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OF THE
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AND
ANIMATED NATURE,

Handwritten signature: Oliver Goldsmith
BY
OLIVER GOLDSMITH.

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AN
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OF
I N S E C T S.

P A R T IV.

VOL. VIII.

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A N
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O F
I N S E C T S.

C H A P. I.

Of the Fourth Order of Insects.

IN the foregoing part we treated of caterpillars changing into butterflies; in the present will be given the history of grubs changing into their corresponding winged animals. These, like the former, undergo their transformation, and appear as grubs or maggots, as aurelias, and at last as winged insects. Like the former, they are bred from eggs; they feed in their reptile state; they continue motionless and lifeless, as aurelias; and fly and propagate, when furnished with wings. But they differ in many respects: the grub or maggot wants the

which the caterpillar is seen to have; the aurelia is not so totally wrapped up, but that its feet and its wings appear. The perfect animal, when emancipated, also has its wings either cased, or transparent like gauze; not coloured with that beautifully painted dust which adorns the wings of the butterfly.

In this class of insects, therefore, we may place a various tribe, that are first laid as eggs, then are excluded as maggots or grubs, then change into aurelias, with their legs and wings not wrapped up, but appearing; and lastly, assuming wings, in which state they propagate their kind. Some of these have four transparent wings, as bees; some have two membranous cases to their wings, as beetles; and some have but two wings, which are transparent, as ants. Here, therefore, we will place the Bee, the Wasp, the Humble Bee, the Ichneumon Fly, the Gnat, the Tipula or Longlegs, the Beetle, the May-Bug, the Glow-Worm, and the Ant. These transformations which all these undergo, are pretty nearly similar; and though very different animals in form, are yet produced nearly in the same manner.

C H A P. II.

Of the Bee.

TO give a complete history of this insect in a few pages, which some have exhausted volumes in describing, and whose nature and properties still continue in dispute, is impossible. It will be sufficient to give a general idea of the animal's operations; which, though they have been studied for more than two thousand years, are still but incompletely known. The account given us by Reaumur is sufficiently minute; and, if true, sufficiently wonderful: but I find many of the facts which he relates, doubted by those who are most conversant with bees; and some of them actually declared not to have a real existence in nature.

It is unhappy, therefore, for those whose method demands an history of bees, that they are unfurnished with those materials which have induced so many observers to contradict so great a naturalist. His life was spent in the contemplation; and it requires an equal share of attention, to prove the error of his discoveries. Without entering, therefore, into the dispute, I will take him for my guide; and just mention, as I go along, those particulars in which succeeding observers have begun to think him
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erroneous.

erroneous. Which of the two are right, time only can discover; for my part I have only heard one side, for as yet none have been so bold as openly to oppose Reaumur's delightful researches.

There are three different kinds of bees in every hive. First, the labouring bees, which make up the far greatest number, and are thought to be neither male or female, but merely born for the purposes of labour, and continuing the breed, by supplying the young with provision, while yet in their helpless state. The second sort are the drones; they are of a darker colour, longer, and more thick by one third than the former: they are supposed to be the males; and there is not above a hundred of them in a hive of seven or eight thousand bees. The third sort is much larger than either of the former, and still fewer in number: some assert, that there is not above one in every swarm; but this later observers affirm not to be true, there being sometimes five or six in the same hive. These are called queen-bees, and are said to lay all the eggs from which the whole swarm is hatched in a season.

In examining the structure of the common working bee, the first remarkable part that offers is the trunk, which serves to extract the honey from flowers. It is not formed, like that of other flies, in the manner of a tube, by which
the

the fluid is to be sucked up; but like a besom, to sweep, or a tongue, to lick it away. The animal is furnished also with teeth, which serve it in making wax. This substance is gathered from flowers, like honey; it consists of that dust or farina which contribute to the fecundation of plants, and is moulded into wax by the little animal, at leisure. Every bee, when it leaves the hive to collect this precious store, enters into the cup of the flower, particularly such as seem charged with the greatest quantities of this yellow farina. As the animal's body is covered over with hair, it rolls itself within the flower, and soon becomes quite covered with the dust, which it soon after brushes off with its two hind legs, and kneads into two little balls. In the thighs of the hind legs there are two cavities, edged with hair; and into these, as into a basket, the animal sticks its pellets. Thus employed, the bee flies from flower to flower, encreasing its store, and adding to its stock of wax; until the ball upon each thigh becomes as big as a grain of pepper; by this time, having got a sufficient load, it returns, making the best of its way to the hive.

