.

LUCANUS.—The STAG BEETLE.

THE Stag Beetle is the largeſt, and moſt ſingular in its ſhape, of any in this country. It is known by two maxillæ, projecting from its head, and reſembling the horns of a Stag. Theſe maxillæ are furniſhed with teeth, from their root to their point. The elytra have neither ſtreaks or ſpots. The whole Inſect is of a deep brown. It is ſometimes found in oaks, near London, where it is much ſmaller than thoſe of the ſame ſpecies found in woody countries. As their horns pinch ſeverely, they are carefully to be avoided. The greateſt beauty they poſſeſs is their maxillæ, or jaws, ſometimes appearing like coral.

The Lucani feed on the oozings from Oaks, where the females depoſit their eggs. The larvæ, or grubs, lodge under the bark, or in the hollow of old trees; which they bite, and reduce to fine powder. Here they tranſform themſelves into Chryſalis. Theſe Inſects are moſtly found in Kent and Suſſex.

The uſe of their porrected maxillæ, or jaws, is to looſen the bark, to which they affix themſelves, while they ſuck the juices oozing from the tree.

SCARABÆUS AURATUS.
THE GOLDEN BEETLE.

(See the ſmaller Inſect, page 42.)

THE larva, or grub, of this Inſect, injures the roots of trees and plants. The Beetle is found upon flowers, and particularly upon the Roſe and Piony. The whole is a burniſhed green, and tinged with red, ſo as to reſemble the fineſt poliſhed copper. The elytra are adorned with a few tranſverſal ſpots, which add to the other embelliſhments of its brilliant colouring. Such is its amazing ſplendor, that it rivals the emerald, and is, therefore, admired as the moſt beautiful Inſect produced in England.

THE ELEPHANT BEETLE.

THE Elephant Beetle is the largeſt of this kind hitherto known, and is found in South America, particularly Guiana and Surinam, as well as about the river Oroonoko. It is of a black colour, and the whole body is covered with a very hard ſhell, full as thick and as ſtrong, as that of a ſmall crab. Its length, from the hinder part of the eyes, is almoſt four inches, and from the ſame part to the end of the proboſcis, or trunk, four inches and three quarters. The tranſverſe diameter of the body is two inches and a quarter, and the breadth

of each elytron, or caſe for the wings, is an inch and three tenths. The antennæ, or feelers, are quite horny; for which reaſon the proboſcis, or trunk, is moveable at its inſertion into the head, and ſeems to ſupply the place of feelers. The horns are eight tenths of an inch long, and terminate in points. The proboſcis is an inch and a quarter long, and turns upwards, making a crooked line, terminating in two horns, each of which is near a quarter of an inch long; but they are not perforated at the end like the proboſcis of other inſects. About four tenths of an inch above the head, or that ſide next the body, is a prominence, or ſmall horn, which, if the reſt of the trunk were away, would cauſe this part to reſemble the horn of a Rhinoceros. There is indeed a beetle ſo called, but then the horns or trunk has no fork at the end, though the lower horn reſembles this. The feet are all forked at the end, but not like lobſter's claws.

DERMESTIDES.

Characteriſtics.

THE antennæ, or horns, end in a head of an oval form; the thorax, or breaſt, is of a convex form; and the head is ſo bent as to lie almoſt concealed under the thorax.

DERMESTIS VIOLACEUS.

THE VIOLET BEETLE.

THIS Inſect is exceedingly beautiful, and is much ſmaller than, though nearly reſembling, the Stag Beetle. The elytra are of a deep violet; the thorax, or breaſt, is covered with green hairs, and the legs are black. The whole creature, glittering with its brilliancy, charms its obſerver. The larva and the perfect inſect being found in dead bodies, evince that the Creator has power to produce the moſt beautiful effects from the moſt diſagreeable of mediums. How different is this from human ability! With the choiceſt of Nature's productions, combined to almoſt infinity, Man is not able

to imitate the ſplendor of this Inſect, which is produced by the Almighty from a dead and putrid body.

BYRRHUS SCROPHULARIUS.
The NETTLE BEETLE.

THIS Inſect is found moſtly in flowers. Its oval body is black, except where the under part of the abdomen appears white, from the multitude of minute ſcales with which this part is covered. The elytra not only incloſe the wings, but the ſides and under part of the body. Theſe elytra are black, with white and red ſcales, reſembling embroidery. This ſpecies is found in gardens. If rubbed, the ſmall ſcales fall, and cauſe the Inſect to appear entirely black.

THE MAY-BUG, or DOREE BEETLE.

THE May-Bug, or Doree-Beetle, has, like all the reſt, a pair of caſes to its wings, which are of a reddiſh-brown colour, ſprinkled with a whitiſh duſt, which eaſily comes off.

In about three months after the eggs have been depoſited in the earth, the Inſect begins to break its ſhell, and a ſmall grub or maggot crawls forth, and feeds upon the roots of whatever vegetable it happens to be neareſt. All ſubſtances, of this kind, ſeem equally grateful, yet it is probable the mother Inſect has a

choice

choice among what kind of vegetables ſhe ſhall depoſit her young. In this manner, theſe voracious creatures continue in the worm ſtate, for more than three years, devouring the roots of every plant they approach, and making their way under ground, in queſt of food, with great diſpatch and facility. At length they grow to above the ſize of a walnut, being a great thick white maggot, as delineated in page 49, with a red head, which is ſeen moſt frequently in new turned earth, and which is ſo eagerly ſought after by birds of every ſpecies.

When largeſt, they are found an inch and an half long, of a whitiſh yellow colour, with a body conſiſting of twelve ſegments or joints, on each ſide of which there are nine breathing holes, and three red feet. The head is large, in proportion to the body, of a reddiſh colour, with a pincer before, and a ſemi-circular lip, with which it cuts the roots of plants, and ſucks out their moiſture. As this Inſect lives entirely under ground, it has no occaſion for eyes, and accordingly it is found to have none; but is furniſhed with two feelers, which, like the crutch of a blind man, ſerve to direct its motions. Such is the form of this animal, that lives for years in the worm ſtate under ground, ſtill voracious, and every year changing its ſkin.

It

It is not till the end of the fourth year, that this extraordinary Inſect prepares to emerge from its ſubterraneous abode, and even this is not effected, but by a tedious preparation.

About the latter end of autumn, the grub begins to perceive the approach of its transformation, it then buries itſelf deeper and deeper in the earth, ſometimes ſix feet beneath the ſurface, and there forms itſelf a capacious apartment, the walls of which it renders very ſmooth and ſhining, by the excretions of its body. Its abode being thus formed, it begins ſoon after to ſhorten itſelf, to ſwell, and to burſt its laſt ſkin, in order to aſſume the form of a chryſalis. This, in the beginning, appears of a yellowiſh colour, which heightens by degrees, till at laſt it is nearly red. Its exterior form plainly diſcovers all the veſtiges of the future winged Inſect, all the fore parts being diſtinctly ſeen; while behind, the animal ſeems as if wrapped in ſwaddling clothes.

The young May-Bug continues in this ſtate for about three months longer, and it is not till the beginning of January, that the aurelia diveſts itſelf of all its impediments, and becomes a winged Inſect, completely formed. Yet ſtill the animal is far from attaining its

natural

natural ſtrength, health, and appetite. It undergoes a kind of infant imbecility, and, unlike moſt other Inſects, that the inſtant they become flies, are arrived at their ſtate of full perfection, the May-Bug continues feeble and ſickly.

Its colour is much brighter than in the perfect animal, all parts are ſoft, and its voracious nature ſeems, for a while, to have entirely forſaken it.

About the latter end of May, theſe Inſects, after having lived for four years under ground, burſt from the earth, when the firſt mild evening invites them abroad. They are at that time ſeen riſing from their long impriſonment, from living long only upon roots, and imbibing only the moiſture of the earth, to viſit the mildneſs of the ſummer air, to chooſe the ſweeteſt vegetables for their banquet, and to drink the dew of the evening. Theſe voracious little cannibals, are in ſome ſeaſons ſo numerous in many parts of this country, and ſo deſtructive to the vegetable productions, that premiums are allowed for gathering them; which the poor country people do in moſt incredible quantities.

Of all the beetle kind, this is the moſt numerous, and therefore deſerves the chief attention of hiſtory. Like them, all other beetles are bred from the egg, which

is

is depoſited in the ground, or ſometimes, though ſeldom, in the barks of trees; they change into a worm; they ſubſiſt in that ſtate by living upon the roots of vegetables, or the ſucculent parts of the bark round them.

It will be endleſs to give a deſcription of all, and yet it would be an unpardonable omiſſion not to mention the particularities of ſome beetles, which are ſingular either from their ſize, their manners, or their formation.

That beetle which the Americans call Tumble-Dung, particularly demands our attention; it is all over of a duſky black, rounder than thoſe animals are generally found to be, and ſo ſtrong, though not much larger than the common black beetle, that if one of them be put under a braſs candleſtick, it will cauſe it to move backwards and forwards, as if it were by an inviſible hand, to the admiration of thoſe who are not accuſtomed to the ſight; but this ſtrength is given it for much more uſeful purpoſes than thoſe of exciting human curioſity, for there is no creature more laborious, either in ſeeking ſubſiſtence, or in providing a proper retreat for its young. They are endowed with ſagacity to diſcover ſubſiſtence by their excellent ſmelling, which di-

rects

rects them in flights to excrements juſt fallen from man or beaſt, on which they inſtantly drop, and fall unanimouſly to work in forming round balls or pellets thereof, in the middle of which they lay an egg. Theſe pellets, in September, they convey three feet deep in in the earth, where they lie till the approach of ſpring, when the eggs are hatched, the neſts burſt, and the inſects find their way out of the earth. They aſſiſt each other with indefatigable induſtry, in rolling theſe globular pellets to the place where they are to be buried. This they are to perform with the tail foremoſt, by raiſing up their hinder part, and ſhoving along the ball with their hind feet. They are always accompanied with other beetles of a larger ſize, and of a more elegant ſtructure and colour. The breaſt of this is covered with a ſhield of crimſon colour, and ſhining like metal; the head is of the like colour, mixed with green, and on the crown of the head ſtands a ſhining black horn, bended backwards. Theſe are called the *kings of the beetles*, but for what reaſon is uncertain, ſince they partake of the ſame dirty drudgery with the reſt.

The

The larger Capricorn green BEETLE.

THE larger Capricorn green Beetle, with the ſcent of muſk is a very large beautiful inſect, all over of a gloſſy, lovely, blue-green colour, with a caſt of a ſhining golden yellow. The body is blue on the upper part, and the wings under the caſe are black. The legs are of the ſame bluiſh green colour, only ſomewhat paler, and the breaſt is pointed at each extremity. Between theſe points there are three little tubercles near the wings,

wings, and three ſmaller towards the head. The caſes of the wings are oblong, and ſomewhat in the ſhape of a lance, with three ribs a little raiſed and running longways. The feelers are nearly as long as the body, and are compoſed of many ſmall joints, which grow ſmaller near the ends. It is ſometimes found among old willow-trees, and has a ſort of muſky ſmell.

THE *Ruſſian Capricorn* BEETLE, *with very long horns*, is about three quarters of an inch long, and is all over grey. The caſes of the wings are blunt, and furniſhed with many ſmall hairs; and among them there are ſeveral ſmall tubercles. A duſky blackiſh ſhade runs acroſs the wings, which at the hinder part bends towards the middle. The breaſt is pointed at each end, and has four beautiful yellow ſpots towards its hinder part. The eyes are black, and there is a black ſpot near the feelers, which are five times as long as the body. They are grey, and conſiſt of ten joints, which are ſhorter the nearer they are to the head; but the wings are black, ſtreaked with brown. The female has

an

an elongation at the vent, which renders the body one third of the length of the feelers. It is found among old wood, but is not very common with us.

THE *black Capricorn* BEETLE, *with a hairy grey breaſt*, has an oblong and ſomewhat depreſſed body, of a deep black, with a little mixture of grey. It is covered with many ſhort hairs with prominent tubercles between them; but all the breaſt is hairy and black, though the hairs are white, which give it a greyiſh appearance; only on its hinder part there are two ſmooth prominent ſpots. The feelers are ſlender and black, and about half the length of the body, and there is an undulated line on the caſe of the wings, but ſo faint, that it is ſcarely viſible. It is found among timber, but is not very common with us.

COCCINELLA.

THIS Genus, of which we have given five ſpecimens, *a*, *b*, *c*, *d*, *e*, comprehends thoſe ſmall Beetles which have red and yellow grounds, ſpotted with black; and are known even by children, who call them Lady-Birds.

Of

Of the different Larvæ of the Coccinella, the moſt curious is that which, from its tufts of hair, and ſingularity of figure, Mr. Reaumur calls the White Hedge-Hog. It feeds on the leaves of trees; and having exiſted a fortnight in its Vermicular ſtate, it turns to a Chryſalis, without diveſting itſelf of its fur; and, three weeks after, it takes flight from its tomb as a perfect Coccinella. When firſt produced, the colours of the elytra are nearly white; but, in a little time, they change to that lively brilliancy for which they are ſo juſtly admired. Their eggs are oblong, and of an amber colour. This beautiful little Inſect is frequently found on Thiſtles.

BROOKS deſcribes the COCCINELLA as follows:

"THE LADY-COW, *with reddiſh caſes for their wings, and ſeven black ſpots thereon*, is an inſect well known even to children, and has a black head with two white ſpots on the forehead, and a black breaſt, which is whitiſh near the edges. The caſes of the wings are of an orange colour; there are three black ſpots towards the baſe of each, and one that is common to both, which with the former makes ſeven in all. The feelers

are

are very ſmall and clavated; and the under part of this inſect is black.

"THE LADY-COW, *with red caſes for the wings, and two black ſpots thereon*, that is one on each, has its breaſt black, only there is one large white ſpot on its ſide, and two very ſmall ones near the baſe; as alſo two others of the ſame ſize at the inſertions of the feelers. The belly and legs are black, as are the feelers likewiſe; and it is common to be met with on alder and other trees, as the former is among hedges in the ſummer time.

"The LADY-COW, *with black caſes for the wings, with four red ſpots thereon*, that is two on each caſe, has its breaſt entirely black, and the ſpot on the caſes of the wings are of a blood-red colour; but that which is neareſt the breaſt on each is largeſt. They are met with on maple trees in the North parts of England, and are ſometimes ſeen, though but ſeldom, in the hedges near London."

GENUS

CHRYSOMELA.

Character.

THE Chryſomelæ have their antennæ, or feelers, ſhaped like bead-necklaces. This Genus contains a great variety of beautiful Inſects, differing in ſize, colour, and abode. They are found almoſt every where, in Woods, Gardens, &c. When caught, they emit a diſagreeable-ſmelling liquor.

CHRY-

CHRYSOMELA GRAMINIS.

The GRASS CHRYSOMELA.

(*b*)

THIS beautiful Inſect, like moſt of the Genus, has an oval and very convex form. The colour is a fine gloſſy green, ſomewhat tinged with blue; which affords a moſt charming reflect. The eyes are yellow, and the thorax and elytra are ſpotted. It is found in the meadows, in May and June, upon Water-Betony, Dead-Nettle, Mint and other labiated plants. By ſome it is called the Blue-Green Chryſomela.

The glittering colours with which ſeveral ſpecies of this Genus are embelliſhed, diſplaying the ſplendor of gold and copper, have conferred on them the pompous name of Chryſomela. The Larvæ prey upon the ſubſtances of leaves, without touching the fibres. The leaping Chryſomelæ infeſt the tender leaves of plants; which ſhould be carefully guarded from their depredations.

GENUS XII.

THE antennæ grow gradually larger from each extremity to the middle, and are ſituated between the eyes. The breaſt, and wing caſes, are covered with protuberant ſpines.

HISPA ARTA.—THE BLACK HISPA.

THIS pretty, ſingular Inſect, of which we have not been able to obtain a correct figure, is of a deep poliſhed black. The upper part of his body is clothed entirely with long and ſtrong briſtles, like the ſhell of a cheſnut, or rather in the manner of a hedge-hog. The caſe of the horns has even a thorn at its end, to guard the Inſect from injury. The breaſt has a row ſet tranſverſely, which are forked. And the elytra, or wing-caſes, are covered with a great number that are ſingle. The points of all are firm and piercing. This Inſect was found by Barbut, in the month of July, at the root of ſome long graſs, in a field near Paddington. This Flying Hedge-Hog, if we may be allowed the term, is difficult to be taken. It bears its antennæ erect before it, as guardians of its progreſs through the aërial element.

CERAM-

CERAMBYX MOSCHATUS.

The NUTMEG CERAMBYX.

(*a*)

THE body of this Insect is entirely green, tinged with blue and gold colour, which renders it most delightfully resplendent. It is sometimes found composed entirely of blue and gold. The elytra are long, soft, and flexible, and finely shagreened. This beautiful creature is found upon the Willow, which it perfumes with an odour like that of a rose, so as to scent a whole meadow. Thus, we perceive, that Nature bestows on this insect this most grateful odour, to supply the want of those delightful scents of which meadows are deprived by the field flowers being shorn by the scythe of the mower; for it is observed, this charming Cerambyx is produced in its perfect state about the general time of making hay. What care does Providence take to accommodate man with a never-ceasing variety of delights, adapted to charm every sense!

LEP-

LEPTURA.

Character.

THEIR antennæ are ſetaceous or briſtly; the elytra diminiſh in breadth towards the extremity; and the thorax is round and ſlender.

LEPTURA ARCUATA.

The RAIN-BOW LEPTURA.

(*a*)

VARIES in reſpect to ſize, and is of a deep black ground, reſembling velvet. The antennæ are of a bright yellow, and nearly as long as the body. The elytra are adorned with high flame-coloured croſs bars, which are formed by a down of a moſt refulgent golden yellow. Viewed through the microſcope, it appears like velvet inlaid with topazes; and, when aſſiſted with

the

the ſolar rays, nothing can excel its infinity of ſplendor. This moſt wonderful Inſect for beauty is the poor tenant of a decayed tree, on which it may be frequently found, eſpecially on an Alder.

The Larvæ are found with thoſe of the preceding Genus, which they greatly reſemble in appearance and mode of exiſtence.

CASSIDA.—The SHIELD-BEETLE.

THIS Genus, which Barbut ranks under the ninth claſs, is thus named, from concealing its head under the margins of the thorax, as if it were defended with a helmet. Many of this ſpecies are found in foreign countries. Their Larvæ form for themſelves a kind of umbrella, which ſhelters them from the ſun and rain. Theſe Inſects inhabit Thiſtles and knotty plants. One ſpecies of them produces a Chryſalis, reſembling an armorial eſcutcheon. This brings forth that ſingular Caſſida, which is ſo diſtinguiſhed for its variegated beauties. Many are found upon the wild Elecampane, growing on the ſide of ponds.

LAM-

LAMPYRIS.

Character.

THESE Inſects are chiefly diſtinguiſhed by their emitting a light in the dark; and are, therefore, called Fire-Flies. The females are apterous, or without wings.

LAMPYRIS NOCTILUCA.

The GLOW-WORM.

CONTRARY to the general order of Nature, the male of this Inſect is leſs than the female. But the greateſt difference between the ſexes is, the male being covered with brown elytra, ſhagreened and marked with two lines longitudinally. The two laſt rings of the abdomen are not ſo bright as thoſe of the female, but they have four luminous points.

The Glow-worm, which is frequently ſeen in woods and meadows at night, in June, is the female of the figure we have given. The ſhining light it emits directs the male to his tender partner, which, not being able to fly, is thus moſt wonderfully provided by Providence with a ſelf-poſſeſſing ray, in the ſun's abſence, to ſhew its mate the ſpot where it is anxiouſly waiting its company. Thus are the banks and hedges adorned with their little illuminations, while the nightly traveller is charmed with their beauteous ſplendour.

Their

Their luminous power depends on a liquor placed at the lower extremity of the Inſect, which by ſuction renders it more ſhining, or by dilating or contracting itſelf withdraws or emits it at pleaſure. That the light is cauſed by a ſpecies of phoſphorus, is evident, from the animal, when cruſhed, leaving upon the hand a luminous matter, which continues its luſtre until it is dried.

The perfect Inſect flies in Autumn evenings, and frequents plantations of Juniper-trees.

The FIRE-FLY of the *Eaſt-Indies*.

(See the Inſect on the left, and at the bottom, of the laſt Cut.)

THIS Fly is about an inch long, and an inch broad. Their head is brown, and has two ſmall horns or feelers. They have four wings. On their backs, they have a black bag, containing a luminous ſubſtance, which is concealed by their wings, unleſs expanded during their flight. In rainy ſeaſons, they ſwarm among trees, and feed upon their bloſſoms. Of theſe flies there are

ſeveral ſpecies in the Eaſt-Indies. Being deſtined, ſeemingly, to roam by night, in order to avoid the exceſſive heat of the ſun by day in thoſe ſultry climates, how providentially has Nature accommodated them with a ſubſtance that renders their aërial courſe perceptible to each other! But when they alight, and ſwarm upon trees, their luminous ſubſtance, being no longer uſeful, is concealed and preſerved by their cloſed wings.