The belly of the bee is divided into six rings, which sometimes shorten the body, by slipping one over the other. It contains within it, beside the intestines, the honey-bag, the venom-bag,

and the sting. The honey-bag is as transparent as crystal, containing the honey that the bee has brushed from the flowers; of which the greater part is carried to the hive, and poured into the cells of the honey-comb; while the remainder serves for the bee's own nourishment: for during summer it never touches what has been laid up for winter. The sting, which serves to defend this little animal from its enemies, is composed of three parts; the sheath, and two darts, which are extremely small and penetrating. Both the darts have several small points or barbs, like those of a fish-hook, which renders the sting more painful, and makes the darts rankle in the wound. Still, however, this instrument would be very slight, did not the bee poison the wound. The sheath, which has a sharp point, makes the first impression; which is followed by that of the darts, and then the venomous liquor is poured in. The sheath sometimes sticks so fast in the wound, that the animal is obliged to leave it behind; by which the bee soon after dies, and the wound is considerably enflamed. It might at first appear well for mankind, if the bee were without its sting; but upon recollection, it will be found that the little animal would then have too many rivals in sharing its labours. An hundred other lazy animals, fond of honey, and hating labour, would intrude

intrude upon the sweets of the hive; and the treasure would be carried off, for want of armed guardians to protect it.

From examining the bee singly, we now come to consider it in society, as an animal not only subject to laws, but active, vigilant, laborious, and disinterested. All its provisions are laid up for the community; and all its arts in building a cell, designed for the benefit of posterity. The substance with which bees build their cells is wax; which is fashioned into convenient apartments 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; another employs itself in laying out the bottom and partitions of their cells; a third is employed in making the inside smooth from the corners and angles; and the fourth company bring food for the rest, or relieve those who return with their respective burthens. But they are not kept constant to one employment; they often change the tasks assigned them: those that have been at work, being permitted to go abroad; and those that have been in the fields already, take their places. They seem even to have signs by which they understand each other; for when any of them wants food, it bends down its trunk to the bee from whom it is expected, which

then opens its honey-bag, and lets some drops fall into the other's mouth, which is at that time opened to receive it. Their diligence and labour is so great, that, in a day's time, they are able to make cells, that lie upon each other, numerous enough to contain three thousand bees.

If we examine their cells, they will be found formed in the exactest proportion. It was said by Pappus, an ancient geometrician, that, of all other figures, hexagons were the most convenient; for, when placed touching each other, the most convenient room would be given, and the smallest lost. The cells of the bees are perfect hexagons: these, in every honeycomb, are double, opening on either side, and closed at the bottom. The bottoms 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 opposite cells. These lodgings have spaces, like streets, between them, large enough to give the bees a free passage in and out; and yet narrow enough to preserve the necessary heat. The mouth of every cell is defended by a border, which makes the door a little less than the inside of the cell, which serves to strengthen the whole. These cells serve for different purposes: for laying up their young; for their wax,
which

which in winter becomes a part of their food; and for their honey, which makes their principal subsistence.

It is well known that the habitation of bees ought to be very close; and what their hives want, from the negligence or unskilfulness of man, these animals supply by their own industry: so that it is their principal care, when first hived, to stop up all the crannies. For this purpose they make use of a resinous gum, which is more tenacious than wax, and differs greatly from it. This the ancients called Propolis: it will grow considerably hard in June; though it will in some measure soften by heat; and is often found different in consistence, colour, and smell. It has generally an agreeable aromatic odour when it is warmed; and by some it is considered as a most grateful perfume. When the bees begin to work with it, it is soft, but it acquires a firmer consistence every day; till at length it assumes a brown colour, and becomes much harder than wax. The bees carry it on their hinder legs; and some think it is met with on the birch, the willow, and poplar. However it is procured, it is certain that they plaister the inside of their hives with this composition.

If examined through a glass hive, from the hurry the whole swarm is in, the whole at first appears like anarchy and confusion: but the

ſpectator ſoon finds every animal diligently employed, and following one purſuit, with a ſet- tled purpoſe. Their teeth are the inſtruments by which they model and faſhion their various buildings, and give them ſuch ſymmetry and perfection. They begin at the top of the hive; and ſeveral of them work at a time, at the cells which have two faces. 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, till they have ſketched out the number of cells neceſſary for the preſent oc- caſion. The conſtruction of their combs, coſts them a great deal of labour: they are made by inſenſible additions; and not caſt at once in a mould, as ſome are apt to imagine. There ſeems no end of their ſhaping, finiſhing, and turning them neatly up. The cells for their young are moſt carefully formed; thoſe de- ſigned for lodging the drones are larger than the reſt; and that for the queen-bee, the largeſt of all. The cells in which the young brood are lodged, ſerve at different times for con- taining honey; and this proceeds from an ob- vious cauſe: every worm, before it is trans- formed into an aurelia, hangs its old ſkin on the partitions of its cell; and thus, while it ſtrength- ens the wall, diminifhes the capacity of its late apartment. The ſame cell, in a ſingle ſummer, is often tenanted by three or four worms in ſuc- ceſſion;

cession; and the next season, by three or four more. Each worm takes particular care to fortify the pannels of its cell, by hanging up its spoils there: thus the partitions, being lined six or eight deep, become at last too narrow for a new brood, and are converted into store-houses for honey.

Those cells where nothing but honey is deposited, 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 work-houses, more bees may be thus employed, without embarrassing each other.

But honey, as was before observed, is not the only food upon which these animals subsist. The meal of flowers, of which their wax is formed, is one of their most favourite repasts. This is a diet which they live upon during the summer; and of which they lay up a large winter provision. The wax of which their combs are made, is no more than this meal digested, and wrought into a paste. When the flowers upon which bees generally feed are not fully blown, and this meal or dust is not offered in sufficient quantities, the bees pinch the tops of the stamina in which it is contained, with their teeth;

teeth; and thus anticipate the progress of vegetation. In April and May the bees are busy, from morning to evening, in gathering this meal; but when the weather becomes too hot in the midst of summer, they work only in the morning.

The bee is furnished with a stomach for its wax, as well as its honey. In the former of the two, their powder is altered, digested and concocted into real wax; and is thus ejected by the same passage by which it was swallowed. Every comb, newly made, is white: but it becomes yellow as it grows old, and almost black when kept too long in the hive. Beside the wax thus digested, there is a large portion of the powder kneaded up for food in every hive, and kept in separate cells, for winter provision. This is called, by the country people, bee-bread; and contributes to the health and strength of the animal during winter. Those who rear bees, may rob them of their honey, and feed them, during the winter, with treacle; but no proper substitute has yet been found for the bee-bread; and without it, the animals become consumptive and die.

As for the honey, it is extracted from that part of the flower called the nectarium. From the mouth this delicious fluid passes into the gullet; and then into the first stomach, or honey-bag, which, when filled, appears like an oblong bladder.

bladder. Children, that live in country places, are well acquainted with this bladder; and destroy many bees to come at their store of honey. When a bee has sufficiently filled its first stomach, it returns back to the hive, where it disgorges the honey into one of the cells. It often happens that the bee delivers its store to some other, at the mouth of the hive, and flies off for a fresh supply. Some honeycombs are always left open for common use; but many others are stopped up, till there is a necessity of opening them. Each of these is covered carefully with wax, so close, that the covers seem to be made at the very instant the fluid is deposited within them.