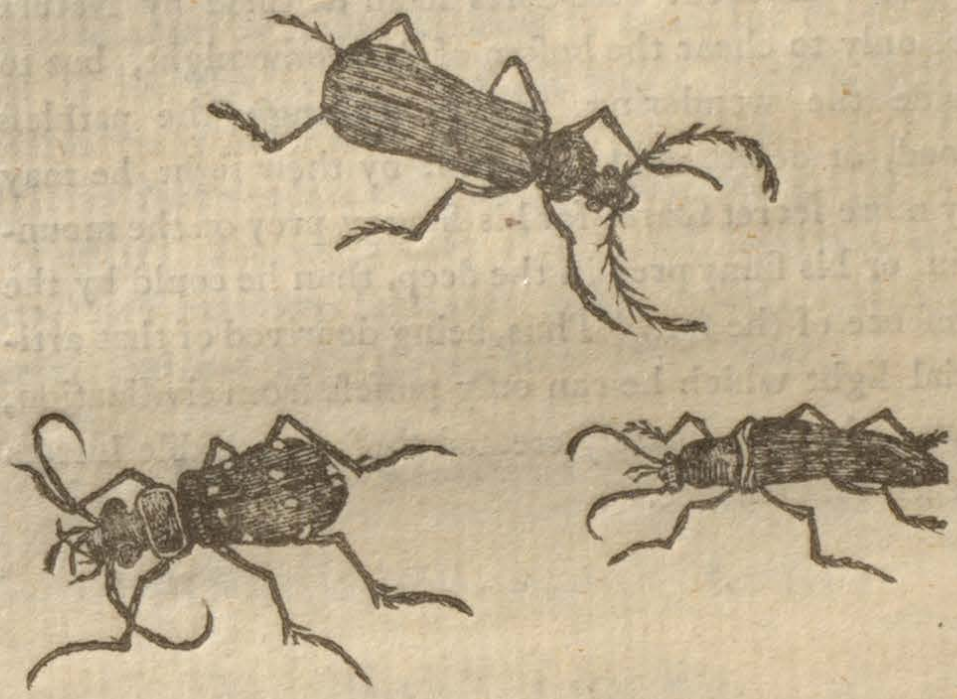
LAMPYRIS NOCTILUCA of *Martinico*.

The FIRE-FLY of *Martinico*.

THIS Fly, according to the Pere de Tertre, is leſs than the common Fly. They emit a ſparkling golden light, which is extremely agreeable. But the Inſect withdraws, and lets it ſhine at intervals, alternately, throughout the night. This effulgence is contained in a whitiſh ſubſtance, of which the Inſect is ſo full, as to make it appear through the crevices of its ſkin at its pleaſure.

Theſe

Theſe different Fire-Flies ſeem deſtined by Nature not only to chear the boſom of darkſome night, but to guide the wandering Savage through the pathleſs wood, or deſert wild. Indeed, by their light, he may lay more ſecret ſnares for his ſhaggy prey on the mountain, or his finny prey in the deep, than he could by the preſence of the ſun. Thus, being deprived of that artificial light which he can only poſſeſs from civilization, Nature has fortunately created theſe admirable Inſects for his convenience.



CANTHARIS.

Character.

THEIR horns or feelers are briſtly; their breaſt is margined; and their elytra, or wings-caſes, are flexible. They are commonly called Spaniſh Flies; but this is erroneous, as they are a diſtinct Genus from the Cantharides.

CAN-

CANTHARIS LIVIDA.

The LEAD-COLOURED CANTHARIS.

(See the Inſect on the top of the Cut.)

THIS Inſect varies in the colour of the elytra; but this difference only ariſes from the difference of ſex. Their horns are all black, except the articulations near the baſe, which are yellow. They have black eyes; and the head, in both ſexes, is a yellowiſh red. The wing-caſes are ſilky, flexible, and appear as if ſtrewed with ſilver-duſt, when viewed by a magnifying glaſs. The abdomen, or belly of this Fly, is black; except the laſt rings, which are yellow. It is found upon a flower.

CANTHARIS PECTINICOMIS.

THE COMB-HORNED CANTHARIS.

THE antennæ or feelers, of this Fly, are black, combed, and as long as the body. The breaſt and elytra are of a beautiful ſcarlet. It has black legs, and yellow eyes. It is a pretty Inſect, and is found among flowers.

This Genus contains a number of beautiful Inſects, the colours of which vary according to the difference of ſex, ſeaſon, &c. which renders it unneceſſary to deſcribe them. They frequent flowers: and their Larvæ are ſimilar to thoſe of the Cerambyces, and are to be found in the trunks of decayed Willows, and other old trees. Although theſe Inſects are frequently confounded with the Cantharides, yet they differ eſſentially: for the Cantharis have five articulations in the tarſi, or intermediate part between the leg and foot; but the Cantharides have five articulations, or joints, only, on the two firſt pair of legs, and four only to the tarſi of the laſt pair.

THE

THE SKIPPER.

(See the Insect at the right-hand, at the bottom of the Cut page 72.)

Character.

THEIR horns are briſtly; and they have an elaſtic ſpring, or ſpine, which projects from the hinder extremity of the breaſt.

ELATER SANGUINEUS.

THE BLOOD-COLOURED SKIPPER.

THE breaſt of this Inſect ends, underneath, in a long point, or ſpine, which enters, as if with a ſpring, into a cavity in the upper part of the under-ſide of the thorax. By this admirable conſtruction, the Skipper is enabled, when upon its back, to leap in the air, and, thus, alight on its feet. It varies in ſize; and, when young, the elytra are of a beautiful red: but in a few days they

loſe this ſplendid hue, which is then changed to poliſhed black; and, when viewed through a microſcope, to nearly a cheſnut-colour. The breaſt is glittering, and appears with dark down, interſperſed with ſome black hairs. The female is black, and marked with ſpots of a deeper dye, occaſioned by a velvet down, lying in tufts, which are only to be diſtinguiſhed by the glaſs.

The larvæ are found in the trunks of decayed trees, where they are transformed into perfect Inſects, which flutter upon flowers, wander over fields, and conceal themſelves in thickets, or under the bark of trees.

CICIN-

CICINDELA.

(See the Insect on the left hand at the bottom of the Cut page 72.)

Character.

THE horns are briſtly; the jaws porrected, and armed with teeth; the eyes are prominent; and the breaſt is rather round, and margined.

CICINDELA CAMPESTRIS.

THE FIELD-SPARKLER.

THE Field-Sparkler is one of our moſt beautiful Inſects. The upper part of its body is rough, and of a fine green, tinged with blue. The under ſide, legs, and horns are of a ſhot colour, gold, and a red, inclining to the copper hue. The eyes, being prominent, give the head a broad appearance. The breaſt is pointed and narrower than the head; which characterizes the Cicindelæ. Like the head, the breaſt is rough; and of a

green colour, tinged with gold. The elytra are delicately and irregularly dotted, with ſix white ſpots on each. This Inſect runs with great ſwiftneſs, and flies with facility. At the beginning of ſpring, it is found in dry, ſandy places, where its Larvæ alſo inhabit. Theſe are a long, ſoft, whitiſh worm, with ſix legs, and a ſcaly head. They make a perpendicular hole in the ground, at the entrance of which they keep their head, to catch other Inſects which fall in it. A ſpot of ground is ſometimes entirely perforated in this manner.

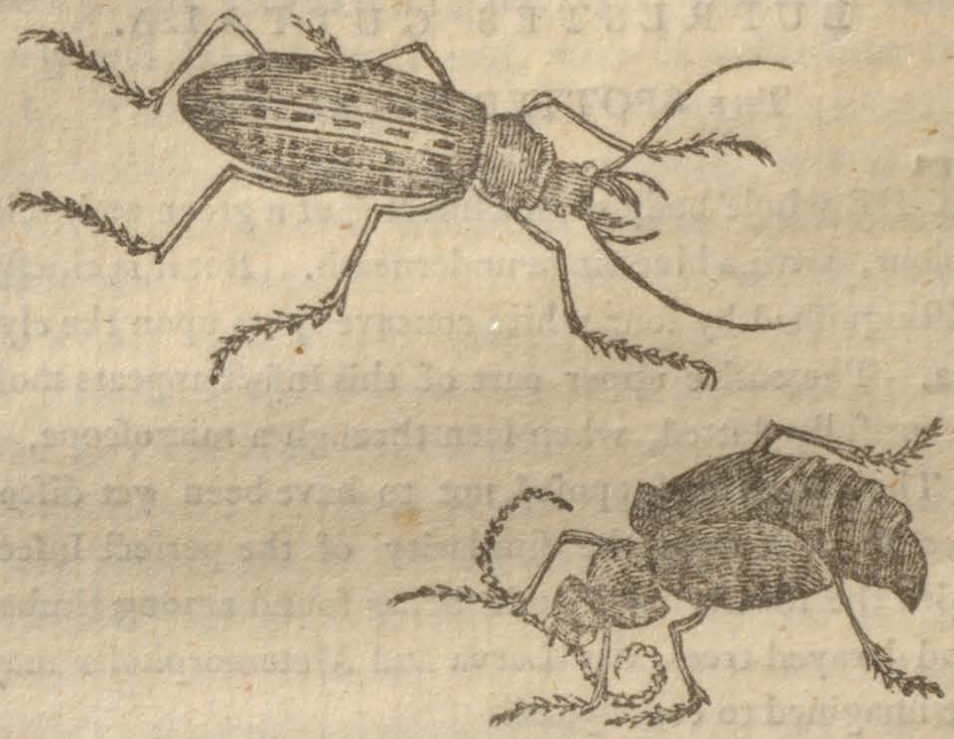
The perfect Inſects of this Genus are moſtly ſo very beautiful, as to merit the attention of the curious in microſcopic obſervations, as well as in natural reſearches; for ſome are minute, though not inferior in ſplendor to the larger: which renders them proper objects for the delightful amuſement of the magnifying-glaſs. And here it may be proper to obſerve, that living objects are always to be preferred to thoſe which are dead, by the enquirer into the produce of Nature. The perfect Inſects of this Genus are, like their Larvæ, perfect tigers in their diſpoſition for prey, which they attack, and deſtroy, with every effort in their power.

BUPRESTES GUTTALA.

THE SPOTTED BUPRESTES.

THE whole body of this Inſect is of a green and gold colour, with a blue tinge underneath. But it is chiefly diſtinguiſhed by four white concave ſpots upon the elytra. The entire upper part of this Inſect appears moſt beautifully dotted, when ſeen through a microſcope.

The Larva is ſuppoſed not to have been yet diſcovered: but from the ſimilarity of the perfect Inſect with the Elater, and both being found among timber and decayed trees, the Larva and Metamorphoſis may be imagined to correſpond.



CACABUS GRANULATUS.

THE GRAINED BULL-HEAD.

(See the Insect delineated on the top of the Cut.)

THIS Species is not only one of the largeſt, but the moſt beautiful and brilliant this country produces. The head, breaſt, and wing-caſes, are of a coppery green. The elytra have three longitudinal rows of oblong raiſed ſpots. All the under-part of this Inſect is black. But having

having no wings beneath the elytra, Nature has providentially ſupplied it with ſuch legs as enable it to run with amazing ſwiftneſs. This Inſect is frequently found in damp places, under ſtones and heaps of decayed plants in gardens. The colour ſometimes varies; for it is frequently found coloured with a beautiful purple.

The Larvæ live under ground, or in decayed wood, where they remain, until metamorphoſed to their perfect ſtate, when they proceed to devour the larvæ of other Inſects, and all weaker animals they can conquer.

They are frequently known by the name of the Ground-Beetle. Some are found ſo early as the beginning of March, in paths, &c. where the ſun warms the earth with his vivifying beams. Many of the larger ſpecies have been found between the decayed bark and wood of Willow-trees.

MELOE.

Character.

THE horns reſemble necklaces; the breaſt is rather round; and the elytra are ſoft and pliant.

MELOE VESIFICATORIUS, OR CANTHARIDES. THE SPANISH FLY.

(See the lower Inſect in the Cut page 80.)

THERE are ſeveral ſpecies of this Inſect, differing in ſize, figure, and colour. But all are apparelled, by Nature, with great luſtre. Green, azure, and gold colours, blend their hues to embelliſh them. They are moſtly natives of the ſouthern parts of Europe. The ſpecies uſed medicinally is nine or ten lines in length, of a ſhining green colour mixed with azure, and very prolific. Theſe Inſects are ſometimes obſerved to fly in ſwarms. A diſagreeable ſmell, like that of mice, indicates their approach. By this ſcent, they are found by

by the gatherers, who collect them for the Apothecaries. When dried, fifty of them ſcarcely weigh a dram. Shrubs, and particularly the leaves of Aſh-tree, are their food. So corroſive are the odorous particles emitted by this Inſect, that great caution is required in taking them. For many have ſuffered greatly, by only having gathered a quantity of them with their bare hands in the heat of the ſun: ſome have been oppreſſed with ſleep by ſitting under trees on which ſwarms of Cantharides have ſettled. Contrary to the general cuſtom of Nature, the female courts the male. The Larvæ are produced from the ground, where the eggs are always depoſited. Theſe Inſects, reduced to powder, are exceedingly efficacious as bliſters, in abſorbing or drawing off humours which threaten the eſſential parts of life. But the Cantharides is, notwithſtanding, a moſt formidable poiſon, if taken internally, without the greateſt caution. Some who have been afflicted by their incautious uſe of them, have found the beſt antidotes to be milk, olives, camphire, and oil of ſweet almonds.

The Larvæ of the Meloes, inhabiting this country, greatly reſemble the perfect Inſects; for they are of

the

the ſame colour, are as large, and are as ſlow in their motion. They are generally found buried deep in the the earth, where they metamorphoſe themſelves into perfect Cantharides.

We have introduced the Meloe Veſicatorius, which is generally known by Cantharides or Spaniſh Fly, to ſhew in what it is different from a preceding Genus, called the Cantharis, for which it is frequently miſtaken.

CUR-

CURCULIO, or WEEVEL.

Of which we have given five ſpecimens, a, b, c, d, e.

THIS Inſect feeds upon corn, the inſide of which it eats, and leaves the bran. In this tribe, Nature diſpenſes the riches of her moſt refulgent colours, ſo as to dazzle the eye with ſplendor. But it is the microſcope that muſt admit us to this ſcene of ſuperlative beauty.

The

The Curculio Regalis, found in Peru, is a wonderful inſtance of the profuſion of beauty Nature can beſtow on even what is generally deemed the moſt inconſiderable of her products.

The Larvæ, reſembling oblong, ſoft worms, are greatly dreaded for the injury they do in granaries. Corn-lofts are frequently laid waſte by their ravages. The Inſect, having remained within the grain until it has devoured the meal, lies concealed under the empty huſk, until it paſſes its Aurelian ſtate, and takes its flight as a Curculio. While one ſpecies feed on corn, others deſtroy, in the ſame manner, beans, peas, and lentils. To diſcover the grain infeſted by the Larvæ, it is thrown into water, when that part which ſwims is certainly perforated by the Curculiones. The heads of Artichokes and thiſtles are often deſtroyed by theſe deſtructive Inſects. This animal being ſo delightful in appearance, and ſo deſtructive in its nature, is a leſſon which teaches, that beauty may effect our ruin while it captivates our ſenſes.

FOR-

FORFICULA.

Character.

THE horns are briſtly; the wing-caſes are half the length of the wings, which, being folded, are, notwithſtanding, covered by the elytra; and the tail is forked.

FORFICULA AURICULARIO.

THE EARWIG.

THIS Species is entirely of a deer colour. The horns are prettily intermingled and variegated. The wings are of the ſame colour as their elytra, or caſes. This Inſect is found in wet ſand, near pools and rivulets; and particularly on Grape-vines. It is generally known, and dreaded by many for its tendency to creep into the human ear. That it has this habit, the Editor of this volume can affirm from experience: but, that perſons need be alarmed, leſt it ſhould, thus, reach the brain, and cauſe death, he denies; for the leaſt acquaintance with

with the anatomy of the head, will evince the impoſſibility of the Inſect reaching the inner part of the cranium by the avenue of the ear, from there being no communicative paſſage from one to the other. The forceps with which Nature has provided its tail, for defence, is capable of biting ſo as to cauſe, for the moment, rather a painful ſenſation. Although furniſhed with this defence, the Earwig has been obſerved not to uſe it, even when he has been ſurrounded with a ſwarm of Ants. But it will frequently pinch the finger of perſons attempting to take them with their hands.

The Larva differs very inconſiderably from the perfect Inſect.

THE SECOND ORDER.

MANTIS.

Character of the Genus;

THE head is unſteady, and has a nodding motion. The mouth is armed with porrected jaws; and the antennæ, or feelers, are briſtly. They have four wings, which are membranous, and wrap round the whole body. The firſt pair of feet have teeth like a ſaw: and the breaſt is narrow, and extends to a conſiderable length.

MANTIS GANGYLODES.

THE WALKING LEAF.

THIS Inſect is remarkably ſhaped. The head is joined to the body by a neck longer than the body itſelf. It has two poliſhed eyes, and two ſhort feelers. The breaſt is long, narrow, and margined. The elytra, which cover two thirds of the body of the Inſect, are veined, and reticulated, or netted. The wings

wings are veined, and tranſparent. The hinder leg are very long, the next ſhorter; and the foremoſt pair of thighs are terminated with ſpines. The reſt have membranous lobes, which ſerve as wings to them in their flight. This Inſect might, therefore, be juſtly called the Mercury of this part of the Creation. The top of the head is membranous, ſhaped like an awl, and divided at its extremity. This animal is one of the innumerable inſtances which Nature affords, to indicate the infinite wiſdom of the Creator. Whenever any part of his workmanſhip is found to deviate from the general ſyſtem, it is ſtill formed to anſwer the deſign of its exiſtence. This Inſect, having ſuch long legs, could never have ſuſtained itſelf in the air, had not Providence beſtowed on it a ſpecies of wings, to balance its weight. Theſe are the inſtances with which Nature teems; and which would make the Atheiſt tremble, had he but ſenſe to contemplate the admirable deſign, ſyſtem, and application, with which they are characteriſed, as

——— parts of one ſtupendous whole;
Whoſe body NATURE is, and GOD the ſoul.

This

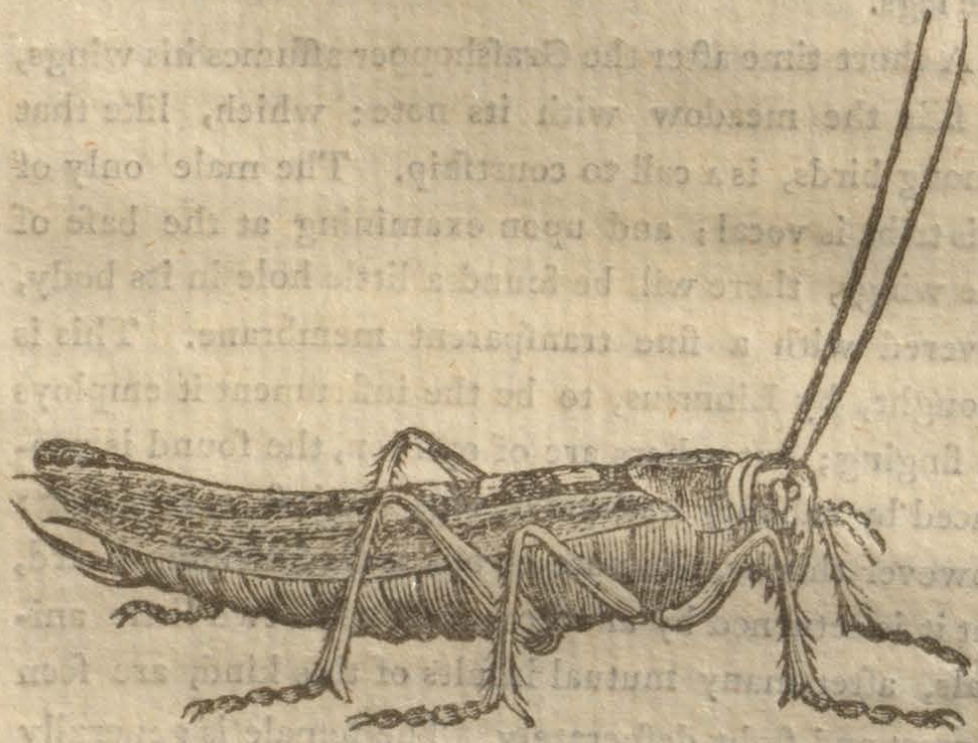
This Genus is generally of a very beautiful green; but the colour ſoon fades, and becomes that of dead leaves; which has cauſed the inhabitants of China, where they are found, to call them by the name of Walking Leaves.

The Larvæ very much reſemble the perfect Inſect: but it is ſeldom ſeen in this country.

GENUS III.

Character.

THE head is bent inwards, armed with jaws, and furniſhed with palpæ, or ſpiral tongues. The wings are ſo deflected as to wrap round the ſides of the body. All the feet are armed with two crotchets, or nails; and the hinder are formed for leaping.



TETTIGONIA.—The GRASSHOPPER.

Of this variegated tribe, the little Grafshopper that breeds in fuch plenty in every meadow, and that continues its chirping through the fummer, is beft known to us; and, by having its hiftory, we fhall be poffeffed of that of all the reft. This animal is of the colour of green leaves, except a line of brown which ftreaks the back,

back, and two pale lines under the belly, and behind the legs.

A ſhort time after the Graſshopper aſſumes his wings, it fills the meadow with its note: which, like that among birds, is a call to courtſhip. The male only of this tribe is vocal; and upon examining at the baſe of the wings, there will be found a little hole in its body, covered with a fine tranſparent membrane. This is thought, by Linnæus, to be the inſtrument it employs in ſinging; but others are of opinion, the ſound is produced by rubbing its hinder legs againſt each other: however this be, the note of one male is ſeldom heard, but it is returned by another; and the two little animals, after many mutual inſults of this kind, are ſeen to meet and fight deſperately. The female is generally the reward of victory; for, after the combat, the male ſeizes her with his teeth behind the neck, and thus keeps her for ſeveral hours.

Towards the latter end of autumn, the female prepares to depoſit her burthen; and her body is then ſeen greatly diſtended with her eggs, which ſhe carries to the number of an hundred and fifty. In order to make a proper lodgment in the earth for them, Nature has furniſhed her with an inſtrument at her tail,

ſomewhat reſembling a two-edged ſword, which ſhe can ſheathe and unſheathe at pleaſure: with this ſhe pierces the earth as deep as ſhe is able; and into the hole, which her inſtrument has made, ſhe depoſits her eggs, one after the other.