Having thus given a cursory description of the insect, individually considered, and of the habitation it forms, we next come to its social habits and institutions; and, in considering this little animal attentively, after the necessary precautions for the immediate preservation of the community, its second care is turned to the continuance of posterity. How numerous soever the multitude of bees may appear in one swarm, yet they all owe their original to a single parent, which is called the queen-bee. It is indeed surprising that a single insect shall, in one summer, give birth to above twenty thousand young; but, upon opening her body, the wonder will cease; as the number of eggs

9 appearing,

appearing, at one time, amounts to five thousand. This animal, whose existence is of such importance to her subjects, may easily be distinguished from the rest, by her size, and the shape of her body. On her safety depends the whole welfare of the commonwealth; and the attentions paid her by all the rest of the swarm, evidently shew the dependence her subjects have upon her security. If this insect be carefully observed, she will be seen at times attended with a numerous retinue, marching from cell to cell, plunging the extremity of her body into many of them, and leaving a small egg in each.

The bees which generally compose her train, are thought to be males, which serve to impregnate her by turns. These are larger and blacker than the common bees; without stings, and without industry. They seem formed only to transmit a posterity; and to attend the queen, whenever she thinks proper to issue from the secret retreats of the hive, where she most usually resides. Upon the union of these two kinds depends all expectations of a future progeny; for the working bees are of no sex; and only labour for another offspring: yet such is their attention to their queen, that if she happens to die, they will leave off working, and take no farther care of posterity. If, however, another queen is in this state of univer-
fal

ful despair presented them, they immediately acknowledge her for sovereign, and once more diligently apply to their labour. It must be observed, however, that all this fertility of the queen-bee, and the great attentions paid to her by the rest, are controverted by more recent observers. They assert, that the common bees are parents themselves; that they deposit their eggs in the cells which they have prepared; that the females are impregnated by the males, and bring forth a progeny, which is wholly their own.

However, to go on with their history, as delivered us by Mr. Reaumur — When the queen-bee has deposited the number of eggs necessary in the cells, the working bees undertake the care of the rising posterity. They are seen to leave off their usual employments; to construct proper receptacles for eggs; or to complete those that are already formed. They purposely build little cells, extremely solid, for the young, in which they employ a great deal of wax: those designed for lodging the males, as was already observed, are larger than the rest; and those for the queen-bees the largest of all. There is usually but one egg deposited in every cell; but when the fecundity of the queen is such, that it exceeds the number of cells already prepared, there are sometimes three or four eggs crowded together in the same apartment. But this

this is an inconvenience that the working bees will by no means suffer. They seem sensible that two young ones, stuffed up in the same cell, when they grow larger, will but embarrass, and at last destroy each other: they therefore take care to leave a cell to every egg; and remove or destroy the rest.

The single egg that is left remaining, is fixed to the bottom of the cell, and touches it but in a single point. A day or two after it is deposited, the worm is excluded from the shell of the egg, having the appearance of a maggot rolled up in a ring, and lying softly on a bed of a whitish coloured jelly; upon which also the little animal begins to feed. In the mean time, the instant it appears, the working bees attend it with the most anxious and parental tenderness; they furnish it every hour with a supply of this whitish substance, on which it feeds and lies; and watch the cell with unremitting care. They are nurses that have a greater affection for the offspring of others, than many parents have for their own children. They are constant in visiting each cell, and seeing that nothing is wanting; preparing the white mixture, which is nothing but a composition of honey and wax, in their own bowels, with which they feed them. Thus attended, and plentifully fed, the worm, in less than six days time, comes to its full growth, and no longer accepts the food offered it.

it. When the bees perceive that it has no further occasion for feeding, they perform the last offices of tenderness, and shut the little animal up in its cell; walling up the mouth of its apartment with wax: there they leave the worm to itself; having secured it from every external injury.

The worm is no sooner left inclosed, but, from a state of inaction, it begins to labour, extending and shortening its body; and by this means lining the walls of its apartment with a silken tapestry, which it spins in the manner of caterpillars, before they undergo their last transformation. When their cell is thus prepared, the animal is soon after transformed into an aurelia; but differing from that of the common caterpillar, as it exhibits not only the legs, but the wings of the future bee, in its present state of inactivity. Thus, in about twenty or one and twenty days after the egg was laid, the bee is completely formed, and fitted to undergo the fatigues of its state. When all its parts have acquired their proper strength and consistence, the young animal opens its prison, by piercing with its teeth the waxen door that confines it. When just freed from its cell, it is as yet moist, and incommoded with the spoils of its former situation; but the officious bees are soon seen to flock round it, and to lick it clean on all sides with their trunks; while
another

another band, with equal assiduity, are observed to feed it with honey: others again begin immediately to cleanse the cell that has been just left; to carry the ordures out of the hive, and to fit the place for a new inhabitant. The young bee soon repays their care, by its industry; for as soon as ever its external parts become dry, it discovers its natural appetites for labour, and industriously begins the task, which it pursues unremittingly through life. The toil of man is irksome to him, and he earns his subsistence with pain; but this little animal seems happy in its pursuits, and finds delight in all its employments.

When just freed from the cell, and properly equipped by its fellow-bees for duty, it at once issues from the hive, and, instructed only by Nature, goes in quest of flowers, chuses only those that yield it a supply, rejects such as are barren of honey, or have been already drained by other adventurers; and when loaded, is never at a loss to find its way back to the common habitation. After this first sally, it begins to gather the mealy powder that lies on every flower, which is afterwards converted into wax; and with this, the very first day, it returns with two large balls stuck to its thighs.

When bees first begin to break their prisons, there are generally above an hundred excluded in one day. Thus, in the space of a few weeks, the

the number of the inhabitants in one hive, of moderate size, becomes so great, that there is no place to contain the new comers; and they are scarcely excluded from the cell, when they are obliged, by the old bees, to fall forth in quest of new habitations. In other words, the hive begins to swarm, and the new progeny prepares for exile.

While there is room enough in the hive, the bees remain quietly together; it is necessity alone that compels the separation. Sometimes, indeed, the young brood, with graceless obstinacy, refuse to depart, and even venture to resist their progenitors. The young ones are known by being browner than the old, with whiter hair; the old ones are of a lighter colour, with red hair. The two armies are therefore easily distinguishable, and dreadful battles are often seen to ensue. But the victory almost ever terminates with strict poetical justice in favour of the veterans, and the rebellious offspring are driven off, not without loss and mutilation.

In different countries, the swarms make their appearance at different times of the year, and there are several signs previous to this intended migration. The night before, an unusual buzzing is heard in the hive; in the morning, though the weather be soft and inviting, they seem not to obey the call, being

intent on more important meditations within. All labour is discontinued in the hive, every bee is either employed in forcing, or reluctantly yielding a submission; at length, after some noise and tumult, a queen-bee is chosen, to guard, rather than conduct, the young colony to other habitations, and then they are marshalled without any apparent conductor. In less than a minute, they leave their native abode, and forming a cloud round their protectress, they set off, without seeming to know the place of their destination; *The world before them, where to chuse their place of rest.* The usual time of swarming, is from ten in the morning to three in the afternoon, when the sun shines bright, and invites them to seek their fortunes. They flutter for a while, in the air, like flakes of snow, and sometimes undertake a distant journey, but more frequently are contented with some neighbouring asylum; the branch of a tree, a chimney top, or some other exposed situation. It is, indeed, remarkable, that all those animals, of whatever kind, that have long been under the protection of man, seem to lose a part of their natural sagacity, in providing for themselves. The rabbit, when domesticated, forgets to dig holes, the hen to build a nest, and the bee to seek a shelter, that shall protect it from the inclemencies of winter. In those countries, where the bees are wild, and unprotected