Having thus provided for the continuation of her poſterity, the animal herſelf does not long ſurvive; but, as the winter approaches, ſhe dries up, ſeems to feel the effects of age, and dies from a total decay. Some, however, aſſert, that ſhe is killed by the cold; and others, that ſhe is eaten by worms: but certain it is, that neither the male nor female are ever ſeen to ſurvive the winter. In the mean time, the eggs which have been depoſited continue unaltered, either by the ſeverity of the ſeaſon, or the retardation of the ſpring. They are of an oval figure, white, and of the conſiſtence of horn: their ſize nearly equals that of a grain of aniſe: they are enveloped in the body within a covering, branched all over with veins and arteries; and, when excluded, they crack, on being preſſed between the fingers: their ſubſtance within is a whitiſh, viſcous and tranſparent fluid.

Generally, about the beginning of May, every egg produces an Inſect, about the ſize of a flea; theſe at

firſt

firſt are of a whitiſh colour; at the end of two or three days they turn black; and ſoon after they become of a reddiſh brown. They appear, from the beginning, like Graſshoppers wanting wings; and hop among the graſs, as ſoon as excluded, with great agility.

Theſe inſects are generally vocal in the midſt of ſummer; and they are heard at ſun-ſetting much louder than during the heat of the day. They are fed upon graſs; and, if their belly be preſſed, they will be ſeen to return the juices of the plants they have laſt fed upon. Though unwilling to fly, and ſlow in flight, particularly when the weather is moiſt or cool, they are ſometimes ſeen to fly to conſiderable diſtances. If they are caught by one of the hinder legs, they quickly diſengage themſelves from it, and leave the leg behind them. This, however, does not grow again, as with crabs or ſpiders; for as they are animals but of a ſingle year's continuance, they have not ſufficient time for repairing thoſe accidental misfortunes. The loſs of their leg alſo prevents them from flying; for, being unable to lift themſelves in the air, they have not room upon the ground for the proper expanſion of their wings. If they be handled roughly, they will bite very fiercely; and when they fly, they make a noiſe with their wings.

They

They generally keep in the plain, where the graſs is luxuriant, and the ground rich and fertile: there they depoſit their eggs, particularly in thoſe cracks which are formed by the heat of the ſun. Such are the habits and nature of thoſe little vocal Inſects, that ſwarm in our meadows, and enliven the landſcape.

The Graſshopper, having many ſtomachs, has cauſed ſeveral authors to aſſert that they chew the cud, like ſome other larger animals.

THE LOCUST.

THE Scripture, which was written in a country where the Locuſt made a diſtinguiſhed feature in the picture of Nature, has given us ſeveral very ſtriking images of this animal's numbers and rapacity. It compares an army, where the numbers are almoſt infinite, to a ſwarm of Locuſts: it deſcribes them as riſing out of the earth, where they are produced; as purſuing a ſettled march to deſtroy the fruits of the earth, and co-operate with divine indignation.

When

When the Locuſts take the field, as we are aſſured, they have a leader at their head, whoſe flight they obſerve, and pay a ſtrict attention to all his motions. They appear at a diſtance, like a black cloud, which, as it approaches, gathers upon the horizon, and almoſt hides the light of the day. It often happens, that the huſbandman ſees this imminent calamity paſs away without doing him any miſchief; and the whole ſwarm proceed onward, to ſettle upon the labours of ſome leſs fortunate country. But wretched is the diſtrict upon which they ſettle: they ravage the meadow and the paſture-ground; ſtrip the trees of their leaves, and the garden of its beauty; the viſitation of a few minutes deſtroys the expectations of a year; and a famine but too frequently enſues. In their native tropical climates, they are not ſo dreadful as in the more ſouthern parts of Europe. There, though the plain and the foreſt be ſtripped of their verdure, the power of vegetation is ſo great, that an interval of three or four days repairs the calamity: but our verdure is the livery of a ſeaſon; and we muſt wait till the enſuing ſpring repairs the damage. Beſides, in their long flights to this part of the world, they are famiſhed by the tedioufneſs of their journey, and are therefore more voracious wherever

they happen to ſettle. But it is not by what they devour that they do ſo much damage, as by what they deſtroy. Their very bite is thought to contaminate the plant, and to prevent its vegetation. To uſe the expreſſion of the huſbandman, they burn whatever they touch; and leave the marks of their devaſtation for two or three years enſuing. But if they be noxious while living, they are ſtill more ſo when dead; for wherever they fall, they infect the air in ſuch a manner, that the ſmell is unſupportable.

Oroſius tells us, that in the year of the world 3800, there was an incredible number of Locuſts which infected Africa; and, after having eaten up every thing that was green, they flew off, and were drowned in the African ſea; where they cauſed ſuch a ſtench, that the putrefying bodies of hundreds of thouſands of men could not equal it.

In the year 1690, a cloud of Locuſts was ſeen to enter Ruſſia in three different places; and thence to ſpread themſelves over Poland and Lithuania, in ſuch aſtoniſhing multitudes, that the air was darkened, and the earth covered with their numbers. In ſome places they were

were ſeen lying dead, heaped upon each other four feet deep; in others, they covered the ſurface like a black cloth: the trees bent beneath their weight; and the damage which the country ſuſtained exceeded computation. In Barbary their numbers are formidable, and their viſits are frequent. In the year 1724, Dr. Shaw was a witneſs in that country of their devaſtations. Their firſt appearance was about the latter end of March, when the wind had been ſoutherly for ſome time. In the beginning of April, their numbers were ſo vaſtly increaſed, that, in the heat of the day, they formed themſelves into large ſwarms, which appeared like clouds, and darkened the ſun. In the middle of May, they began to diſappear, retiring into the plains to depoſit their eggs. In the next month, being June, the young brood began to make their appearance, forming many compact bodies of ſeveral hundred yards ſquare; which afterwards marching forward, climbed the trees, walls, and houſes, eating every thing that was green in their way.

The CRICKET.

THIS Inſect very much reſembles the Graſshopper in its ſhape, its manner of ruminating, its voice, its leaping, and methods of propagation. It differs in its colour, which is uniformly of a ruſty brown; in its food, which is more various; and in its place of reſiden which is moſt uſually in the warmeſt chinks behind a country hearth. They are, in ſome meaſure, obliged to the bad maſonry employed in making peaſants houſes for their retreats. The ſmalleſt chink ſerves to give them ſhelter; and where they once make their abode they are ſure to propagate. They are of a moſt chilly nature, ſeldom leaving the fire-ſide; and, if undiſturbed, are ſeen to hop from their retreats to chirrup at the blaze in the chimney. The Wood-Cricket is the moſt timorous animal in nature; but the Chimney-Cricket, being uſed to noiſes, diſregards them. Whether the voice of this animal is formed in the ſame manner with that of the graſshopper, is not yet aſcertained; nor do we well know the uſe of this voice, ſince anatomical inſpection has not been able to diſcover the ſmalleſt organs of hearing. Still, however, we

can

can make no doubt of their power of diſtinguiſhing ſounds, though probably not in the ſame manner with the more perfect ranks of nature. Certain it is, that they have been often heard to call, and this call is as regularly anſwered by another, although none but the males are vocal.

As the Cricket lives chiefly in the dark, ſo its eyes ſeem formed for the gloomineſs of its abode; and thoſe who would ſurprize it, have only to light a candle unexpectedly; by which it is dazzled, and cannot find the way back to its retreat. It is a very voracious little animal, and will eat bread, flour, and meat; but it is particularly fond of ſugar. They never drink, but keep for months together at the back of the chimney, where they could paſſibly have had no moiſture. The warmth of their ſituation only ſerves to increaſe their mirth and loquacity.

The great Scaliger was particularly delighted with the chirrupping of Crickets, and kept ſeveral of them for his amuſement, encloſed in a box, which he placed in a warm ſituation. Others, on the contrary, think there is ſomething ominous and melancholy in the ſound, and

uſe every endeavour to baniſh this inſect from their houſes.

Ledelius tells us of a woman who was very much incommoded by Crickets, and tried, but in vain, every method of baniſhing them from her houſe. She at laſt accidentally ſucceeded; for having one day invited ſeveral gueſts to her houſe, where there was a wedding, in order to encreaſe the feſtivity of the entertainment, ſhe procureed drums and trumpets to entertain them. The noiſe of theſe was ſo much greater than what the little animals were uſed to, that they inſtantly forſook their ſituation, and were never heard in that manſion more.

THE MOLE CRICKET.

OF all the Cricket kind, that which is called the Mole Cricket is the moſt extraordinary. This animal is the largeſt of all the Inſects with which we are acquainted in this country, being two inches and an half in length, and three quarters of an inch in breadth. The colour is of a duſky brown; and, at the extremity of the tail, there are two hairy excreſcences, reſembling, in ſome degree, the tail of a mouſe. The body conſiſts of eight ſcaly joints, or ſeparate folds, is brown on the upper part, and more deeply tinged below.

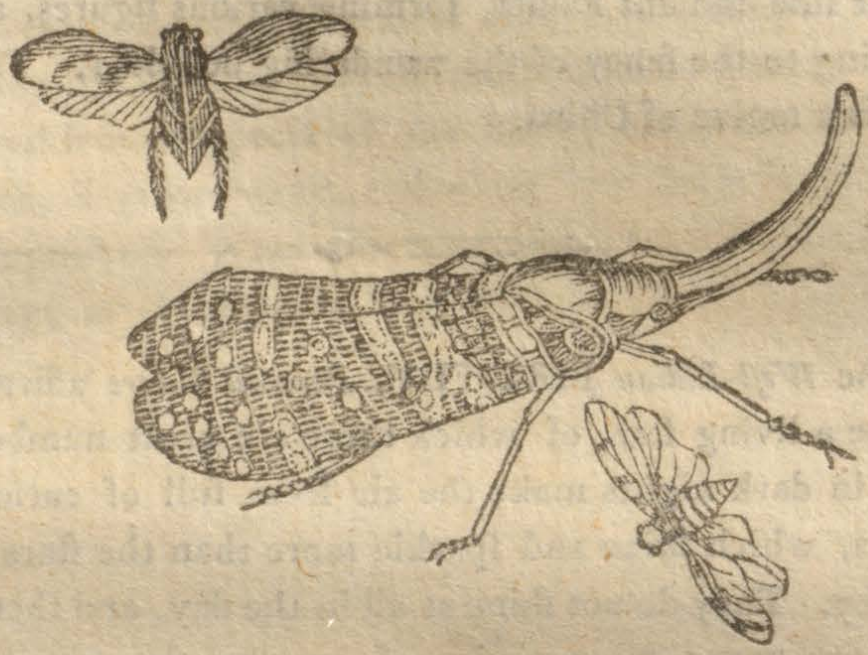
The wings are long, narrow, and terminate in a ſharp point, each having a blackiſh line running down it: however, when they are extended, they appear to be much broader than could, at firſt ſight, be ſuppoſed. The ſhield of the breaſt is of a firm texture, of a blackiſh colour, and hairy. The fore-feet, which are this animal's principal inſtruments of burrowing into the earth, are ſtrong, webbed, and hairy; it generally, however, runs backward; but it is commonly under ground, where it burrows even faſter than a mole. It is thought alſo to be amphibious; and capable of living under water, as well as under ground.

Of all Inſects this is the moſt deteſted by gardeners, as it chiefly reſides in that ground which lies light, and where it finds ſufficient plenty under the ſurface. Thus, in a ſingle night's time, it will run along a furrow which has been newly ſown, and rob it of all its contents. Its legs are formed in ſuch a manner, that it can penetrate the earth in every direction; before, behind, and above it. At night it ventures from its underground habitation, and, like the Cricket, has its chirping call.

Nothing can exceed the care and affiduity which theſe animals exhibit in the preſervation of their young. Whereever the neſt is placed, there ſeems to be a fortification, avenues and entrenchments drawn round it: there are numberleſs winding ways that lead to it, and a ditch drawn round it, which few of its inſect enemies are able to paſs. But their care is not confined to this only; for, at the approach of winter, they carry their neſt entirely away, and ſink it deeper in the ground, ſo that the froſt can have no influence in retarding the young brood from coming to maturity. As the weather grows milder, they raiſe their magazine in proportion; till, at laſt, they bring it as near the ſurface as they can, to receive the genial influence of the ſun, without wholly expoſing it to view; yet, ſhould the froſt unexpectedly return, they ſink it again as before.

THE FIELD CRICKET.

THIS Inſect is of a blackiſh colour, and the male has a longer body than the female; the head, in proportion to the body, is large, and the eyes big and prominent. The forehead is furniſhed with two feelers without joints, but it can turn them any way it pleaſes. It has ſix feet or legs of the ſame colour as the body, and thoſe behind are the longeſt, that it may leap the better. The wings ſeem to be lightly variegated with ſculptures, ſeeming almoſt to cover the whole body, and the tail is forked. The bulk of the body of the male is leſs than that of the female, for this laſt has a larger belly, and graſs-green eyes, with red feelers, and a tail like a trident. They are found in the fields in the ſummer time, making holes in the ground, where they build their neſt, and where they lie concealed in a mild winter; but in one that is ſevere, they die in their holes. They make a particular ſort of noiſe with their wings, which is plain from this; namely, that when their wings are taken off the noiſe ceaſes. They ſing day and night, and delight in the ſun, ſitting at the mouths of their holes. They frequent paſture-grounds and meadows that are quite open, for they ſhun ſhady places. They ſing moſt when people are at a diſtance; for when they come near they are ſilent, and get into their holes.



FULGORA CANDELARIA.

THE LANTERN FLY.

THE head and breaſt of this Inſect are generally the colour of a muddy brown; the elytra are of a lively green, ſpotted with a pale yellow; the wings are of a beautiful yellow, and have their extremities bordered with a gloſſy black. When the Inſect flies, the waving

of the elytra cauſe the tranſparent ſpots to appear in the night like radiant flaſhes, forming various figures, according to the fancy of the wondering beholder. This Fly is a native of China.

The *Weſt-Indian* FIRE-FLY, *Pere du Tertre* affirms, is like a living ſtar, of which there are great numbers that in dark nights make the air ſeem full of curious lights, which ſhine and ſparkle more than the ſtars in the ſky. They do not ſhine at all in the day, and therefore are never taken notice of by any that are unacquainted with them. They have ſomewhat of the appearance of dirty Beetles, and delight to be among rotten wood till the ſun is ſet, and then they fly here and there, ſeeming to be ſo many lighted candles carried in the woods and houſes by inviſible hands. They will purſue the light of a candle, and other things that ſparkle or ſhine, with ſo much ardour, that they often kill themſelves, like our Moths. He tells us very gravely, and no doubt with ſome truth, that the poorer popiſh clergy, when they want candles or oil, catch one of.

of theſe Flies, by whoſe light they will be able to read their matins as eaſily as if they had a lamp. While they are alive and in full health, a flame ſeems to proceed from all parts of the body; but when they are ſick, it grows weak, and when they die, it is quite extinguiſhed. When they are caught, they live but fifteen days, or three weeks at moſt.

LANTERN FLY *of the* EAST-INDIES.

THIS Lantern Fly is a nocturnal inſect, that has a hood, or bladder, on its head, which appears like a lantern, in the night: but by day it is clear and tranſparent, and very curiouſly adorned with red and green ſtripes. Such a ſhining light iſſues from this part of the Inſect, that it is poſſible to read by it. The wings, and whole body, are elegantly adorned with a mixture of red, green, yellow, and other ſplendid colours. The

creature

creature contracts or dilates the hood, or bladder, as it pleaſes. When taken, they withdraw their light; but when at liberty, they ſuffer it to ſhine again, with all its wonderful reſplendency.

Theſe Flies are as luminous as a lighted torch, while they reflect a luſtre on all neighbouring objects. They are in continual motion during the night; but the motion is various, and uncertain: ſometimes they riſe, and then ſink. They will frequently diſappear, and the next inſtant riſe in another place. They commonly hover about ſix feet from the ground. It is ſaid, there is not a night in the year in which they are not ſeen. In the coldeſt winter they are more frequently obſerved, than in the warmeſt ſummer. Neither rain or ſnow hinders their appearance. From all theſe circumſtances many ſuppoſe it to be the Ignis Fatuus, or Jack-in-the-Lantern: which, many have contended, is an inflammatory meteor, exhaled from marſhy lands, over which it is obſerved to wander in the darkeſt night.

In *Meriana*'s ingenious account of the Indian Lantern Fly, publiſhed among her Inſects of Surinam, ſhe ſays, when

when she once had bought some insects from the persons usually employed in collecting them, she had brought her the LANTERN FLIES, which she shut up in a large chest; and not knowing they shone by night, being waked out of her sleep by an unusual noise, she got out of bed, and ordered a light to be brought. It immediately appeared that the noise came from the chest; which, being opened, there came as it were, a flame of fire as often as a new insect flew out, which at length being observed, they gathered the little creatures together again.

CICADA.

Character.

THE head bends downwards; the feelers are bristly; the four wings are membranous; and the feet are adapted to leaping.

(See the two small Insects in page 109.)

CICADA

CICADA SPUMERIA.

THE FOAMY FROG-HOPPER.

AMONGST the Species found in this Country, of this Genus, this is one of the largeſt. It is a brown, tinged with green. The head, breaſt, and elytra, are beautifully dotted: on the laſt are two white ſpots. Before the Inſect has meramorphoſed itſelf, the Larva which produces it, lives and reſides upon plants: but it is not perceived, unleſs the ſpot of its devouring is certainly known; for by emitting, from every part of its body, foamy bubbles, reſembling ſpittle, under which it conceals itſelf, the Larva is not eaſily diſcovered: but when this froth is removed, the Larva is found: but it is ſoon covered again, by a freſh emiſſion of froth. Thus the Larva is enabled by Nature to preſerve itſelf againſt the injury of the weather, and from being deſtroyed by other Inſects. This is another inſtance of the variety of means adopted by the Creator to preſerve the balance of all things. As the Larva of this Inſect is liable to be preyed upon by different animals, it is provided with the power of emitting this foam, as the only protection againſt its enemies.

CICADA SANGUINOLENTA.

The CRIMSON FROG-HOPPER.

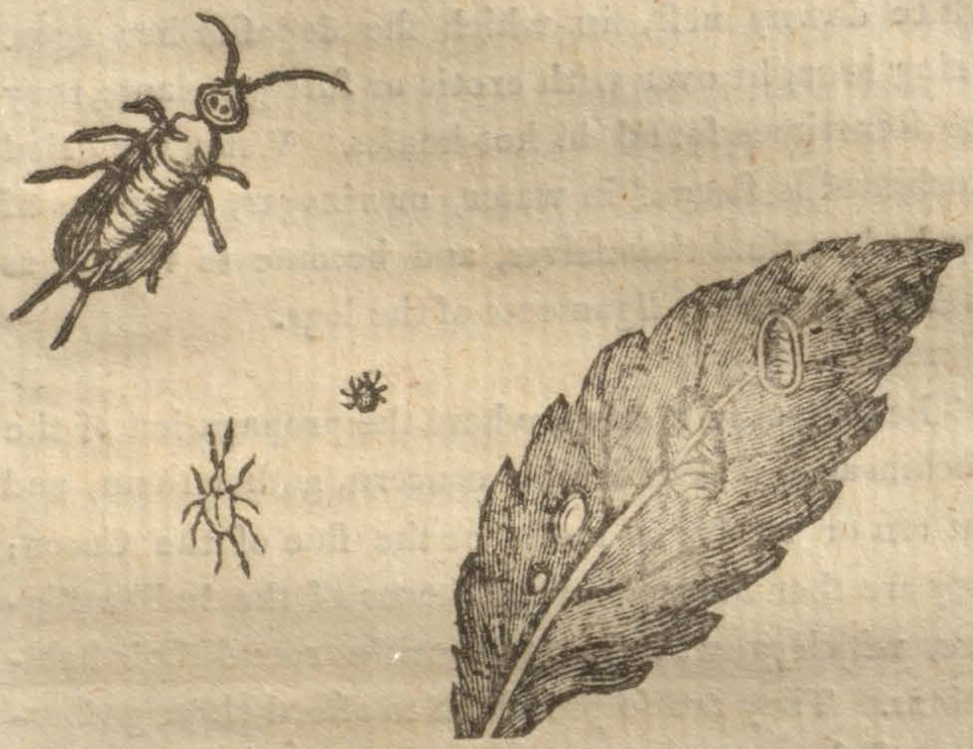
THIS is thought the fineſt Species which we, in this country, poſſeſs of this Genus. The elytra alone have ſix large beautiful crimſon ſpots: both the elytra are black at their extremity; and the wings are a of duſky colour, and tinged with a little red at their baſe. This Inſect, not leaping much, is eaſily taken: but not near London; as it is very ſeldom found near the Metropolis. It varies according to the different ſize of the crimſon ſpots obſerved on its elytra, or wing-caſes.

COCCUS.

Character.

THE trunk is placed in the breaſt; the hinder part of the abdomen is briſtly. The males have two erect wings; while the females are apterous, or without any.

COCCUS



COCCUS PHALARIDIS.

THE COCHINEAL FLY.

THE feet and body of this Inſect are nearly of a pink coſour, and ſprinkled with a little white powder. The wings and four threads of its tail, are of the cleareſt white. It is found on a ſpecies of graſs called Phalaris.

The

The female forms, on the ſtalk of this dog-graſs, a white downy neſt, in which ſhe depoſits her eggs. Being brought over with exotic or foreign plants, they are ſometimes found in hot-houſes. When the dried Cochineal is ſteeped in water, or vinegar, the parts of the body unfold themſelves, and become ſo viſible, as to diſplay even the ligaments of the legs.

The Indians in Mexico, where the propagation of the Cochineal is a conſiderable concern, gather them, and put ten or twelve in moſs, or the flue of the Cocoa: they are then hung upon the thorns of the Indian Fig-tree, which grows in great quantities round their habitations. They are ſo prolific as to afford three gatherings of them every year. As ſoon as they are collected, they are deſtroyed. Some they kill by the heat of ovens; and others, by throwing them into hot water: while many are deſtroyed upon the hot plates uſed for roaſting maize. Three pounds of freſh Cochineal weigh but one pound when dried. Cochineals will preſerve, for ages, its colouring particles. This valuable Inſect is uſed for dying ſcarlet and crimſon. The Engliſh mix it with Gum Lac, to dye their cloths. The

Cochineal

Cochineal furniſhes painters with many beautiful and ſplendid tints: as the richeſt carmine is made from this Inſect. It is computed, that 880,000 lb. of theſe Inſects is imported yearly into this Kingdom. Were it propagated in our American Iſlands, where the climate is congenial with this Inſect, great advantages might be derived: and as the Cochineals of Europe reſemble greatly thoſe of America, they might, probably, be productive of emolument.

The above account is confirmed by *Brooks*, who ſays, "COCHINEAL, as they appear in our ſhops, when brought from America, are of an irregular ſhape, convex on one ſide, and a little concave on the other; but are both marked with tranſverſe ſtreaks or wrinkles. They are of a ſcarlet colour within, and without of a blackiſh red, and ſometimes of a white reddiſh aſh-colour, which are accounted the beſt, and are brought to us from Mexico. They were a long while taken for fruit, but they are now known to be inſects adhering to the prickly pear-tree or ſhrub.

"The COCHINEAL INSECT is of an oval form, of the ſize of a ſmall pea, with ſix feet and a ſnout or trunk;

trunk; it brings forth its young alive, and is nouriſhed by ſucking the juice of the plant. Its body conſiſts of ſeveral rings, and when it is once fixed on the plant, it continues immoveable, being ſubject to no change. Some pretend there are two ſorts, the one domeſtic, which is beſt, and the other wild, that is of a vivid colour: however, they appear to be the ſame, only with this difference; that the wild feed upon uncultivated trees, without any aſſiſtance; whereas the domeſtic are carefully, at a ſtated ſeaſon, removed to cultivated trees, where they feed upon a purer juice. Thoſe who take care of theſe inſects, place them on the prickly pear-plant, in a certain order, and are very induſtrious in defending them from other inſects; for if any other kind come among them, they take care to bruſh them off with foxes tails.

"Towards the end of the year, when the rains and cold weather are coming on, which are fatal to theſe inſects, they take off the leaves or branches covered with cochineal, that have not attained their utmoſt degree of perfection, and keep them in their houſes till the winter is paſt. Theſe leaves are very thick and juicy,

juicy, and ſupply them with ſufficient nouriſhment, while they remain within doors. When the milder weather returns, and theſe animals are about to exclude their young, the natives make them neſts, like thoſe of birds, but leſs, of tree moſs, ſoft hay, or the down of cocoa-nuts, placing twelve in every neſt. Theſe they fix on the thorns of the prickly pear-plant, and in three or four days time they bring forth their young, which leave their neſts in a few days, and creep upon the branches of the plant, till they find a proper place to reſt in and take their nouriſhment; and when the females are fecundated by the males, they produce a new offspring; ſo that they have a harveſt, as it were, thrice a year.

" When the native Americans have gathered the cochineal, they put them into holes in the ground, where they kill them with boiling water, and afterwards dry them in the ſun, or in an oven, or lay them upon hot plates. From the various methods of killing them, ariſe the different colours which they appear in when brought to us. While they are living, they ſeem to be ſprinkled over with a white powder, which they loſe as

ſoon as the boiling water is poured upon them. Thoſe that are dried upon hot plates, are the blackeſt. What we call cochineal, are only the females; for the males are a ſort of fly, as in the Kermes. They are uſed both for dying and in medicine, and are ſaid to have much the ſame virtue as the Kermes; tho' they are now ſeldom uſed alone, but are mixed with other medicines to give them a more beautiful colour."

THE

THE FOURTH ORDER.

INSECTA NEUROPTERA.

NEUROPTEROUS Inſects have four tranſparent, membranous, and uncaſed wings, which are veined like net-work. Their tail is unarmed, or ſtingleſs: but it is frequently furniſhed with appendices, like pincers, by which the males are diſtinguiſhed.

LIBEL-

LIBELLULA.---THE DAMSEL.

THIS Genus of Inſects is well known to every body. The largeſt ſpecies is produced from a water-worm, that has ſix feet, which, yet young, are very ſmall, is tranſformed to a Chryſalis, that has its dwelling in the water. People have thought they diſcovered them to have gills like fiſhes. It wears a maſk, as perfectly formed as thoſe that are worn at a maſquerade; and this maſk, faſtened to the Inſect's neck, and which it moves at will, ſerves it to hold its prey, while it devours it. The period of transformation being come, the Chryſalis makes to the water-ſide, undertakes a voyage, in ſearch of a convenient place; fixes on a plant, or ſticks faſt to a bit of dry wood. Its ſkin, grown parched, ſplits at the upper part of the thorax. The winged Inſect iſſues forth gradually, throws off its ſlough, expands its wings, flutters, and then flies off with gracefulneſs and eaſe. The elegance of its ſlender ſhape, the richneſs of its colours, the delicacy and reſplendent texture of its wings, afford infinite delight to the beholder.

In

In order to accompliſh the purpoſe of Nature, the male, while hovering about, watches, and then ſeizes the female by the head, with the pincers with which the extremity of his tail is armed. The raviſher travels thus through the air, till the female yields to his ſuperior ſtrength. Theſe flies are ſeen thus coupled in the air, exhibiting the form of a ring. The female depoſits her eggs in the water, from whence ſpring Water-worms, which afterwards undergo the ſame transformations.

LIBELLULA GRANDIS.

THE GREAT DAMSEL.

THIS ſpecies is the largeſt of any this Country affords. Its head is yellow, eſpecially forwards; its eyes are brown, and being very large, meet on the top of the head, and are often ſet with dots, raiſed and ſhining, which would conſtitute a very diſtinctive character, if it were conſtant; but ſometimes thoſe dots are abſent, or there are, at moſt, but one or two. The thorax is dun-coloured, with two oblique bands on each ſide, of a lemon-colour. The abdomen, which is very long, is likewiſe of a deep buff, often ſpotted with white on the top and bottom of each ſegment. The ſmall laminæ that terminate the abdomen are very long in this ſpecies. The wings have more or leſs of the yellow dye, with a brown ſpot on the exterior edge. At the riſe of each wing there is a ſmall protuberance, of a dark brown colour.

LIBEL-

LIBELLULA VIRGO.---The VIRGIN.

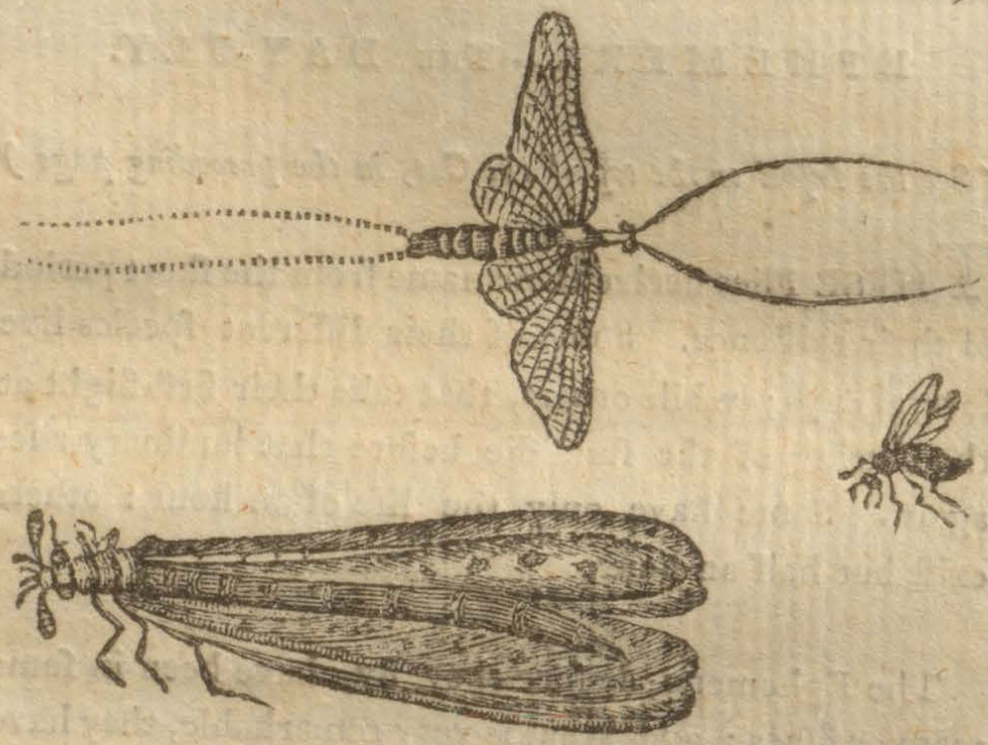
THIS beautiful Libellula has a large head, reticulated, prominent, brown eyes, that are not in contact with each other. The ſpace intervening between the eyes, exhibits three brown ſtemmata, placed in a triangle. The neck, on which the head is reſted, is ſhort and narrow. The thorax is larger, of a bright green and blue colour. From the inferior part of the thorax ariſe the ſix legs, long, and charged with a double row of ſmall ſpines, a circumſtance common to this Genus. From the upper part come forth the four wings, all of equal ſize. They are much reticulated, and have on their middle a large cloud, of a bluiſh brown, that occupies above one half of them. The baſe and extremity of the wing are the only parts not charged with the ſame colour, being only of a yellowiſh hue. On the outer edge of the wing there is no ſpot; which is uncommon in this Genus. The abdomen long, cylindric, and conſiſting of nine or ten ſegments, is of a blue colour, ſometimes bordering on green, and very bright. This beautiful Inſect is met with in meadows, on the banks of ponds.

LIBELLULA PUELLA.

THE wings of this Insect are whitish, nicely veined with black, with a black spot on the exterior edge towards the extremity. The colour of the head is a leaden blue, with brown eyes. The thorax, which is blue, is adorned with three brown longitudinal bands, one on the middle, and two narrower ones on the sides. The segments of the abdomen are blue, with a black ring towards their posterior extremity. They are nine in number; the two last larger than the rest, and entirely brown. This Insect is found in meadows.

The remaining Libellula is only a variety in colour, the body being of a fine red.

EPHE-



EPHEMERA.

Character.

THE mouth has neither teeth nor ſpiral tongue. The wings are erect, and the hinder ſhorteſt. The tail is furniſhed with hairs, or briſtles. The horns are ſhort and briſtly.

EPHEMERA.---THE DAY-FLY.

(See the Inſect on the top of the Cut, in the preceding page.)

THESE Flies derive their name from the ſhort period of their exiſtence. Some of their different ſpecies live ſeveral days; while others, that take their firſt flight at the ſetting of the ſun, die before that luminary riſes again. Some have only the life of an hour: others exiſt but half an hour.

The Ephemeræ, before they fly, have been in ſome manner fiſhes: and, what is very remarkable, they have been obſerved to remain as long as one, two, and three years, in their Larva and Chryſalis ſtates. Both the Larva and Chryſalis have ſmall fringes of hair on each ſide; which, when moved in the water, ſerve them as fins. The plying of theſe little oars is exceedingly curious. The Larvæ make their reſidence by perforating, or making holes in the banks of rivers; and, when the water falls, or decreaſes, they make other holes lower in order to have ready acceſs to their favorite element.

Flames

Flames attract them ſo, as to cauſe them to form a thouſand circles round ſuch a light, with an amazing regularity. One ſingle female will lay ſeven or eight eggs, which ſink to the bottom of the water, where they are depoſited. The Larvæ which they produce conſtruct habitations to ſhelter them from every danger. The Flies, having propagated, immediately die in heaps. Fiſhermen conſider theſe multitudes of deſtroyed inſects as manna for the fiſh. We can, therefore, perceive, that even this Inſect, which cannot, for its very ſhort exiſtence, be of much ſervice during life, is, by the wiſdom of the Creator, ſo calculated, as to be of eſſential ſervice even in its departed ſtate.

MYRMELION.

Character.

THE mouth is armed with jaws, two teeth, and four long ſpiral tongues. The tail, in the male ſex, is forked. Their feelers are club-formed, and as long as the breaſt, and the wings bent downwards.

MYRMELION.---THE ANT-EATER.

(See the Inſect at the bottom of the Cut, page 129.)

AS few Inſects afford greater entertainment, or gratify curioſity, by their wiles and ſtratagems, than this; we ſhall forbear all unintereſting deſcription, to confine ourſelves to what we think more eſſential. Before the head

head of the Larvæ is placed a dentated forceps, with which they catch and ſuck flies, and ants eſpecially. This animal having a retrograde motion, which prevents its being able to purſue its prey, it has recourſe to the following ſtratagem. Having dived into the ſand, or ſoft mould, it hollows out furrows, that meet in a centre, and grow deeper by degrees. The ſuperfluous ſand it carefully removes from the ſcene of action: after this, it digs a hole, like a funnel, at the bottom of which this animal ſtations itſelf, ſuffering only its extended forceps to be ſeen above it. Ruin awaits the inſect that falls, unfortunately, into this cavity. The Myrmelio, being appriſed of its approach, by grains of ſand rolling down to the bottom, immediately overwhelms the fallen prey with a ſhower of duſt, which it caſts with its horns. It then drags the poor captive to the bottom of the hole, where it is immediately deſtroyed. Such is the rapacity of this creature, that it will prey in this manner even on its own ſpecies. This is one of the few inſtances Nature affords, of any one ſort of animal preying on its fellow-creatures. To the diſgrace of man, this deſtruction of each other is very rarely ſanc-

tioned by example, in all the infinite courſe of beings with which the Creation abounds.

The perfect Inſect of the Ant-Eater is very ſeldom found; when it is, it is chiefly in ſandy places, near rivulets.

THE

THE FIFTH ORDER.

INSECTA HYMENOPTERA.

HYMENOPTEROUS Inſects have four membranous wings: and moſt of their tails have ſtings; except the males, which are harmleſs.

CYNIPEDES.

Character.

THE mouth is armed with jaws; but has no trunk. The ſting is ſpiral, and concealed moſtly in the body.

CYNIPS.---THE GALL-FLY.

(See the small Insect in page 129.)

THIS Insect is of a burnished shining brown colour: the horns are black, the feet chesnut, and the wings are white. The Gall-Fly is produced in those little smooth, round, and hard Galls, which are found fastened to the fibres under Oak-leaves. This gall is caused by the overflowing of the sap of the leaf, occasioned by the Fly having pierced it, for the purpose of depositing there its eggs. Sometimes, instead of the Cynips, a large Insect proceeds from the Gall, and which is called an Ichneumon. This latter Insect is not the real inmate of the Gall: he is a parisite, whose mother deposited her egg in the yet tender Gall; and, when hatched, produces a Larva, that devours the Larva found there of the Cynips. Of this Genus there is a Species, which produces the Galls of which the Norway ink is made.

FLYING INSECTS *with two wings.*

THE Breeze, or Gad-Fly, is of the ſize of a common blue fleſh Fly, and has black large eyes, with feelers that conſiſt of a long thread like a briſtle, and the body is yellow, only it is ſurrounded with a black belt or ſtripe; the belly is of a tawny colour, except the laſt joint, which is black. The tail is long, bending under the belly, and the wings are whitiſh, and have a black line, with three black ſpots upon each. The female is ſaid to lay her eggs under the back of cattle, under the ſkin, where it lives in the ſtate of a Maggot all the winter.

The Grey Fly, or Trumpet-Fly, is conſiderably bigger than the common Blue Fly, and the body is of a duſky-grey colour, approaching to black; it is ſmooth, except about the breaſt, which is beſet with a great number of yellow long hairs; the wings are large and tranſparent, the body oblong, and the eyes large and black. The female lays her eggs in the noſtrils of ſheep, deer, and ſome other animals. It is called the Trumpet-Fly, from the noiſe it makes in the hot days of ſummer.

The Hornet Fly is as big as a common Hornet, and is ſo like it, that one may be eaſily taken for the other. The head is large, the ſnout long and black, with a ſharp point, and the eyes are prominent, the breaſt is large and bunched, and of a duſky colour, but the wings, legs, and belly, are of an iron-grey; the body on its upper part is black and yellow, and conſiſts of ſeven joints, the three uppermoſt of which are black. and the reſt yellow.

The Waſp Fly is of the ſize of a common waſp, and very much reſembles it in ſhape and colour. The head is ſmooth and yellowiſh, the body blunt, and all its joints, at the edges, are of a pale yellow, and the ſnout is long, and pointed at the end.

The Virginian Hornet Fly is of the ſize of our largeſt Flies, and has a black head, with a ſilver line that runs from the ſhoulders to the mouth; it has large black eyes, a long and ſtrong weapon on its mouth, the ſhoulders are of a blackiſh brown, and it has two ſilver wings. At the back part are ſeven or eight joints of a whitiſh colour, but the other parts are blackiſh, except the belly, which is of yellowiſh aſh-colour, with a greeniſh caſt.

The

The Muſcovite Hornet-Fly has a very long body, with oblong large eyes, that take up the greateſt part of the head; the ſnout is black, hardiſh, and divided into three parts, with which it can penetrate through cloth, and hurt the ſkin of the perſon that wears it.

The Common Horſe-Fly is pretty large, and has a body of an oblong ſhape, and rounded at the end; it is of a grey colour, and has a ſmooth ſkin, with large eyes, and large tranſparent wings. Each of its legs are terminated by four ſhort and ſharp claws, and it has a clavated ſnout, in the ſhape of a cylinder, it being blunt at the end, and the tongue is like a briſtle.

The Swallow's-neſt Fly is but ſmall, and has a ſmall head. The breaſt is ſomewhat in the ſhape of a cone, and the body is broadeſt at the extremity. The wings are long, but remarkably narrow, and the legs are all terminated with ſix ſhort claws. The former of theſe are exceedingly troubleſome to horſes and cattle, and ſtick on firmly wherever they lay hold; ſometimes they will make horſes almoſt mad: the laſt is frequently ſeen on the necks of horſes.

The Great Horſe-Fly has a greyiſh head, and large black eyes, with broad tranſparent wings, but of a duſky colour, marked with iron-grey lines. The breaſt and body are grey, only the back part under the wings is a little yellowiſh, and in the centre of each of the rings, all the way down the back, there is a triangular white ſpot. The thighs are black and the legs yellow.

The Eaſt-Indian Horſe-Fly is a moſt pernicious Inſect, and ſtings and bites moſt terribly. It is about two inches broad, and as much long, and of a brown colour, with a yellow ſtreak along the body. They build their neſts very curiouſly on the rafters of barns or out-houſes, as the Eaſt-Indian Waſps do on the twigs of trees; in theſe the lay their eggs, and hatch their young ones; they feed upon fruit, and after they are killed have a moſt diſagreeable ſmell.

The Green Horſe-Fly was brought from China, and has the body and under wings of a fine ſhining green, which has the luſtre of poliſhed metal; the tips of their wings, and their under ſide, are duſky or black, but

but the upper wings are of a light brown, very thin and tranſparent.

The Purple and Brown Horſe-Fly is a native of the Weſt-Indies, and the wings are of a dirty purpliſh brown, with ſome tranſparent ſpots thereon.

The Burrel-Fly has an oblong body, which is divided into three principal parts, namely, the head, the ſhoulders, and the belly, which laſt has five or ſix joints or rings. It is all over of a whitiſh colour, inclining to grey, and has a ſtrong, brawny, long ſnout. In July and Auguſt it is very troubleſome to horſes and cattle. Mouſet gives us an inſtance of a horſe that was tied with a halter to a tree in a wood, where he was killed in ſix hours time by theſe Flies, which he ſuppoſed was owing to the great loſs of blood, of which they are very fond.

The Fly with white wings, and a black ſpot on each, has a large red head, and a ſhort blunt black body, and black legs; the eyes are large, and, while ſitting, it is conſtantly ſhaking its wings; they are common in orchards upon apple-trees.

The Hairy Fly is of a large kind, and has a body of a black oval ſhape, and its extremities are covered with a great number of yellowiſh hairs, as well as the breaſt. The head and legs are black, and the wings tranſparent. only they are whiteſt towards the baſe, and have each a large iron-grey ſpot towards the outer edge. This is not a very common Fly.

The Black Fly is pretty large, and has a body of an oval blunt ſhape, the breaſt is oblong, the head and eyes large, and the legs are black. The ſides are marked each with a very large pale-coloured ſpot, and the tail is beſet with black hairs; moreover, the ſides of the belly are covered with ſomewhat of a ſhelly ſubſtance.

Of FLIES, *which in a worm ſtate feed upon trees, and plants, and the Inſects thereon, are theſe:*

1. The Fly, with a black oval body, with two marks in the ſhape of half-moons, and three yellow belts.

2. The Fly, with an oval body, and three pair of whitiſh half-moons, called by authors the Elephant's Trunk. It feeds in its worm-ſtate on the pear-tree.

3. The

3. The Oblong Yellow-bodied Fly, with black tranſverſe lines.

4. The Oblong Yellow-bodied Fly, with three pair of yellow ſpots.

5. The Long-bodied Fly, with ſix three-cornered yellow ſpots.

6. The Fly, with the body in the ſhape of a cylinder, with ſix ſpots in the ſhape of half-moons, on the back.

7. The Grey Fly, with four black ſpots on the back.

8. The oblong-bodied Fly, whoſe hinder legs are largeſt.

9. The Fly, whoſe body is marked with three yellow circular lines.

Of FLIES *that have variegated bodies, there are,*

1. The Black Fly, with the baſes of the wings of an iron-grey.

2. The Fly, with a grey breaſt, and the baſe of the belly marked with a yellow ſpot, and having the edges of the ſegments whitiſh.