lected by man, they are always sure to build their waxen cells in the hollow of a tree; but with us, they seem improvident in their choice, and the first green branch that stops their flight, seems to be thought sufficient for their abode through winter. However, it does not appear that the queen chuses the place where they are to alight, for many of the stragglers, who seem to be pleased with a particular branch, go and settle upon it; others are seen to succeed, and at last, the queen herself, when she finds a sufficient number there before her, goes to make it the place of her head-quarters. When the queen is settled, the rest of the swarm soon follow; and, in about a quarter of an hour, the whole body seem to be at ease. It sometimes is found, that there are two or three queens to a swarm, and the colony is divided into parties; but it most usually happens, that one of these is more considerable than the other, and the bees, by degrees, desert the weakest, to take shelter under the most powerful protector. The deserted queen does not long survive this defeat; she takes refuge under the new monarch, and is soon destroyed by her jealous rival. Till this cruel execution is performed, the bees never go out to work; and if there should be a queen-bee, belonging to the new colony, left in the old hive, she always undergoes the fate of the former. How-
ever,

ever, it must be observed, that the bees never sacrifice any of their queens, when the hive is full of wax and honey; for there is at that time no danger in maintaining a plurality of breeders.

When the swarm is thus conducted to a place of rest, and the policy of government is settled, the bees soon resume their former labours. The making cells, storing them with honey, impregnating the queen, making proper cells for the reception of the rising progeny, and protecting them from external danger, employ their unceasing industry. But soon after, and towards the latter end of summer, when the colony is sufficiently stored with inhabitants, a most cruel policy ensues. The drone bees, which are (as has been said) generally in an hive to the number of an hundred, are marked for slaughter. These, which had hitherto led a life of indolence and pleasure, whose only employment was in impregnating the queen, and rioting upon the labours of the hive, without aiding in the general toil, now share the fate of most voluptuaries, and fall a sacrifice to the general resentment of society.

The working bees, in a body, declare war against them; and in two or three days time, the ground all round the hive is covered with their dead bodies. Nay, the working bees will even kill such drones, as are yet in the worm
state,

state, in the cell, and eject their bodies from the hive, among the general carnage.

When an hive sends out several swarms in the year, the first is always the best, and the most numerous. These having the whole summer before them, have the more time for making wax and honey, and consequently their labours are the most valuable to the proprietor. Although the swarm chiefly consists of the youngest bees, yet it is often found, that bees of all ages compose the multitude of emigrants, and it often happens, that bees of all ages are seen remaining behind. The number of them is always more considerable than that of some populous cities, for sometimes upwards of forty thousand are found in a single hive. So large a body may well be supposed to work with great expedition; and in fact, in less than twenty-four hours, they will make combs above twenty inches long, and seven or eight broad. Sometimes they will half fill their hives with wax, in less than five days. In the first fifteen days, they are always found to make more wax than they do afterwards during the rest of the year.

Such are the outlines of the natural history of these animals, as usually found in our own country. How they are treated, so as to produce the greatest quantity of honey, belongs rather to the rural œconomist, than the natural

VOL. VIII. C historian;

historian; volumes have been written on the subject, and still more remains, equally curious and new. One thing, however, it may be proper to observe, that a farm, or a country, may be over-stocked with bees, as with any other sort of animal; for a certain number of hives always require a certain number of flowers to subsist on. When the flowers near home are rifled, then are these industrious insects seen taking more extensive ranges, but their abilities may be over taxed; and if they are obliged, in quest of honey, to go too far from home, they are over-wearied in the pursuit, they are devoured by birds, or beat down by the winds and rain.

From a knowledge of this, in some parts of France and Piedmont, they have contrived, as I have often seen, a kind of floating bee-house.

They have on board one barge threescore or an hundred bee-hives, well defended from the inclemency of an accidental storm; and with these, the owners suffer themselves to float gently down the river. As the bees are continually chusing their flowery pasture along the banks of the stream, they are furnished with sweets before unrifled; and thus a single floating bee-house yields the proprietor a considerable income. Why a method similiar to this has never been adopted in England, where we
have

have more gentle rivers, and more flowery banks, than in any other part of the world, I know not; certainly it might be turned to advantage, and yield the possessor a secure, though perhaps a moderate income.

Having mentioned the industry of these admirable insects, it will be proper to say something of the effects of their labour, of that wax and honey, which are turned by man to such various uses. Bees gather two kinds of wax, one coarse and the other fine. The coarser sort is bitter, and with this, which is called *propolis*, they stop up all the holes and crevices of their hives. It is of a more resinous nature than the fine wax, and is consequently better qualified to resist the moisture of the season, and preserve the works warm and dry within. The fine wax is as necessary to the animal's preservation as the honey itself. With this they make their lodgings, with this they cover the cells of their young, and in this they lay up their magazines of honey. This is made, as has been already observed, from the dust of flowers, which is carefully kneaded by the little insect, then swallowed, and having undergone a kind of digestion, is formed into the cells, which answer such a variety of purposes. To collect this, the animal rolls itself in the flower it would rob, and thus takes up the vegetable dust with the hair of its body. Then carefully brushing it

into a lump, with its fore paws it thrusts the composition into two cavities behind the thighs, which are made like spoons to receive the wax, and the hair that lines them serves to keep it from falling.

As of wax, there are also two kinds of honey, the white and the yellow. The white is taken without fire from the honey-combs. The yellow is extracted by heat, and squeezed through bags, in a press. The best honey is new, thick, and granulated, of a clear transparent white colour, of a soft and aromatic smell, and of a sweet lively taste. Honey made in mountainous countries is preferable to that of the valley. The honey made in the spring, is more highly esteemed than that gathered in summer, which last is still more valuable than that of autumn, when the flowers begin to fade and lose their fragrance.

The bees are nearly alike in all parts of the world, yet there are differences worthy our notice. In Guadaloupe, the bee is less by one half than the European, and more black and round. They have no sting, and make their cells in hollow trees; where, if the hole they meet with is too large, they form a sort of waxen house, of the shape of a pear, and in this they lodge and store their honey, and lay their eggs. They lay up their honey in waxen vessels, of the size of a pigeon's egg, of a black or
deep

deep violet colour; and these are so joined together, that there is no space left between them. The honey never congeals, but is fluid, of the consistence of oil, and the colour of amber. Resembling these, there are found little black bees, without a sting, in all the tropical climates; and though these countries are replete with bees, like our own, yet those form the most useful and laborious tribe in that part of the world. The honey they produce, is neither so unpalatable, nor so surfeiting as ours; and the wax is so soft, that it is only used for medicinal purposes, it being never found hard enough to form into candles, as in Europe.

Of insects that receive the name of bees, among us there are several; which, however, differ very widely from that industrious social race we have been just describing. The Humble-Bee is the largest of all this tribe, being as large as the first joint of one's middle finger. These are seen in every field, and perched on every flower. They build their nest in holes in the ground, of dry leaves, mixed with wax and wool, defended with moss from the weather. Each humble-bee makes a separate cell, about the size of a small nutmeg, which is round and hollow, containing the honey in a bag. Several of these cells are joined together, in such a manner, that the whole appears like a cluster of grapes. The females, which have the ap-

pearance of wasps, are very few, and their eggs are laid in cells, which the rest soon cover over with wax. It is uncertain whether they have a queen or not; but there is one much larger than the rest, without wings, and without hair, and all over black, like polished ebony. This goes and views all the works, from time to time, and enters into the cell, as if it wanted to see whether every thing was done right: in the morning, the young humble-bees are very idle, and seem not at all inclined to labour, till one of the largest, about seven o'clock, thrusts half its body from a hole, designed for that purpose, and seated on the top of the nest, beats its wings for twenty minutes successively, buzzing the whole time, till the whole colony is put in motion. The humble-bees gather honey, as well as the common bees; but it is neither so fine nor so good, nor the wax so clean, or so capable of fusion.

Besides the bees already mentioned, there are various kinds among us, that have much the appearance of honey-makers, and yet make only wax. The Wood-Bee is seen in every garden. It is rather larger than the common queen-bee; its body of a bluish black, which is smooth and shining. It begins to appear at the approach of spring, and is seen flying near walls exposed to a sunny aspect. This bee makes its
nest

nest in some piece of wood, which it contrives to scoop and hollow for its purpose. This, however, is never done in trees that are standing, for the wood it makes choice of is half rotten. The holes are not made directly forward, but turning to one side, and have an opening sufficient to admit one's middle finger; from whence runs the inner apartment, generally twelve or fifteen inches long. The instruments used in boring these cavities, are their teeth; the cavity is usually branched into three or four apartments; and in each of these they lay their eggs, to the number of ten or twelve, each separate and distinct from the rest. The egg is involved in a sort of paste, which serves at once for the young animal's protection and nourishment. The grown bees, however, feed upon small insects, particularly a louse, of a reddish brown colour, of the size of a small pin's head.