3. The Black Fly, with all the fragments of the body except the firſt, yellow, and a black mark in the middle.

4. The Fly, with a yellow breaſt, with four yellow

tranſverſe lines on the belly-part, the firſt being larger than the reſt, and interrupted.

5. The Fly, with four yellow ſtreaks on the breaſt, and three of the ſegments of the belly-part yellow.

6. The Black Fly, with a white body, and two black ſtreaks thereon.

7. The Brown and ſomewhat Hairy Fly, with the edge of the belly ſharp, and having three yellow lines, with a triangular ſpot.

8. The Bee-Fly, produced from the long-tailed maggot of neceſſary-houſes. The Black Fly with a velvet body, marked with three tranſverſe lines.

9. The Black Fly, with two yellow belts on the back.

10. The Black Fly, with iron-grey wings, and three white interrupted belts on the back.

11. The Brown Fly, with iron-grey wings, and the edges of the ſegments of the body grey.

Of the Hairy FLIES, *there are,*

1. The Black Fly, with the edges of the wings thin, ſcallopped and whitiſh.

2. The Common Hairy Dung-Fly, with a ſpot on each of the wings.

The

3. The Black Fly, with the baſe of the belly-part white, and its extremity brown.

4. The Fly, with a grey breaſt, and the point of the belly-part white, and the wings marked with an iron-grey ſpot.

5. The Fly, with a grey breaſt, and a black body, having a duſky iron-grey ſpot on each of the wings.

6. The Fly, with a white body, except behind, where it is black, and having white wings, marked with a black ſpot.

7. The Fly, with a yellow breaſt, and a brown ſpot on the wings.

8. The Grey Fly, with iron-grey wings, and a brown ſpot on each.

Of FLIES, *that have variegated wings, there are,*

1. The Fly, with black wings tipped with white.

2. The Fly, with two black ſpots on each wing.

3. The Fly, with white wings and a ſingle black ſpeck on the extremity of each.

4. The unguiculated winged Fly, with white wings and a black ſpot in the middle.

5. The Black Fly, with the wings variegated on the fore part, with black and white.

6. The

6. The Fly, with grey wings, ſpotted with black.

7. The Grey Fly, with unguiculated wings, ſpotted with brown.

8. The Fly, with white wings, whoſe edges are black, and marked with black ſpots.

9. The Fly, with white wings, and three brown ſpecks, and a brown ſpot at the end.

10. The Fly, with white wings, marked with four grey ſtreaks, and as many ſmaller, running alternately between them.

11. The Fly, with white wings, marked with four ſtreaks, and having five pair of ſpots on the back.

12. The Green-eyed Fly, with white wings, and marked with the letter S, in a double line, of a brown colour.

13. The Fly, with white unguiculated wings, marked with four brown ſtreaks, and having the extremity of the breaſt yellow.

14. The Fly, with pale wings, marked with black veins, and two tranſverſe undulated brown lines, and brown tips.

15. The Fly, with membranaceous wings, ſpotted with black, and three rows of black ſpecks on the body.

APIS.—THE BEE.

THESE Inſects are divided into ſeveral Species, which are diſtinguiſhed from each other, by genius, talent, manner, and diſpoſition. Some live in ſociety, and ſhare the toils: others dwell, and work, in ſolitude; building the cradles of their families, as the Leaf-cutter Bee does, with a roſe-leaf; the Upholſterer, with the gaudy

gaudy tapeſtry of the corn-roſe; the Maſon-Bee, with plaſter; and the Wood-Piercer, with ſaw-duſt. But all, in general, are employed, in their little kingdom, with providing for their poſterity, and contributing to the general welfare of their community.

Of Bees there are three ſorts; the Plebeians, the Drones, and the Queen. The Queen, or Parent-Bee, is the ſoul of the hive; to her all the reſt are ſo attached, that they will follow her wherever ſhe goes. If ſhe happens to die, all their labours are at an end, an univerſal mourning enſues, and all her ſubjects die, by rejecting their food. Should a new Queen ariſe, before this cataſtrophe attends the hive, joy renovates their ſpirits, and their toils are renewed. This has been tried by removing the Chryſalis of a Queen-Bee from one hive, to another which had loſt its own Empreſs. But this attachment is only in proportion to the utility ſhe affords to the commonwealth. She is ſo prolific, that ſhe lays 15 or 18,000 eggs, which produce 800 males, four or five Queen-Bees, aud the reſt Neuters, or Plebeians. Their cells differ in ſize; the largeſt are for the males, the royal cells for the Queens, and the

ſmalleſt

ſmalleſt for the Neuters. The Parent-Bee depoſits in thoſe cells ſuch eggs as will produce the ſpecies for which the reſpective cells are deſtined. In two or three days the eggs are hatched; when the Neuters turn nurſes to the reſt, which they feed, moſt tenderly, with unwrought wax and honey. After twenty-one days, the young Bees are able to form colonies, with ſuch indefatigable activity, that they will do more, in one week's time, than they will during all the reſt of the year. Sometimes there are Bees leſs laborious, who ſupport themſelves by pillaging the reſt of the hives; on which a battle enſues between the induſtrious and the deſpoiling Inſects. Frequently contentions will ariſe among them, when a new colony ſeek their habitation in a hive already occupied. Their foes are the the Waſp and Hornet; which will rip open their bellies with their teeth, in order to ſuck out the honey contained in the bladder. Sparrows, ſometimes, are ſeen to take one in their bill, and one in each of their claws.

The Neuter Bees collect from flowers their honey and unwrought wax; they roll themſelves over the ſtamina,

mina, and thus cauſe the duſty eſſence to ſtick to the hairs which cover different parts of their bodies. Being thus laden, they proceed with their burden to the hive; where they are met by other Bees, that ſwallow the wax they bring: this being afterwards refined in the laboratory of their ſtomachs, is again produced by the mouth, as genuine wax, in the form of dough, which is next moulded into cakes of an admirable ſtructure.

From the nectareous effluvia of flowers the Bee collects the honey, by means of its proboſcis, or trunk; which is a moſt aſtoniſhing piece of mechaniſm, conſiſting of more than twenty parts. Entering the hive, the Inſect diſgorges the honey into cells, for winter ſubſiſtence; or elſe preſents it to the labouring Bees. A Bee can collect, in one day, more honey than a hundred chemiſts could extract in a hundred years.

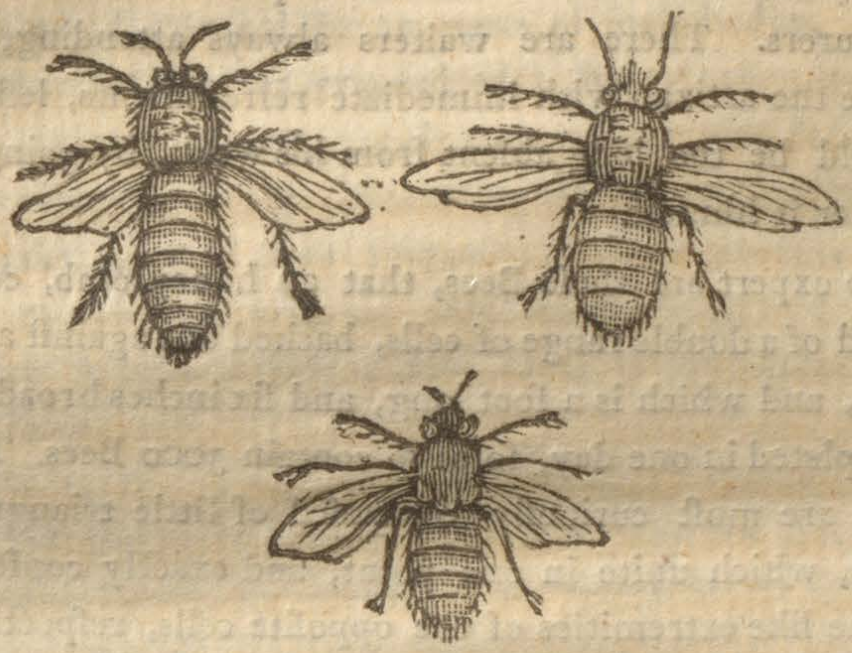
When they begin to form their hive, they divide into four parties; one is deputed to the fields, to collect materials; another is ordered to work on theſe materials; a third is left to poliſh the rough work of the cells;

cells; and the fourth is allotted to provide food for the labourers. There are waiters always attending, to ſerve the artizan with immediate refreſhments, leſt he ſhould be too long abſent from his work, by going to gather it himſelf.

So expert are theſe Bees, that an honeycomb, compoſed of a double range of cells, backed one againſt another, and which is a foot long, and ſix inches broad, is completed in one day, ſo as to contain 3000 Bees. The cells are moſt curiouſly compoſed of little triangular ſides, which unite in one point, and exactly conform to the like extremities of the oppoſite cells, reſpectively. At every cell, the Creator has, moſt wiſely, taught them to form a ledge, which fortifies each aperture againſt the injuries they might receive from the frequent ingreſs and return of the Bees.

How grateful ought we to be for the creation of this admirable Inſect! To his toil and wiſdom we are indebted for one of the moſt agreeable and wholeſome ſubſtances afforded by Nature. Were it not for the Bee, theſe flowery ſweets would be loſt in the "deſert "air," or decline with the fading flower. All the various uſes to which wax is applied, would be loſt to man, had not the Bee an exiſtence.

EVERY



EVERY ſwarm conſiſts of three kinds of Bees, the moſt numerous of which are the common ſort, whoſe buſineſs it is to gather the honey and wax. Theſe may be called the labouring Bees, and, according to the moſt curious obſervers, they are neither male nor female. The ſecond ſort are the drones, and theſe are males. Of the third ſort, there is generally but one which was commonly called the king, but is now known to be the queen; for it is a female, and is always the mother of a numerous poſterity.

A Bee

A Bee conſiſts of three parts, namely, the head, the breaſt, and the belly. The head is armed with two jaws and a trunk. Theſe jaws, or rather nippers, play in opening and ſhutting, to the right and left, and are uſed inſtead of hands, to take up the wax to knead it, and to throw out whatever is uſeleſs. One of theſe is as long again as the other, and the longeſt is a little thicker on one ſide, but becomes leſs gradually to the other end; it is a little crooked or bent about the middle, and is ſurrounded at the baſe with four hollow branches, like the pieces of a reed cut into four parts; the other is more thick, but very ſhort, with branches that are hardly viſible, they being very cloſe to each other; in the firſt there is a trunk deſigned for labour, and in the ſecond there is another, folded up in its ſheath; and by the firſt trunk, a Bee can gather more honey in a day, than a hundred chemiſts in a hundred years. It is long, pointed, ſupple, and moveable every way, and the Bee can thruſt it to the bottom of the cup of the flower, notwithſtanding the leaves and the ſtamina are in the way, where it ſucks out the honey, and carries it to the hive. But as this trunk, if it were always extended, would be incommodious, and might be broken

by a thouſand accidents, it is compoſed of two pieces, united by a ſpring or joint, in ſuch a manner, that after it has performed its work, it may be ſhortened, or rather folded up, and ſo preſerved from danger, by the help of four ſtrong ſcales, two of which lie immediately upon it, and the two others, which are larger, and more hollow, cover them all.

The middle of the body of the BEE, or corſlet, is furniſhed with ſix legs or paws, and four wings, of which two are large, and two are ſmall. It is all over covered with hair, that ſerves to retain the particles of wax which fall from the top of the ſtamina to the bottom of the cups; at the end of which claw there are two ſmall hooks, which by the help of a microſcope, appear to be like two ſickles, proceeding from the ſame handle, having the points oppoſite to each other. Theſe crooked nails, which are uſeful to ſupport the Bee upon many occaſions, lie upon two ſpungy cuſhions, to render cheir common walking more ſoft and eaſy.

The belly of the Bee is joined to the corſlet by a thread, and is divided into ſix rings, which ſometimes

ſhorten

ſhorten the body, by ſlipping one over another; the inſide of the belly conſiſts of four parts, the inteſtines, the honey-bag, the venom, and the ſting. The inteſtines ſerve for the digeſtion of the food, as in all other animals, and the honey-bag is as tranſparent as cryſtal, containing the honey that the Bee has ſucked from the flowers, of which the greateſt part is carried to the hive, and poured into the cells of the honey-comb, and the remainder ſerves the Bee for nouriſhment; that in the hive being to ſerve for winter proviſion. The bladder of venom, or gall, is at the root of the ſting, of which the Bee lets fall ſome drops through a pipe, into the wound made by the ſting, that it may have a worſe effect. The ſting is compoſed of three parts, namely, of the ſheath and the two darts; the ſheath terminates in a very fine point, only there is an opening a little below it, thro' which the venom paſſes. Both the darts have ſeveral ſmall points or barbs, like thoſe of a fiſh-hook, which render the ſting more painful, and hinder the darts from ſlipping out again; or at leaſt not without much difficulty to the Bee. The ſheath itſelf has a ſharp point, and makes the firſt wound, which is followed by that of the darts, and pouring out the

venomous

venomous fluid. This ſheath is connected to pretty ſtrong muſcles, by which it is drawn back, unleſs the ſting ſticks too faſt, and then it is drawn out of the body of the Bee along with it. The pain cauſed by the wound is attended with a little ſwelling, which will continue ſeveral days, unleſs the ſting be immediately taken out.

The DRONE, which may be ſeen on the right ſide in page 152, may be diſtinguiſhed from the working Bee, not only by the trunk, the teeth, and the eyes, but by the corſlet, which is more hairy than that of the common Bee, and the rings of the belly are more ſmooth. Beſides, the hairs of the bruſhes of the hind feet are more crowded together, and ſhorter. The body is generally larger and longer, by about a third part, and the head in particular is more round, and more full of hair. Add to this, that at certain ſeaſons, there are two fleſhy horns behind, about a third part as long as the body, and ſometimes longer; and between theſe horns there is a fleſhy ſubſtance, which riſes upon the hinder part of the body, and is crooked like a bow. The inward parts are alſo different, for he has no ſting,

and

and within the body there is little elſe but thick, white, crooked veſſels, that are pretty ſolid, and contain a milky fluid. They have a honey-bag, indeed, like the reſt; but there is no ſmall pipe or canal, which runs from the bag to the neck, by which means, the common Bees depoſit their honey in the magazine; for if you preſs a Bee ever ſo little, the honey will come out by this pipe, which it will not do in the Drone; and conſequently it brings nothing to the common ſtock. It is well fed, never works, nor goes into the fields, but wanders about the hive at full liberty. Its having no ſting, perhaps, may be owing to the want of an enemy to defend itſelf againſt. However, it appears, that the Drones are deſigned only for the multiplication of their kind; therefore, when the ſummer is paſt, and the queens have done breeding, the other Bees uſe the Drones ill, and drive them away from the hives, that they may not be a burthen to the reſt, ſince they then would do nothing but eat. They likewiſe fall upon the young drones that are not yet hatched, pull them out of their cells, kill them, and throw them out of their hives. It is to no purpoſe for the drones to ſtruggle, for if they will not go away freely, they take them by the wings

and

and ſhoulders, and thruſt them out, leaving only a very few behind, and thoſe of a ſmall kind, that they may not devour too much of the honey, and theſe are kept only for the next year's uſe; for this is obſervable, that the queen is full of eggs in the beginning of the ſpring, though the Drones are not then much different from other Bees in ſize. As for the drones that are driven away, they either die with hunger, are killed by the rain, or are devoured by birds; and ſometimes the ground will be almoſt covered with them near the hives.

The QUEEN, as exhibited on the left ſide of the three figures in page 152, is longer, but not ſo thick as the Drone, and the wings are very ſhort, in proportion to the length of the body; for they ſcarcely cover it half way. The trunk is much ſhorter, and more ſlender, than that of the working Bee; but longer and thicker than that of the Drone. The corſlet is brown, and the rings of the belly are of a deep cheſnut-colour. The ſting is much larger than that of the common Bee; but inſtead of being ſtrait, turns back a little towards the belly, and the bladder of venom is proportionable thereto. Her

eggs

eggs are diſtributed into two ovaries, one of which is on the right ſide, and the other on the left. Each ovary is an aſſemblage of veſſels, all which terminate in a common canal, and they are full of eggs at the time of breeding.

The ancients were of opinion, that the generation of Bees was occaſioned by putrified ſubſtances, and not in a manner analogous to that of other animals. Some who have built their faith too much on what *Virgil* has ſaid in the fourth book of his *Georgicks*, in the fable of the ſhepherd *Ariſtæus*, and have taken a bull of two years old, have ſtopped up his noſtrils, and afterwards killed him, and ſo left him to putrify. But this procedure was ſo far from producing ſwarms of Bees, that they only met with thouſands of maggots, and a dreadful ſtench. Others have publiſhed variety of fictitious ſtories, to acquaint the world in what manner theſe inſects generated.

During the greater part of the year, there is but one female in every hive, which may readily be diſtinguiſhed from other Bees, by the ſhape of her body, as was before

before obſerved; but it is ſomewhat difficult to find her out. The males, who may be ſeen by hundreds, ſpend almoſt their whole lives in company with the female. For this reaſon, they are ſeldom out of the hive, but they lie idle therein, doing nothing at all but feeding upon the honey, which the working Bees have gathered. A ſingle Bee is ſufficient for ſtocking the whole hive, for ſhe is moſt amazingly fertile, and on her alone depends the hope of a future progeny. It is certain, that all the Bees leave off working, and take no farther care of futurity, after the death of the Queen. Beſides, if any other female Bee be put in among them, ſhe is immediately acknowledged for Queen. The life of all the reſt is nothing in compariſon of her's. They do her all manner of ſervices, and pay her all the homage, that is due from ſubjects to a ſovereign: for ſhe never goes abroad without a numerous guard; they keep her body clean with their trunks, and follow her wherever ſhe goes. In ſhort, the life of the reſt of the Bees depends upon that of the Queen, for in a few days after her death, they will all ſuffer themſelves to die with hunger.

The

The working BEES, one of which we have exhibited in page 152, are always very provident in providing cells for the young; and will leave off their common employment, to conſtruct proper receptacles for the eggs. They build, purpoſely, little cells, of a roundiſh oblong ſhape, and extremely ſolid, and employ great plenty of wax in this work. This poſition is greatly different from that of the other combs: theſe ſort of Bees know, or at leaſt appear to know, what number of eggs the queen lays in a year, from whence proceed other females, that give birth to ſeveral thouſands of the working Bees, and ſeveral hundred males. Sometimes they lay but three or four at firſt, and ſometimes none at all; but in this laſt caſe, the hives produce no ſwarms. The fecundity of this Bee is ſuch, that in ſeven or eight weeks time, ſhe will produce 10 or 12,000 Bees and upwards. Generally ſpeaking, ſhe lays but one egg in each cell, becauſe it would not be ſufficient to hatch any more. In two or three days time, according to the heat of the weather, the egg will appear hatched at the bottom of the cell. It has the appearance of a kind of maggot, which is always white, and placed in the ſame attitude, that is, rolled up like

a ring, lying ſoftly in a bed of a kind of jelly, of a whitiſh colour; and this is what the brood feeds upon. The common Bees are a kind of nurſes to the brood, and have greater affection for it than the hired nurſes among mankind. They take great care in viſiting each cell, and in examining whether any thing is wanting. They are fed with honey and wax, prepared in the bodies of the Bees; and in leſs than ſix days time, the worm comes to its full growth. When the Bees perceive that the worms have no farther occaſion for feeding, they ſhut them up in their lodgings, and wall them up, if the expreſſion may be allowed, with wax. Then the worm continuing in a ſtate of perfect reſt, begins to grow larger, and lines the walls of the cell with ſilken tapeſtry, which they ſpin in the ſame manner as Caterpillars, before they undergo their laſt transformation. But it is obſervable, that the Bees bring them more nouriſhment than they are able to conſume. Before they ſpin their covering, they eat up all their proviſion of jelly, leaving the bottom of the cell clean and dry. In a day's time, or longer, they obtain their full growth, and then they caſt off their ſkins, which ſerved them in their worm ſtate, and become an Aurelia or

Nymph.

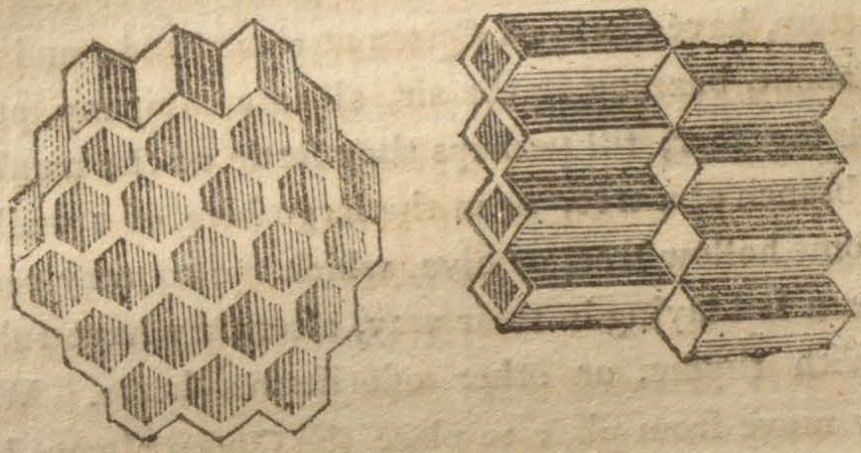
Nymph. The worms that produce Drones, are of the ſame ſize as thoſe of the working Bees. Theſe laſt take care of them with the ſame application; and it may well be imagined that they are not leſs attentive to thoſe which are to be metamorphoſed into female Bees; for it has been obſerved, that they ſupply them with nouriſhment in greater profuſion.

When all parts of the Aurelia have acquired the conſiſtence proper to the parts of the Bee, then that which is to appear opens its priſon, by piercing with its teeth the waxen cover about its middle. The Bees then flock about it, and ſeem to expreſs their joy, that they are going to be metamorphoſed; and this they diſcover by their good offices. Two or three of them lick and clean all its ſides with their trunks, and ſome of them feed it with honey. Others again begin immediately to cleaſe the cell that has been juſt left, and carry away the filth out of the hive. As ſoon as the external parts of the young Bee become dry, it begins to diſcover what employment it is to have during life; for it immediately proceeds out of the hive, and goes in queſt of flowers; and is not at all at a loſs to find its way back to the common habitation. After this firſt ſally,

it begins ſometimes to gather the powder of the ſtamina; and MARALDI aſſures us, that he has ſeen one of theſe, on the very day it came into the world, return back with two large balls of this ſubſtance. When the Bees firſt begin to break their priſons, there is generally above 100 of them in a day; inſomuch that, in the ſpace of a few weeks, the number of the inhabitants becomes ſo great, that the hive cannot contain them; and then they begin to ſally out in ſwarms. Young Bees are the browneſt, with red hair, and the old are of a lighter colour, with red hair. The ſwarm is made on purpoſe to ſeek out a new ſettlement; at the head of which is the Queen; for one of theſe is ſufficient to conduct the whole ſwarm. About five or ſix days after the birth of a female Bee, ſhe is ready to lay her eggs, and conſequently is in a condition to place herſelf at the head of thoſe that are diſpoſed to follow her.

While the BEES have room enough in their hives, they remain quietly together; but when it becomes too little, then the old Bees continue in them, and the young ſally out, to go and ſeek a new ſettlement; if they ſhould refuſe, a bloody battle would enſue, and therefore

therefore the young ones are generally wiſe enough to ſubmit. The young Bees, thus going out to ſeek new quarters, have always a Queen at their head; and they fly about, buzzing in the air, all in a company, pretty cloſe together, till perhaps they ſettle on the trunk, or the branch of a tree, or in the large hole of a wall, or in ſome hollow tree, or hive, which the country people ſeldom fail laying in their way, after they have rubbed it with thyme, or other odoriferous herbs. When they move from place to place, the Queen always leads the way, and enters firſt into the hole they deſign for their abode, and all the reſt follow her. The owners often let them know there is a lodging provided for them, by the ſounding of a bell, or a braſs kettle, which makes ſuch an impreſſion upon them (for perhaps they take it for thunder, which will be followed by a great ſtorm) that they immediately conſider with attention the place that is provided for them, and they immediately enter in. Then ſome one takes up the hive, very gently, and places it upon a bench, or ſome ſuch thing, where the bottom may be ſo cloſe, that no inſects, or vapours from the ground, can enter in. There is always a ſmall hole left at the bottom of the hive, for them to go in and out.



THE BEE COMB.

THE ſubſtance they build their cells with, is nothing elſe but the wax which is gathered from the different ſorts of flowers; and the deſign of their work is a lodging for themſelves and their young. When they begin to work in their hives, they divide themſelves into four companies, one of which roves in the fields in ſearch of materials, and the others employ themſelves in laying out the bottom and partitions of their cells; others make the inſide ſmooth from the corners or angles, take away the ſuperfluous wax, and bring the

the work to perfection. The fourth company bring food for the reſt, that they may not leave their work; but they give nothing to thoſe that go into the fields in ſearch of wax, becauſe they may provide food for themſelves. They often change their employment; thoſe that have been at work, being permitted to go abroad, and thoſe that have been in the fields already, take their places; and doubtleſs, theſe ſort of changes is a great alleviation of their labour. They have ſome ſort of ſigns by which they underſtand each other; for when any one wants food, it bends down its trunk to the bee from whom it is expected, which opens its honey-bag, and lets ſome drops fall into its trunk, which at this time is opened wider, on purpoſe to receive it. Their diligence at labour is ſo great, that in a day's time they are able to make cells, which lie upon each other, numerous enough to contain three thouſand bees.

Theſe cells are compoſed in a more exact proportion than thoſe of waſps; for in theſe their bottoms terminate in a point deſigned to receive the egg, which perhaps could not be ſo certainly hatched, if it was laid upon a broad bottom. The bottoms of theſe

cells are compoſed of little triangular panes, which, when united together, terminate in a point, and lie exactly upon the extremities of other panes of the ſame ſhape in the oppoſite cells. Theſe lodgings are compoſed of a double row of cells, which touch at the bottom, and are ſuſpended perpendicularly, with a ſpace between each two, large enough to give the bees a free paſſage in and out, and narrow enough to preſerve the neceſſary heat. All the cells are defended by a border, which makes the door a little leſs than the inſide of the ſhell, which renders their works ſtronger, and is the more neceſſary, as bees will live ſeven or eight years. Their houſes or cells do not become weak by length of time, ſince each egg firſt turns to a maggot, and then into a bee, at which time the outward covering is left behind, and united cloſe to the ſides of the ſhell, inſomuch, that they become more ſubſtantial every year. They have cells that ſerve for ſeveral purpoſes, namely, to lay their young in, for their wax, and for their honey.

Theſe cells are of ſo regular a form, and applied ſo ingeniouſly one againſt another, that every thing ſeems to be diſpoſed, with ſuch ſymmetry, and ſo well

well finiſhed, as to exceed even the efforts of human induſtry. All the cells are hexagons, that is, they have ſix equal ſides; and this figure not only takes up the leaſt room, but is the moſt capacious.

It is no eaſy matter to ſee them at work, except by the aſſiſtance of a glaſs hive. They are always ready to aſſiſt each other in laying the foundation of ſome new comb, or in enlarging the old, though a ſpectator might conclude, from the hurry that they are in, that there was nothing but confuſion among them. However, it is eaſy to perceive that their teeth are the inſtruments by which they model and faſhion their combs. They begin at the bottom of their building, and ſeveral of them work at a time at the cells, which have two faces. But if they are ſtinted, with regard to time, they give the new cells but half the depth which they ought to have, leaving them imperfect, and put off finiſhing them till they have ſketched out the number of cells which are neceſſary for the preſent time. The conſtruction of their combs coſts them a great deal of labour, for they are not able to make them in molds, as at firſt ſome might think they were. They are all buſied in erecting, ſhaping, and poliſhing the cells that are unfiniſhed; and the

uſe they make of them, is to lodge their honey, and to depoſit their brood therein; for there the eggs increaſe and grow, till they are transformed into Bees. But the cells deſigned for the worms to change into drones, ought to be larger than the reſt; and for that reaſon, they make ſome with greater diameters than others. The cells of the brood, at different times, ſerve for the honey-combs; however, thoſe that were deſigned for the honey only are much deeper than the reſt. When the harveſt of honey is ſo plentiful, that they have not ſufficient room for it, they either lengthen their combs, or build more, which are much longer than the former.

Sometimes they work at three combs at a time: for when there are three workhouſes, more bees may be employed at a time, without embarraſſing each other, and they can perform their buſineſs more readily. The combs are generally parallel to each other, and are ſlightly faſtened to the top of the hive. There is always a ſpace between two combs, which are like ſtreets, that will only admit two at a time a-breaſt. Though the combs conſiſt of very thin leaves of wax, yet when they are full of honey, they become heavy. The bees have a method of connecting their combs to

the ſides of their hive; for which reaſon, thoſe that make them ſhould place ſmall ſticks acroſs each other, to ſerve as ſupports to the combs that are to be built, which will ſave the bees a great deal of labour.

The ſubſtance wherewith they make their combs is gathered from flowers, but not from every ſort indifferently; for it is only on the ſtamina of flowers, that yield proper materials for making their wax; for they find none ready made. It is very common to ſee bees ſitting upon flowers, with their bodies all over powder, which they could have got no where elſe. Sometimes they are ſo full of it, that they become quite yellow, and might be miſtaken for another inſect. However, they take care to clean themſelves with the bruſhes of their feet, and to make the powder into two ſmall balls, which they place in the two triangular cavities of their hinder legs. Sometimes theſe balls are as large as a grain of pepper, a little flatted.

When the flowers are not fully blown, the bees pinch the tops of the ſtamina with their teeth, wherein they know the grains of duſt are incloſed; and by this means they force them open. Some of theſe balls are

yellow, others red, others of a whitiſh yellow, and others again green. This ſubſtance, however, does not, as is generally ſuppoſed, become wax, till it has been eaten and digeſted by the bee. In April and May the bees are buſy from morning to evening, in gathering this ſubſtance for making the wax; but when the weather becomes hot, in June and July, they work only in a morning, till about ten o'clock; becauſe, when the powder of the ſtamina has been moiſtened with the dew, or with the fluid that they tranſpire, it is of a more proper conſiſtence than that at other times, to be moulded into a maſs.

It is ſaid, that the ſecond ſtomach is the organ by which this powder is altered, digeſted, and connected into real wax, and is thrown out through the ſame paſſage that it went in. It is with this ſort of paſte that they build their combs, and when it is dry, it becomes the ſubſtance, named Bees-wax. Every comb newly made is white; but they become yellowiſh as they grow old, and the very oldeſt of all become almoſt black. But all theſe do not furniſh wax equally white, as is well known to thoſe whoſe buſineſs it is to blanch it.

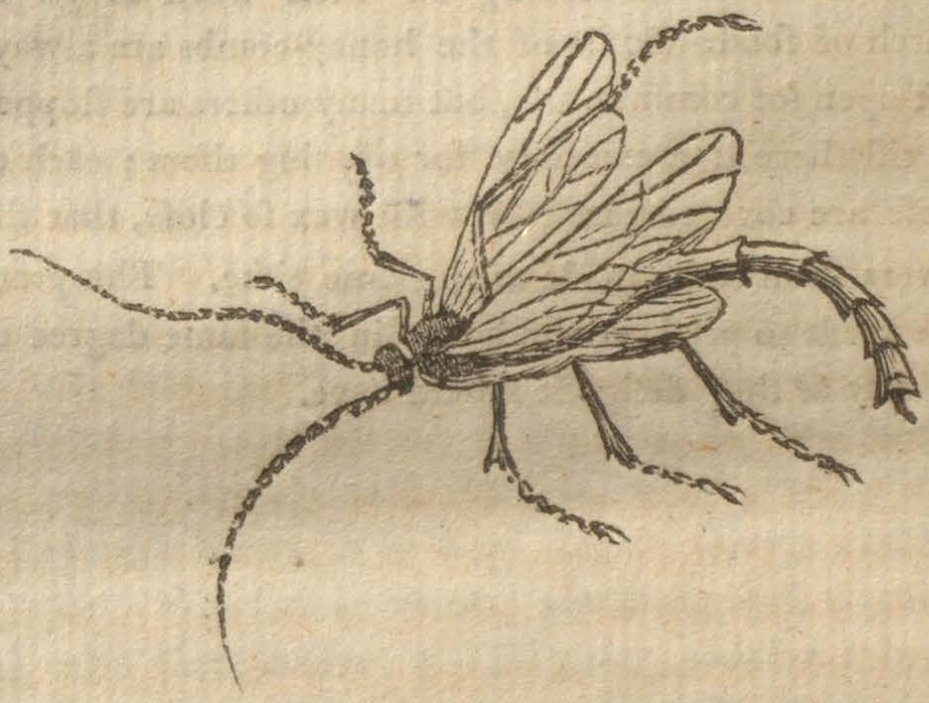
However,

However, as it is neceſſary for bees to make a proviſion of rough wax, there is in every hive a pretty large portion of the combs, whoſe cells are filled with nothing but wax; and theſe are like ſo many little magazines, where the bees go to depoſit their little balls, one after another; while other bees take care to knead them, preſs them, and place them in order. Thoſe proviſions of undigeſted wax, which ſome have called bee-bread, ſerve them in winter, as feeding upon honey alone would give the animal a ſcowering, that would quickly carry it off. The bees ſometimes come out of their hives at four o'clock in the morning, and continue labouring till eight in the evening. They fly backwards and forwards four or five times in a day, and ſometimes more, for this depends on the length of their journies, and the plenty of flowers.

It is obſervable, that the bees extract but a ſmall quantity of real wax out of the powder which they gather; becauſe a great part of the materials of wax ſerves to feed them; it is alſo remarkable, that the drones never employ themſelves in making wax, all their nouriſhment being honey. With regard to the honey, it is but lately taken notice of, that there are

veſſels in flowers full of a ſweet fluid, to which authors have given the name of nectarium, and it is to theſe that the bees reſort, to gather the liquor, which afterwards becomes honey. For this purpoſe, they make uſe of their trunks, and with theſe the bees conduct the fluid to their mouths, cauſing it to run along the upper part of their trunks. The powder of the ſtamina produces the nouriſhment of bees; and it is very well known, they do not make honey on purpoſe for us. The ſweet fluid falls from the œſophagus, or gullet, into the firſt ſtomach, which, while it is filled with honey, is in ſhape like an oblong bladder. Children that live in country places are well acquainted with this bladder; and they even ſeek for it in the bodies of the bees, and more eſpecially in thoſe of humble bees, to ſuck out the honey. When a bee has ſufficiently filled its firſt ſtomach, it returns back to the hive, where it throws up the honey into a cell. There is reaſon to believe that the honey does not return out of the body unchanged; becauſe the firſt ſtomach is capable of contraction, in the ſame manner as that of ruminating animals. It often happens, that the Bee, inſtead of flying back to the hive, goes back to places where the other Bees are buſy in their ſeveral.

ral employments, and offers them honey, perhaps to hinder them from leaving off their work to go in ſearch of food. Some of the honey-combs are always left open for common uſe, but many others are ſtopped up till there is a neceſſity for opening them; each of theſe are covered carefully with wax ſo cloſe, that the covers ſeem to be made at the ſame time. This practice tends to preſerve the honey in the ſame degree of fluidity as they deſign it ſhould have.



THE ICHNEUMON.

THE mouth has jaws, without any tongue. The horns contain more than thirty joints; and the abdomen is generally joined to the body by a pedicle. The ſting is incloſed in a cylindrical ſheath, compoſed of two valves.

Character.

ONE diſtinguiſhing and ſtriking character of theſe ſpecies of flies, is the almoſt continual agitation of their antennæ. 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 and Mangouſte deſtroy the Crocodile. The variety to be found in the ſpecies of Ichneumon is prodigious among the ſmaller ſpecies. The males perform their courtſhips in the moſt paſſionate and gallant manner. The poſterior part of the females is armed with a wimble, viſible in ſome ſpecies, no ways diſcoverable in others; 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-wimbled fly. The food of the family to be produced by this fly, is the Larva of Waſps, or Maſon-Bees; for it no ſooner perceives one of thoſe neſts, than it fixes on it with its wimble, and bores through the mortar of which it is built. The wimble itſelf, of an admirable ſtructure, conſiſts of three pieces:

two

two collateral ones, hollowed out into a gutter, ſerve as a ſheath; and contain a compact, ſolid, dentated ſtem; along which runs a groove, that conveys the egg from the animal, which ſupports the wimble with its hinder legs, leſt it ſhould break; and, by a variety of movements, which it dexterouſly performs, it bores through the building; and depoſits one or more eggs, according to the ſize of the Ichneumon, though the largeſt drop but one or two. Some agglutinate their eggs upon Caterpillars eggs, 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; which appears healthy, and even ſometimes transforms itſelf to a Chryſalis. It is not uncommon to ſee Caterpillars fixed upon trees, as if they were ſitting upon their eggs; and it is afterwards diſcovered that the Larvæ, which were within their bodies, have ſpun their threads, with which, as with cords, the Caterpillars are faſtened down, and ſo periſh miſerably.

The Ichneumons performed ſpecial ſervice in the years 1731 and 1732, by multiplying in the ſame proportion as did the Caterpillars: their Larvæ deſtroyed more of them than could be effected by human induſtry. Thoſe Larvæ, when on the point of turning into Chryſalis, ſpin a ſilky cod. Nothing is more ſurpriſing and ſingular, than to ſee thoſe cods leap, when placed on the table or hand. Plant-lice, the Larvæ of the Curculiones, Spider's eggs, are alſo ſometimes the cradle of the Ichneumon Fly. Carcaſes of 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, deſtroys the ſprings and inward economy of the Plant-louſe, performs its metamorphoſis under ſhelter of the pellicule which enfolded it, contrives itſelf a ſmall circular outlet, and ſallies forth into the open air.

There are Ichneumons in the woods, which dare attack Spiders, run them through with their ſting, tear them to pieces, and thus avenge the whole nation of flies of ſo formidable a foe: others, deſtitute of wings (and thoſe are females), depoſit their eggs in Spiders neſts. The Ichneumon of the bedeguar, or

ſweet-

ſweet-briar ſponge, and that of the roſe-tree, perhaps, only depoſit their eggs in thoſe places, becauſe they find other inſects on which they feed.

The Genus of the Ichneumon flies might, with propriety, be termed a race of diminutive canibals.

FOR-

THE LARGE WOOD ANT,

As viewed through the Microscope.

FORMICA.

Character.

A Little upright scale is situated between the breast and the belly. The feelers are broken, and have the first

first articulation longer than the reſt. The Females and Neuters have a ſting, concealed in the abdomen. The males and females are winged; and the Neuters are apterous, or without wings.

FORMICA.---THE ANT.

NOT to impoſe upon our Readers thoſe fables which have been related of this remarkable Inſect, we ſhall confine ourſelves to the moſt authentic accounts, and to our own obſervations, in what we ſhall briefly mention reſpecting the Ant. Sanctorius ſays, when the Ants carry any corn to their habitations, they carry it, exactly in form and intention, as they do bits of wood, for the conſtruction of their dwellings merely. For what purpoſe ſhould they provide corn for the winter, when they paſs that ſeaſon without motion? But, from what we have lately obſerved ourſelves, we rather imagine this error aroſe from ſome perſons having ſeen them dragging a number of their Aurelias, when

when they have been removed, by a hoe or ſpade, again to their repoſitories; for theſe Aurelias are exactly of the ſize and colour of a grain of wheat. The great prudence Ants diſcover is in ſheltering themſelves from cold, which, when ſevere, almoſt deprives them of motion.

At the beginning of March, if the weather be warm, they go abroad in ſearch of nouriſhment. If corn be thrown to Ants, they will remove it, from place to place, by ſome dragging, others lifting, and two or three more puſhing forward, the weighty maſſes, as a grain of wheat muſt be conſidered in proportion to their ſize and ſtrength. They have the precaution to make a bank, near ſix inches high, above the entrance; and to make ſeveral roads, to go out and in, by what may be called their terrace-walk. From May or June, they work until the ſeaſon's change diſcontinues their induſtry. This labour is entirely for the preſervation of their brood, which is produced during the fine weather. When they attack fruit, they tear it into ſmall bits, and thus is each Ant enabled to carry home his provender. Liquors, which are ſweet, they have a

mode

mode of ſaving, and carrying home for their young. They ſend their foragers to ſeek for food: if one of them proves ſucceſsful in finding ſome, he returns to inform the republic, and immediately they ſally from their town, to capture the prize. To prevent any delay, obſtruction, or confuſion, they have two tracks; one for the party loaded, and the other for that which are going to load themſelves. Should any be killed, ſome of them inſtantly remove the ſlain to a diſtance. When proviſions are ſcarce, they portion them according to their preſent and future wants.

A neſt of Ants is a ſmall well-regulated republic, united by peace, unanimity, good underſtanding, and mutual aſſiſtance. Great police in their little labours, prevents among them thoſe diſorders which frequently embarraſs and perplex the happineſs of even man, who aſſumes to himſelf the title and conſequence of Lord of the Creation. Each Ant has its taſk aſſigned it; whilſt one removes a particle of mould, another is returning home to work. They never think of eating, until all their taſk is performed. Within their common, but ſubterraneous hall, which is about a foot deep, they aſſemble,

assemble, form their social communities, shelter themselves from bad weather, deposit their eggs, and preserve their Aurelias; which, resembling grains of corn, as was observed before, has caused many to mistake them for their granaries.

THE

THE SEVENTH ORDER.

INSECTA APTERA.

APTEROUS Insects are distinguished from those of every other Order, by neither sex having wings.

FIGURE

FIGURE 1.

This ſmall ſpider is of a ſcarlet colour. It was found in a wood the beginning of June. They are likewiſe found on trees in gardens. They are the only ſpecies of Spiders that are thought to be venomous, except the Tarantula: for Spiders are, in general, more frightful than injurious. This Spider, and all the reſt here deſcribed, are drawn from Nature; and are exactly the ſize of the Spiders themſelves.

FIGURE 2.

Has ſix eyes. It was found in a wood in April. The colour is chiefly dark, with a broad ſtreak of light colour in the middle of its back; and the form of a diamond, of the ſame colour, on the upper part of its belly. The legs are beautifully ſpotted.

FIGURE 3.

This ſmall long-legged Spider is ſo finely marked, that it is impoſſible to deſcribe it, either in words or colours; there being ſo admirable a combination of

green,

green, red, and black, interchangeably diſpoſed into the moſt agreeable forms. The legs are as curiouſly marked with the ſame colour. Its ſmall eyes are not diſcernible.

FIGURE 4.

This is one of the Leaping Spiders. It has eight eyes, placed in a circle; and all that have their eyes, thus diſpoſed, leap at their prey, like a cat ſeizing a mouſe. It is extremely nimble; and was taken in a garden. When viewed through a microſcope, its beauty appears unparalleled. Black, cheſnut, red, and white, are moſt admirably diſpoſed into the moſt beautiful forms; but to the naked eye, it only appears rough, hairy, and grey ſpeckled. Dr. HOOK gives the following diverting account of this Spider, as deſcribed by Mr. EVELYN in his Travels through Italy:

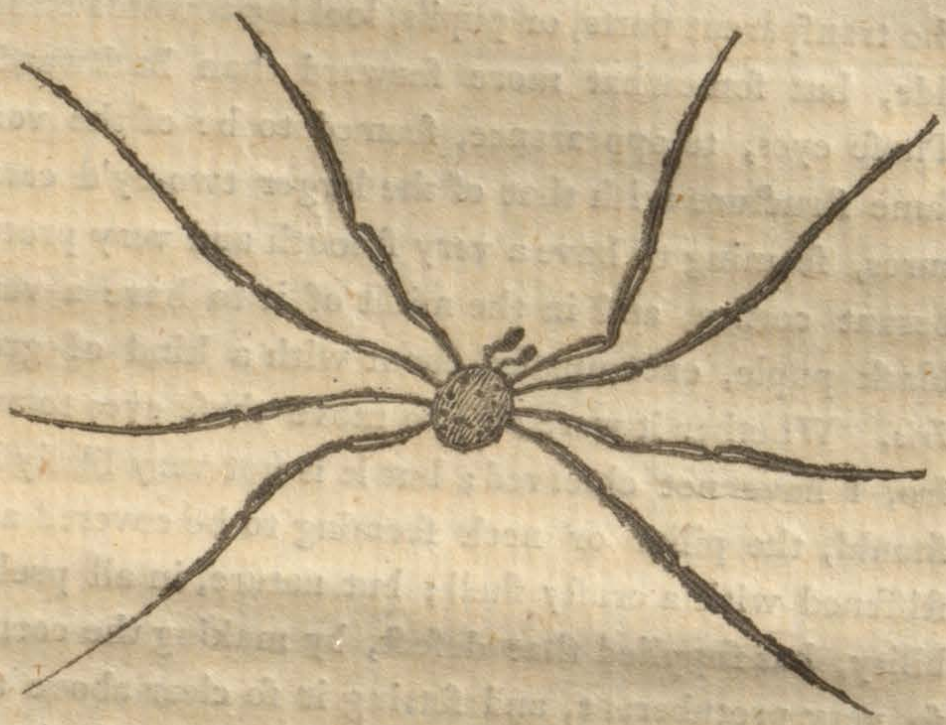
"Of all the ſorts of Inſects," ſays he, "there is none has afforded me more diverſion than the ſmall Grey Jumping Spider, prettily beſpeckled with black ſpots over the body, which the microſcope diſcovers to be a kind of feathers, like thoſe on Butterflies wings, or the body

body of the White Moth. It is very nimble by fits, ſometimes running, and ſometimes leaping like a Graſshopper; then ſtanding ſtill, and ſetting itſelf on its hinder legs, will very nimbly turn its body, and look round itſelf every way. Such," ſays Mr. EVELYN, "I did frequently obſerve at Rome, which, eſpying a Fly at three or four yards diſtance, upon the balcony where I ſtood, would not make directly to her, but crawl under the rail, till, being arrived right under her, it would ſteal up, ſeldom miſſing its aim: but, if it chanced to want any thing of being perfectly oppoſite, would, at firſt peep, immediately ſlide down again; till, taking better notice, it would come, the next time, exactly upon the Fly's back; but, if this happened not to be within a competent leap, then would this Inſect move ſo ſoftly, as the very ſhadow of the dial ſeemed not to be more imperceptible, unleſs the Fly moved; and then would the Spider move alſo in the ſame proportion, keeping that juſt time with her motion, as if the ſame ſoul had animated both thoſe little bodies; and, whether it were forwards, backwards, or to either ſide, without at all turning her body, like a well-managed horſe: but if the capricious Fly took wing, and pitched upon another place, behind our huntreſs,

then

then would the Spider whirl its body ſo nimbly about, as nothing could be imagined more ſwift; by which means, ſhe always kept the head towards her prey, though, to appearance, as immovable as if it had been a nail driven into the wood, till, by that indiſcernible progreſs, being arrived within the ſphere of her reach, ſhe made a fatal leap, ſwift as lightning, upon the Fly, catching him in the pole, where ſhe never quitted hold till her belly was full, and then carried the remainder home. I have beheld them inſtructing their young ones how to hunt; which they would ſometimes diſcipline for not well obſerving; but when any of the old ones did miſs a leap, they would run out of the field, and hide themſelves in their crannies, as aſhamed, and not be ſeen abroad for four or five hours after: for ſo long have I watched the nature of this ſtrange Inſect, the contemplation of whoſe wonderful ſagacity and addreſs has amazed me: nor do I find, in any chace whatſoever, more cunning and ſtratagem obſerved. I have found ſome of theſe Spiders in my garden, when the weather, towards the ſpring, is very hot; but they are nothing ſo eager of hunting as they are in Italy."

THE



THE CARTER, OR LONG-LEGGED SPIDER.

THE CARTER, or LONG-LEGGED SPIDER, for two particularities has very few creatures like it; the firſt, which is diſcoverable only by the microſcope, is the curious contrivance of his eyes, of which he has only two, and thoſe placed upon the top of a ſmall pillar or hillock, riſing out of the middle of the top of its back, or rather the crown of its head; for they were fixed on the very top of this pillar, placed back to back, with

the tranſparent parts, or pupils, looking towards either ſide, but ſomewhat more forward than backwards. Theſe eyes, to appearance, ſeemed to be of the very ſame ſtructure with that of the larger two-ey'd creatures, ſeeming to have a very ſmooth and very protuberant cornea, and in the midſt of it to have a very black puple, encompaſſed about with a kind of grey *Iris*. Whether it were able to move theſe eyes to and fro, I have not obſerved; but it is not very likely he ſhould, the pillar or neck ſeeming to be covered and ſtiffened with a cruſty ſhell; but nature, in all probability, has ſupplied that defect, by making the cornea ſo very protuberant, and ſetting it ſo clear above the ſhadowing or obſtructiug of its proſpect by the body, that it is likely each eye may perceive, though not ſee diſtinctly, almoſt an hemiſphere; whence having ſo ſmall and round a body, placed upon ſuch long legs, it is quickly able ſo to wind and turn it, as to ſee any thing diſtinct. This creature, as do all other Spiders, differs very much from moſt Inſects in the figure of its eyes; for the beſt microſcope does not diſcover its eyes to be any ways knobbed or pearled, like thoſe of other Inſects. The ſecond peculiarity which is obvious to the eye, is alſo very remarkable, and that is the prodigious

digious length of its legs, in proportion to its ſmall round body, and which are jointed, juſt like thoſe of a crab, but every one of the parts are ſpun out prodigiouſly longer in proportion; each of theſe legs are terminated in a ſmall caſe or ſhell, ſhaped almoſt like that of a muſcle-ſhell, faſtened to the body in ſo admirable a manner, as does not a little manifeſt the wiſdom of Nature in the contrivance; for theſe long leavers (as I may ſo call them) of the legs, having not the advantage of a long end on the other ſide of the *Hypomochlion*, or centers, on which part of the legs move, muſt neceſſarily require a vaſt ſtrength to move them, and keep the body balanced and ſuſpended, inſomuch, that if we ſhould ſuppoſe a man's body ſuſpended by ſuch a contrivance, an hundred and fifty times the ſtrength of a man would not keep the body from falling on the breaſt. To ſupply therefore each of theſe legs with its proper ſtrength, nature has allowed to each a large cheſt or cell, in which is included a very large and ſtrong muſcle; and thereby this little animal is not only able to ſuſpend its body upon leſs than theſe eight, but to move it very ſwiftly over the tops of graſs and leaves. This creature ſeems to throw its body upon the prey, not unlike a Jumping-Spider. The whole

Fabrick, when viewed by the microſcope, appeared a very pretty one; and could it have been diſſected, as many ſingularities might have been found within it as without; perhaps for the moſt part, not unlike the parts of a crab, which this little creature does in many things very much reſemble. I omit the deſcription of the horns of the mouth, which ſeemed like that of a crab's; the ſpeckledneſs of his ſhell, which proceeded from a kind of feathers, or hairs, and the hairineſs of his legs, his large thorax and little belly, and the like, and ſhall only take notice, that the three parts of the body, namely, the head, breaſt and belly, are in this creature ſtrangely confuſed, ſo that it is difficult to determine which is which, as they are alſo in a crab; and indeed, this ſeems to be nothing elſe but an Air-Crab, being made more light and nimble, proportionable to the medium wherein it reſides; and as air ſeems to have but one thouſandth part of the body of water, ſo does this ſpider ſeem not to be a thouſandth part of the bulk of a crab.

All kinds of ſpiders ſeem to be creatures of prey, and to feed on other ſmall Inſects; but their ways of catching

catching them are very different: The Shepherd Spider by running on its his prey; the Jumping Spider by leaping on it; other ſorts weave nets, or cobwebs, whereby they inſnare them; nature having both fitted them with materials and tools, and taught them how to work and weave their nets, and lie perdue, and to watch diligently to run on a fly as ſoon as entangled.

The Foot of a Spider is of an admirable and wonderful mechaniſm, whereby he is able to ſpin, weave, and climb, or run on his curious tranſparent clue. Mr. ALBIN, in his *Natural Hiſtory of Spiders*, juſt publiſhed, has collected near two hundred different ſorts of theſe Inſects. Their thread or web ſeems to be ſpun out of ſome viſcous kind of excrement, lying in their belly; which, tho' ſoft when drawn out, is preſently, by reaſon of its ſmallneſs, hardened and dried by the ambient air.

ARANEA.

Character.

THIS Inſect has eight feet, as many eyes, a mouth armed with two crotchets, two ſpiral tongues; and the bottom of the abdomen has two inſtruments, like nippers, adapted for ſpinning.

ARANEA DIADEMA.

THE DIADEM'D SPIDER.

OF theſe Inſects there are many different ſpecies; but the moſt beautiful is that we have delineated, as above. That which moſtly diſtinguiſhes the Spider, is the manner of forming its web: ſhe firſt chooſes a place where there is a cavity, that ſhe may have a clear paſ-

ſage to paſs freely on each ſide, and to eſcape occaſionally. She begins, by dropping on the wall ſome of her gum; to which ſhe attaches her firſt thread, which lengthens as ſhe paſſes to the other ſide, to which ſhe fixes the thread in a ſimilar manner: thus ſhe paſſes and repaſſes, from ſide to ſide, until ſhe has made what may be termed the warp of her web, exactly the ſize ſhe intends it ſhould be, or which ſhe thinks will anſwer her purpoſe of preying on the paſſing fly. It is obſerved that, in order to finiſh her work the ſooner, ſhe ſpins ſeveral threads at one time: after thus finiſhing, ſhe then croſſes her work with threads, in the ſame direction as the weaver throws the woof with his ſhuttle. To prevent her being ſeen, ſhe weaves a ſmall cell in the web, where ſhe lies, unobſerved, until the tremulous thread informs her of ſome prey being entangled in her toils: ſhe then darts along the line, and ſeizes the victim, then devoted to deſtruction. Many ſuperficial obſervers of Nature have wondered from whence the Spider could be ſupplied with the gum ſhe uſes in the many webs ſhe is obliged to make, or repair: they never reflected, that the ſame Providence which knows the Spider is hated, and that her web is always in danger of injury, could furniſh her with a magazine of both

gum

gum and thread, for ſuch exigences; and that when the magazine was exhauſted, it could, by the ſame means, be repleniſhed. However, it muſt be admitted, the recruits fail in time; for when the Inſect grows old, it is deprived of its weaving materials: it is therefore obliged to depend on the generous compaſſion of the young Spider, who will frequently reſign its own web to the infirm Inſect, and weave for itſelf another.

The web of the Garden Spider differs almoſt as much from the web of a Houſe Spider, as a net does from a cloſe-weaved piece of cloth: but it is, perhaps, more curious in its formation. They greatly reſemble a wheel, that has bars croſſing the ſpokes at equal diſtances. Theſe ſpaces are in proportion to the ſize of the prey the Spider deſigns ſhall not paſs through them. Being too ſmall for large flies, moths, butterflies, &c. to paſs through, with their expanded wings, ſuch generally fall the victims of the Spider, whenever they unknowingly fly againſt its web.

Having given this general deſcription of what is moſt extraordinary in the Spider, we ſhall now ſay a few

words on the Aranea Diadema, or the Diadem'd Spider. This Inſect grows very large. The upper part of its belly is moſt beautifully embelliſhed with black and white dots and circles: in the middle of them is a band, compoſed of oblong-ſhaped ſpots, of a pearl colour; reſembling, in their arrangement, the fillet of an Eaſtern King: the ground of this fillet, when viewed in the ſun, through a glaſs, is perhaps one of the richeſt and moſt ſplendid ſpectacles Nature has to exhibit in all her tribe of Inſects. The eyes are eight in number, ſparkling, and placed on the crown of the head: the legs are long, yellow, encircled with dark brown, and furniſhed with briſtles. This moſt extraordinary Inſect has been found in Kew-Gardens.

THE TARANTULA.

THIS Inſect being of this Genus, and much reſembling a Houſe Spider, we ſhall cloſe our brief Syſtem of Inſects, with a few words on this extraordinary animal. The bite of it, in hot countries, producing the moſt aſtoniſhing effects, naturally firſt arreſts our attention. The quantity of the poiſon emitted into the wound, is too inconſiderable to render it immedi-

ately perceptible; but as it ferments, it cauſes, in about five or ſix months, the moſt frightful diſorders. The perſon bit, at this time, laughs and dances inceſſantly, is all agitation, and aſſumes a moſt extravagant ſpecies of gaiety; or elſe is afflicted with a moſt diſmal melancholy. At the return of the period when the bite was given, the madneſs renews; and the diſtempered party repeats his former inconſiſtencies, by fancying himſelf a king, or a ſhepherd, or ſome other character, according as his ſhipwrecked reaſon is driven againſt the rocks of abſurdity. He has no regular train of thought: all his mind and feelings are but a chaos of wildneſs and extravagance. Sometimes theſe unhappy ſymptoms will continue ſeveral years, until death relieves the ſufferer. Thoſe who have been in Italy, where the natives are frequently afflicted with this malady, tell us, the only cure is muſic, from ſuch an agreeable and ſprightly inſtrument as the violin, which is, therefore, one of the moſt common ſpecies of muſic in that country: no village, or cottage, ſcarcely is without it. The tune is choſen according to the natural temper and diſpoſition of the patient: this is diſcovered by playing ſeveral tunes, until the unhappy ſufferer, by his geſtures, ſhows that

one

one is found agreeable to his fancy: this is thought an infallible ſign of a cure being effected. The patient immediately begins to dance, and riſes and falls in concert with the modulations of the tune. This is continued until he begins to perſpire, which inſtantly cauſes an external evacuation of the venom. In this manner are thoſe afflicted with the bite of a Tarantula cured. But is it not an extraordinary inſtance of Providence, that inſtrumental muſic ſhould have attained ſo great and general a perfection as it has in Italy, where it is neceſſary to preſerve the lives of the natives, who would otherwiſe frequently die from the bite of this baneful and venomous Inſect?

THE ZIMB.

HAVING obſerved the following curious account of the Zimb, extracted from the Travels of the ingenious Mr. Bruce, by the Editor of the Monthly Review, with that taſte of ſelection, and accuracy of inſertion, which ſo juſtly diſtinguiſh his judicious

arrangement of that periodical publication; we could not refrain from copying it, as a moſt valuable addition to our ſmall Compendium of Natural Hiſtory.

This Inſect is called the Zimb, or Tzalſalya. It is a little larger than the Bee; with wings of pure gauze. The head is large; the upper jaw ſharp, and furniſhed with a ſharp-pointed hair, about a quarter of an inch long: the lower jaw has two of theſe pointed hairs; and the three, joined into one pencil, make a reſiſtance to the finger, nearly equal to that of a hog's briſtle. As ſoon as this winged aſſaſſin appears, and his buzzing is heard, the cattle forſake their food, and run wildly about the plain till they die, worn out with fatigue, affright, and pain. The inhabitants of Melinda, down to Cape Gardefan, to Saba, and the ſouth coaſt of the Red Sea, are obliged to put themſelves in motion, and remove to the next ſand, in the beginning of the rainy ſeaſon: this is not a partial emigration: the inhabitants of all the countries, from the mountains of Abyſſinia, northward, to the confluence of the Nile, and Aſtaboras, are, once in a year, obliged to change their abode, and ſeek protection in the ſands of Beja.

The

The elephant and rhinoceros, which, by reaſon of their enormous bulk, and the vaſt quantity of food and water they daily need, cannot ſhift to deſart and dry places, are obliged, in order to reſiſt the Zimb, to roll themſelves in mud and mire, which, when dry, coats them over like armour.

Of all thoſe who have written of theſe countries, the Prophet Iſaiah alone has given an account of the Zimb, or Fly, and deſcribed the mode of its operation, Iſaiah, chap. vii. ver. 18 and 19. Providence, from the beginning, it would appear, had fixed its habitation to one ſpecies of ſoil; which is a black, fat earth, extremely fruitful. And, contemptible as it ſeems, this Inſect has invariably given law to the ſettlement of the country: it prohibited, abſolutely, thoſe inhabitants of the black earth, called Mazaga, houſed in caves and mountains, from enjoying the help of labour of any beaſts of burden. It deprived them of their fleſh, and milk, for food; and gave riſe to another nation, leading a wandering life, and preſerving immenſe herds, by conducting them into the ſands, beyond the limits of the black earth, and bringing them back when the danger from this Inſect was over.

In the plagues brought on Pharoah, it was by means of this Inſect that God ſaid he would ſeparate his people from the Egyptians. The land of Goſhen, the poſſeſſion of the Iſraelites, was a land of paſture, not tilled, nor ſown, becauſe not overflowed by the Nile; but the land overflowed by the Nile, was the black earth of the valley of Egypt: and it was here that God confined the Zimb; for he ſays, It ſhall be a ſign of this ſeparation of the people, which he had then made, that not one Fly ſhould be ſeen in the ſand, or paſture-ground, the land of Goſhen. And this kind of ſoil has ever ſince been the refuge of all the cattle emigrating from the black earth, to the lower part of Albara: ſo powerful is the weakeſt inſtrument in the hands of the Almighty.

THE SMALL SILVER-COLOURED

BOOK-WORM,

MAGNIFIED.

As among greater animals there are many that are ſcaled, both for ornament and defence, ſo are there not wanting ſuch alſo among the leſſer bodies of Inſects, whereof this little creature gives us an inſtance. It is a ſmall white ſilver-ſhining worm or moth, found much converſant among books and papers; and is ſuppoſed to be that which corrodes and eats holes through the

leaves and covers: It appears, to the naked eye, a ſmall glittering pearl-coloured moth, which upon the removing of books and papers in the ſummer, is often obſerved to ſcud away to ſome lurking cranny, where it may the better protect itſelf from any apparent danger. Its head appears big and blunt, and its body tapers from it towards the tail, ſmaller and ſmaller, being ſhaped almoſt like a carrot. The body is divided into fourteen ſeveral partitions, being the appearance of ſo many ſeveral ſhells or ſhields that cover the whole body; every of theſe ſhells are again covered or tiled over with a multitude of thin tranſparent ſcales, which, from the multiplicity of their reflecting ſurfaces, make the whole animal appear of a perfect pearl-colour. This Inſect was furniſhed on either ſide of its head with a cluſter of eyes; and each of theſe cluſters were beſet with a row of ſmall briſtles, much like the Cilia or hairs on the eye-lids; and, perhaps, they ſerved for the ſame purpoſe. It had two long horns; curiouſly ringed or knobbed, having at each knob ſmall hairs, or briſtles, here and there diſperſed among them: beſides theſe, it had two ſhorter horns, or feelers, which were knotted and fringed, juſt as the former. It had three tails, in every particular reſembling the two longer

longer horns that grow out of the head. The legs of it were ſcaled and haired juſt like the reſt, but are not expreſſed in this figure, the creature being intangled all in glue, and ſo the legs of this appeared not through the glaſs, which looked perpendicularly upon the back. The body is beſet with ſharp-pointed briſtles, like ſpears. Dr. HOOKE ſays, "This animal probably feeds upon the paper and covers of books, and perforates in them ſeveral ſmall round holes." Mr. ALBIN calls it the Cloth-Worm, or Moth, and ſays it is the very creature that eats the woollen cloth; and that it is produced from a ſmall grey ſpeckled moth that flies a-nights, and creeps in among woollen cloths, and there lays her eggs, which are hatched in their ſeaſon by the natural heat of the woollen; upon which theſe little creatures feed, till they change into a flying Inſect like their animal parent. To prevent the havock that this little creature (which is one of the teeth of time) is wont to make among woollen cloths, &c. They ſhould ſometimes be aired and bruſhed, before the warm ſeaſon comes on the eggs to hatch, which will abſolutely deſtroy the eggs, and preſerve the garments.

ARANEA.

SNAILS.

LINNÆUS divides Snails into three kinds, that is, the Earth, the Marſh, and the Sea Snails. Of the Earth Snails there are,

1. The Snail, with an oval ſhell, and five ſpines, is called by LISTER the Aſh-coloured Snail, whoſe mouth is covered in the winter with a ſort of mortar. It is found in gardens, and is eaten by ſome.

2. The Snail, with a yellow ſhell, convex on both ſides, with a ſingle brown ſtreak, and the lip turned up, is met with in woods, groves, and buſhes.

3. The Snail, with a ſhell convex on both ſides, and a ſingle grey ſtreak, and a turned-up lip, is found in the ſame places as the former, and differs greatly in colour.

4. The

4. The Snail, with a ſhell convex on each ſide, rough, and having five round turns, being perforated underneath, is found on plants and trees.

5. The Snail, with a ſhell convex on each ſide, and four turns of the colour of horn, as alſo with a browniſh ſtreak, is like the former, but ſmaller, and has a ſlender black body.

6. The Snail, with a ſhell convex on each ſide, perforated underneath with an acute turn, and an oval tranſverſe mouth, is called by PETIVER the Engliſh Snail, with a flattiſh ſhell, and a ſmall clavicle, ſharp at the point.

7. The Snail, with the ſhell of a flattiſh convexity above, quite convex below, perforated with an acute turn, and a mouth in the ſhape of half a heart, is very uncommon, and is found on craggy mountains.

8. The Snail, with an oblong tranſparent ſhell, with ten turns, and a roundiſh mouth, in the Upſal Tranſactions, is named the Snail with an oblong blunt ſhell, with a roundiſh mouth, and from eight to twelve turns. It is found in moſs at the feet of trees.

9. The Snail, with a tranſparent ſhell, with ſix turns, and nearly of a cylindric blunt ſhape, or the

ſmall

ſmall Snail with ſeven turns, is alſo found at the feet of trees, and on the old thatch of houſes.

10. The Snail, with a yellow tranſparent ſhell, a ſharp clavicle, and an oblique mouth, is found in the ſame places as the former.

11. The Snail, with a tranſparent yellow oval ſhell, has an oval lanceolated mouth, and a long clavicle.

Of the WATER SNAILS, there are,

1. The Snail, with a flat brown ſhell, umbilicated above, and having four turns, is called by LISTER the brown Snail, hollow on each ſide about the clavicle. It is found in rivers, marſhes, and ditches.

2. The Snail, with a flat white ſhell, hollow on each ſide, and having five ſmooth turns, is found in lakes.

3. The brown Snail, flatter on one ſide than on the other, and four ſpines on the edge (ſo called by LISTER; but by LINNÆUS, the Snail with a brown flat ſhell, hollow above, having four turns, and a prominent margin) is found in all watery places.

4. The Snail, with a flat brown ſhell, and five turns, having an acute margin, is called by LISTER the ſmall browniſh Snail, with the ſhell flatter on one ſide than the

the other, without a margin, and with five turns. It is found in the ſame places as the former.

5. The Snail, with a flattiſh ſhell, convex above and hollow underneath, having four turns, and with a margin downwards, is found in rivers and marſhes.

6. The Snail, with a flat ſhell, equal on both ſides, umbilicated, and the mouth in the ſhape of a half-moon, is found in ditches, and at the feet of trees.

7. The Snail, with a long ſhell, opaque, acuminated, having ſix turns, and an oval mouth, is called a Trumpet-ſhell by moſt authors, and is found in ditches, marſhes, rivers, and ponds.

8. The Snail, with a long acuminated tranſparent ſhell, having ſix turns, and an oval oblong mouth, is nearly of the ſame ſhape as the former, and is a kind of Trumpet-ſhell.

9. The great dark brown Snail, with a ſtreaked ſhell, is called by ſome the Ox-head, and is found in lakes, marſhes, and rivers; it is termed by LINNÆUS the Snail with a longiſh blunt ſhell, having three turns, and three livid lines.

10. The Snail, with an oblong blunt ſhell, with four looſe aſh-coloured opaque turns, and the mouth a little oval, is found in the ſame places as the former.

11. The

11. The Snail, with an oblong ſhell, which is tranſparent, having five turns, and an oval mouth, is twice as ſmall as the former, and is found in rivers.

12. The Snail, with a tranſparent ſhell, having four turns, and a ſharp ſhort clavicle, with an acute mouth, by all other authors it is named a Trumpet-ſhell; and LISTER terms it the yellowiſh tranſparent Trumpet-ſhell, with four turns, a ſharp clavicle, and a very large mouth. It is found in rivers and ponds.

13. The Snail, with a tranſparent ſhell, has a large oval mouth, four turns, and a wrinkled ſurface.

14. The Snail, with a membranaceous yellowiſh oblong ſhell, with a blunt clavicle, and three turns, is called by other authors a Trumpet-ſhell, and is found in lakes and rivers.

15. The Nerite Snail, called by LISTER the River Nerite, is of a bluiſh green colour, variegated with ſpots, and having a reddiſh cover, in the ſhape of a half-moon, and beſet with prickles.

16. The Lake Nerite Snail, ſo called by LINNÆUS, is common in the lakes near Upſal.

Of the SEA SNAILS, there are,

1. The Nerite Sea Snail, called the reticulated Nerite, and by PETIVER the Engliſh Sea common Nerite.

2. The

2. The Snail, with a thick oval ſhell, prominent on each ſide, and having five furrowed turns, and an undulated lip, is a ſort of Trumpet-ſhell, and is found in the Weſtern Ocean.

3. The Snail, with a long ſharp ſhell, having twelve ſtreaked turns, is termed by LISTER the ſtreaked thin Trumpet-ſhell, with twelve turns at leaſt. It is found as the former in the Weſtern Ocean.

4. The Snail, with a long acuminated ſhell, and a dilated lip, having a double ſinuated ſtreak on the fore part, is commonly found in the Atlantic Ocean.

5. The Snail, with a roundiſh, blunt, umbilicated ſhell, marked with five round ſtreaks, in the ſhape of arrows, and the ſecond with undulated lines, is named by LISTER the reddiſh Snail with ſpotted ſtreaks, eſpecially on the lower turns.

6. The oblong Snail, with the ſhell marked with longitudinal marginated ſtreaks, is called by PETIVER the leſſer white Trumpet-ſhell, with ribs curiouſly raiſed.

A CATA-

A CATALOGUE *of South and North-American Inſects.*

IT may not here be improper to give a general account of the inſects of our American plantations, though many of them have been already mentioned in their proper places; eſpecially, as it will be more ſatisfactory to ſtrangers that happen to be new-comers into that country.

In the Weſt Indies, the Ants are very numerous, both in the woods and fields, and do a great deal of miſchief, not only to vegetables but animals.

They have likewiſe various ſorts of Bees, Beetles, Bugs, Butterflies, and Caterpillars. Of theſe, the Nightſhade Caterpillar is of a very black colour, only the head and ſides are ſpotted with white, and is covered with yellow hair or briſtle. When a man touches it with his ſkin, it will cauſe it to burn like fire.

Chegoes

Chegoes are inſects like Fleas, and frequently get under the nails of the hands and feet, where they cauſe great itching, ſwell, and lay their eggs, unleſs picked out with a needle.

They have likewiſe Crickets, Earwigs, Flies of various ſorts, Gnats, Lice, Locuſts, Scorpions, and Spiders: of which laſt the great hairy Spider is the moſt remarkable, though common to be met with in theſe parts; for notwithſtanding it feeds on Flies and other inſects, yet, when they are caught and kept in a box, they will live a long time without eating.

BEES are very numerous in North America, particularly in Carolina, not only in hives, but in the planter's gardens, and in ſeveral parts of their large woods, where they make their cells in hollow trees, in which are frequently found large quantities of honey and wax. The planters make their hives with a piece of a hollow tree, eſpecially the ſweet gum tree, which they cut into a proper length for that purpoſe, and lay a board on the top, to ſhelter the Bees from the rain, ſun, and other extremities of the weather. They generally form

form their cells very large, which is the reaſon that they make uſe of ſuch ſort of wood.

The HUMBLE BEES are pretty common here, and do not ſeem to differ much from thoſe in Great Britain and other parts of Europe.

SILK WORMS have been found in the woods of Carolina, and ſeem to be pretty nearly the ſame as thoſe in other parts of the world. Sometimes great numbers of them have been ſeen together, and perhaps they are thoſe that the planters have made uſe of for the eſtabliſhment of a ſilk manufactory. The balls of ſilk, that have been made by them, are as large as an ordinary walnut.

BUTTERFLIES are in great plenty in theſe parts, ſome of which are large, and others ſmall; but they are all in general beautifully variegated with a great variety of colours. They lay their eggs in May, June, and July, and doubtleſs undergo the ſame changes as thoſe in Europe; though travellers have forgot, or perhaps, have not obſerved this material circumſtance, ſome of

theſe

theſe Butterflies are larger than any in Europe, and are ſo ſtrong, that they will drive away the Humming Birds from the flowers they have a mind to ſettle upon. If what a certain phyſician ſays is true, they will not only live, but fly for above thirty-five days after their heads are off; but this the reader may believe or not, as he pleaſes.

GRASSHOPPERS are very common, and are chiefly of two ſorts; the firſt of which are much larger than thoſe in Europe, and the other are much of the ſame ſize; but they are both more lazy and inactive than the Europeans, for they are frequently ſeen groveling in the duſt, and are ſeldom heard to ſing. They ſeem not to be endowed with a very quick ſight, for they ſeldom ſtir till a man is juſt ready to tread them under his feet. Inſtead of a mouth, they have a trunk or tube on their breaſts, wherewith they ſuck in their food, which ſome ſuppoſe to be nothing but dew; however this is improbable. They have alſo ſmall ſharp pipes or tubes on the breaſt, with which they make a ringing noiſe, which thoſe not uſed to them cannot tell what to make of. Their backs are rough and ſharp, and travellers tell us it is with eaſe

they

they make the holes in the earth, wherein they lay their eggs, which are hatched by the heat of the ſun. At firſt they appear like worms or maggots, that having undergone the uſual changes, turn into Graſshoppers. The males are the only ſingers of this tribe: for the females are ſaid to be always ſilent, and neither one nor the other ever appear in the winter ſeaſon.

The HOG-LICE are of two ſorts, and are to be ſeen almoſt every where, eſpecially under ſtones, and among rotten wood. When they are touched they roll themſelves up like ours, but at other times they are thin.

The FIRE-FLY is ſo called, becauſe in the night they ſhine like Glow Worms, giving a pretty ſtrong light like fire. They are as long as the Drone Bees, but much thicker, and of a browniſh colour. They begin to appear in May, and continue moſt part of the ſummer.

The CRICKETS are winged inſects, like Graſshoppers or Locuſts, and are very common in theſe parts;

parts; but they are not of the houſe kind; for they are only ſeen and heard in the woods and corn-fields, in ſummer, where they ſing almoſt continually. In winter they get into warm places, and ſometimes into the houſes, where they eat large holes in linen and woollen cloths: they likewiſe do a great deal of miſchief to corn, and all ſorts of grain, of which they are great devourers.

LADY BIRDS are alſo met with in theſe parts, being much the ſame as thoſe in Europe, for the uppermoſt wings are red, ſpotted with black; when they are reduced to powder, they are of a deep purple colour, and will give a tincture either to water or ſpirit of wine.

They have alſo a FLY here like the Cantharides, or Spaniſh Flies, which are to be met with in the ſummer ſeaſon. They proceed from ſmall worms, which have the appearance of Caterpillars that are bred upon fig-trees. Whether they have the ſame qualities or not in raiſing bliſters, is not very certain, though it is ſuppoſed they have.

The

The ANT has much the ſame qualities here as in Europe. They lay up their hoards in the ſummer time, near the full moon, or while it yields a conſiderable light; but about the new, their labour ceaſes, as is confidently affirmed, which ſeems to ſhew that they ſtand in need of a conſiderable light to ſee what they are about. They wear away the ſtones, that is, they make tracts or paths in them, by their running ſo often backwards and forwards, and drawing their burthens along. There is a greater ſort that lead the way, and the leſſer drag the corn. They are very neat in their habitation, and will not enter them before they have taken off the dirt from their bodies: they alſo make dams to keep the water out of their neſts, and are careful in burying their dead. They likewiſe throw up the earth over the mouths of their neſts, wherein they have three cells, in one of which they live, in another they breed and bury their dead, and in the third they keep their corn. When they are old, they always have wings, but do not continue long in that ſtate, for they die ſoon after.

There are ſeveral ſorts of SPIDERS in North America, the moſt remarkable of which is the mountain

tain Spider, or rather the wood Spider, near the mountains. It is of a very large ſort, and exceeding venomous. They are ſaid to make their webs ſo ſtrong, like thoſe of Bermudas, as to catch ſmall birds. Their ſting or bite is attended with violent pains at the heart, cold and heat by turns, ſhortneſs of breath, tremblings, cold ſweats, vomitings, and many other ſymptoms, which commonly end in death, unleſs a proper remedy be timely applied. The cure is generally performed by bathing the wound with a decoction of ſtinking trefoil and oil, and by fomenting it with ſpunges dipt in vinegar, not omitting proper cordials. The native Americans cure it by ſucking the wound with their mouths, repeating it ſeveral times, and ſpitting out the venom.

The EARWIGS ſeem to be much the ſame as thoſe in Europe, and therefore nothing needs to be ſaid about them.

The common ſmall black FLIES are in great plenty, but they are more troubleſome here than in Europe; for they will fix on a man's ſtockings, and pierce

through them with their trunks or ſnouts, and cauſe great pain.

The large black Mackarel FLIES are alſo very common, eſpecially in the ſummer time; but they do not differ from thoſe in Europe, which ſome call by that name.

There are ſeveral ſorts of Ox or Gad FLIES, and of various colours; but moſt of them are yellow and green, and appear to be moſt numerous in the months of July and Auguſt, at which time they are very troubleſome to horſes, attacking their eyes and heads, but no other part.

The WEEVIL, ſo called in theſe parts, is a ſmall worm, not much bigger than a Mite. It is very deſtructive to Indian corn, for it will get into barrels wherein it is put, and entirely ſpoil it; which however they do not touch in the open fields, nor indeed any thing elſe that is expoſed to the wind and ſun. To prevent this miſchief, they ſpread a little ſalt at the bottom of the caſk, and, when the corn is in, over the top.

They

They have BUGS here as well as in Europe, which are flat and red, and exactly of the ſame ſhape and ſize as Hog Lice. They were very probably brought from Europe in the ſhips, and will get about beds, where they are as troubleſome as in London.

The Cock ROACHES here are as large as Crickets, and ſeem to be a ſort of Beetle, of a dark brown colour. They often get into the houſes, where they do a great deal of miſchief to books and linen.

The TUMBLE-DUNG is a ſort of Beetle, and is ſo called from its rolling of horſe-dung from one place to another, till it makes it into balls of the ſize of ſmall bullets.

The MUSKETOES, called by the Americans Toquani, are of two ſorts, one of which is ſmall, of a dark colour, and very troubleſome, eſpecially in ſavannahs and marſhy low grounds; for which reaſon none can live in ſuch places except the native Americans, who perhaps are defended from their bites, by the greaſe or fat which they every day dawb themſelves with; as alſo by the colours wherewith they paint

their bodies. The other ſort are of the ſame ſhape and ſize as the former, but their colour is whitiſh; theſe are not ſo troubleſome as the former ſort, nor are they ſo apt to bite They are generally brought to the northern parts of America by the ſoutherly winds in July and Auguſt, in prodigious quantities; but they do not ſtay long, for they either die, or are carried back by contrary winds.

The MUSKETO HAWKS, are *inſects*, ſo called from their continually hunting after Muſketoes, which they kill and eat. It is a large Fly, with a long body, large head and wings, reſembling a Dragon Fly. They are in great numbers in the latter end of ſummer, but they ſeldom appear in the day time, which perhaps is owing to their purſuing Muſketoes all the night, which are their natural prey.

The Horned BEETLE, BULL-FLY, or STAG-BEETLE, is ſo called from a large pair of horns on its head, exactly reſembling the horns of a deer. They can bring them together as Lobſters do their nippers, and make the ſame uſe of them. This is not like the Stag Beetle of Europe; for the horns are larger

and

and of a different make, and their bodies are alſo much bigger. It is moſt commonly known to the planters by the name of the Flying Stag. They hang them about the children's necks as a charm, in ſeveral diſeaſes; but if they have any virtue at all, it muſt be from the effluvia which they emit from their bodies.

The Sand FLY is ſo called, from its being found in ſand banks near the rivers. It is not much bigger than the Ant, but it is as troubleſome as a Muſketoe, though it never moleſts any other part but the face.

The WASPS of North America build their neſts in trees, of a ſubſtance that reſembles cobwebs, or rather thin brown paper. They live upon inſects, and will feed upon any ſort of fleſh, when they can come at it. They do not appear in winter, but lodge in the holes of trees, or in thoſe that are hollow, but they do not live above two years. They are not miſchievous, for they never ſting, unleſs they are provoked, or when their neſts are in danger. However, the planters endeavour to deſtroy them, by ſhooting at their neſts with gun-powder, or rather with a wad

that keeps it down, for this will ſet them on fire; but then they run away with all the ſpeed they can, as ſoon as they have ſhot; however, they very ſeldom eſcape without being ſtung, for the Waps will purſue them in great numbers, and the ſting is a great deal worſe than that of the Bees.

The HORNETS, in theſe parts, build their neſts in cavities and holes of the earth, and are made much like the former. This is an evident ſign that they are not exactly the ſame with ours; but what the difference may be, we have no certain account of. It is ſaid, if they are boiled in water, the decoction, when applied to the ſkin, will make the part ſwell, as if it were dropſical, and yet without pain. As for their ſting it produces a great deal of pain, and ſome very bad ſymptoms; but it may be cured with a poultice of cow dung, and taking Venice treacle inwardly.

The LABOURERS, ſo called in theſe parts, are a kind of Hornets, which have their name from the pains and labour they are at in building their neſts with a ſort of yellow clay. They make their rooms

or cells in theſe in a very artificial manner; for they are ſo hard, when dry, that they are broken with difficulty, when their brood is deſigned to be taken out. They are almoſt as big as a Hornet, and are of the ſame ſhape and colour, with long legs. They are more mild than the common Hornet, for they ſeldom or never ſting. They are obliged to make holes in the ſand by the river ſides, and other moiſt places, which often muſt be very deep to come at the clay. They will ſometimes attempt to build their neſts in the ceiling of houſes; but they are generally prevented, after they have begun to fix their clay thereon.

The large Dog TICK is remarkable for its burrowing in the ſkin of ſeveral animals, and ſeems to be much of the ſame ſort as our Sheep Tick; but it has no vent; and therefore when it has ſucked the blood till it is quite full, it generally falls off.

The Sea TICK, or rather the Water TICK, is ſo called for its being common in marſhes near the water ſide. They are ſo ſmall, that their bulk is ſeldom

equal to that of a ſmall pin's head; but they are very troubleſome to thoſe that travel in the woods, and near the ſides of rivers; for they ſtick ſo faſt in the ſkin, that it is almoſt impoſſible to pull them out; but they may be deſtroyed, by bathing the part with a decoction of the leaves of tobacco.

Some travellers take notice of a ſort of Locuſt in North America; but it may be doubted whether there are any properly ſo called in theſe parts or not; at leaſt it is certain, that they are never met with in any great numbers; for no author whatever takes any notice of any miſchief done by them, or of their appearing in ſwarms.

The CATERPILLARS and PALMER-WORMS are as frequent here as in other parts, and undergo the like changes; but as the trees are all different, eſpecially before the Europeans had tranſplanted ſome from Europe, the Caterpillars muſt be different too, as well as the Flies and Butterflies that proceed from them; but we have not met with any naturaliſt that has been curious enough to give us a diſtinct account thereof.

They

They have a ſort of GALLY WORMS, with a great number of feet of different kinds; for ſome of them are ſmooth, and others are hairy all over, about the thickneſs of a man's little finger, and near two inches in length; however, they are not common, for they have a great many natural enemies, that take care to deſtroy them.

The tobacco WORM, or CATERPILLAR, is ſo called from its feeding on the leaves of the tobacco plant. It reſembles a Gally Worm in ſhape, but is ſomewhat larger, and not hairy. It has two ſharp horns or feelers on its head, and the body variegated with white and black. It has as many feet as a Gally Worm, of which it ſeems to be a ſpecies. They do a great deal of miſchief in the tobacco plantations, unleſs prevented; and therefore the negroes are employed by the planters to ſearch for and kill them. They do not ſeem to be of a venomous nature, from whence they appear to be of the Caterpillar kind. The planters, by way of puniſhment, will often oblige the negroes to eat them, from whence it is evident, that they are not of a venomous nature, for they never do them any harm. This puniſhment is inflicted when

the

theſe even in our parts at home, and that the freſh water has no effect in deſtroying them; but when they lie in the mud, or on the ſand, they often receive a great deal of damage. Sometimes the planks of ſhips, when taken off, have appeared to be eaten into cells, like honey-combs, in leſs than ſix weeks time.

The Earth WORMS are like thoſe in Europe, and ſo are the Snails, but theſe laſt are not very common; for they have a great number of enemies, that always lie in wait to deſtroy them.

the negroes have been negligent, and have not taken care to pick them all off the tobacco plants.

There is a ſort of GLOW WORM in North-America, which ſhines like thoſe in Europe, and are commonly found in ſwamps and wet low grounds, where they ſhine ſo much, that they may be ſeen at a great diſtance.

The Land WOOD-WORMS are of a ſhining copper colour, and are about five inches in length, but not quite ſo thick as a man's little finger. They have their name from their being found in old rotten trees, and their bite is ſuppoſed to be venomous.

The TIMBER WORM is ſo called from its breeding in ſhips, and other timber, lying in ſalt water. They have ſmall ſoft white bodies, and large hard black heads. They are met with of different ſizes, ſome being no thicker than a horſe hair, while others are as big as a child's finger. When a ſhip was brought into freſh water, it was ſuppoſed that this would effectually deſtroy the worms in the bottom; but fatal experience evinces, that there are numbers of

theſe

theſe even in our parts at home, and that the freſh water has no effect in deſtroying them; but when they lie in the mud, or on the ſand, they often receive a great deal of damage. Sometimes the planks of ſhips, when taken off, have appeared to be eaten into cells, like honey-combs, in leſs than ſix weeks time.

The Earth WORMS are like thoſe in Europe, and ſo are the Snails, but theſe laſt are not very common; for they have a great number of enemies, that always lie in wait to deſtroy them.

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Ephe-

FINIS.