Mason-Bees make their cells with a sort of mortar, made of earth, which they build against a wall that is exposed to the sun. The mortar, which at first is soft, soon becomes as hard as stone, and in this their eggs are laid. Each nest contains seven or eight cells, an egg in every cell, placed regularly one over the other. If the nest remains unhurt, or wants but little repairs, they make use of them the year ensuing: and thus they often serve three or four

years successively. From the strength of their houses, one would think these bees in perfect security, yet none are more exposed than they. A worm with very strong teeth, is often found to bore into their little fortifications, and devour their young.

The Ground-Bee builds its nest in the earth, wherein they make round holes, five or six inches deep; the mouth being narrow, and only just sufficient to admit the little inhabitant. It is amusing enough, to observe the patience and assiduity with which they labour. They carry out all the earth, grain by grain, to the mouth of the hole, where it forms a little hillock, an Alps compared to the power of the artist by which it is raised. Sometimes the walks of a garden are found undermined by their labours; some of the holes running directly downward, others horizontally beneath the surface. They lay up in these cavities provisions for their young, which consist of a paste that has the appearance of corn, and is of a sweetish taste.

The Leaf-cutting Bees make their nest and lay their eggs among bits of leaves, very artificially placed in holes in the earth, of about the length of a tooth pick-case. They make the bits of leaves of a roundish form, and with them line the inside of their habitations. This tapestry is still further lined by a reddish
kind

kind of paste, somewhat sweet or acid. These bees are of various kinds; those that build their nests with chestnut-leaves are as big as drones, but those of the rose-tree are smaller than the common bee.

The Wall-Bees are so called because they make their nests in walls, of a kind of silky membrane with which they fill up the vacuities between the small stones which form the sides of their habitation. Their apartment consists of several cells, placed end to end, each in the shape of a woman's thimble. Though the web which lines this habitation is thick and warm, yet it is transparent and of a whitish colour. This substance is supposed to be spun from the animal's body; the males and females are of a size, but the former are without a sting. To these varieties of the bee kind might be added several others which are all different in nature, but not sufficiently distinguished to excite curiosity.

C H A P. III.

Of the Wasp.

HOWEVER similar many insects may be in appearance, this does not imply a similitude in their history. The bee and the wasp resemble each other very strongly, yet,

in examining their manner and their duration, they differ very widely; the bee labours to lay up honey, and lives to enjoy the fruits of its industry; the wasp appears equally assiduous, but only works for posterity, as the habitation is scarcely completed when the inhabitant dies.

The Wasp is well known to be a winged insect with a sting. To be longer in proportion to its bulk than the bee, to be marked with bright yellow circles round its body, and to be the most swift and active insect of all the fly kind. On each side of the mouth this animal is furnished with a long tooth, notched like a saw, and with these it is enabled to cut any substance, not omitting meat itself, and to carry it to its nest. Wasps live like bees in community, and sometimes ten or twelve thousand are found inhabiting a single nest.

Of all other insects the wasp is the most fierce, voracious, and most dangerous when enraged. They are seen wherever flesh is cutting up, gorging themselves with the spoil, and then flying to their nests with their reeking prey. They make war also on every other fly, and the spider himself dreads their approaches.

Every community among bees is composed of females or queens, drones or males, and neutral or working bees. Wasps have similar occupations;

occupations ; the two first are for propagating the species, the last for nursing, defending and supporting the rising progeny. Among bees, however, there is seldom above a queen or two in an hive ; among wasps there are above two or three hundred.

As soon as the summer begins to invigorate the insect tribes, the wasps are the most of the number, and diligently employed either in providing provisions for their nest, if already made, or in making one, if the former habitation be too small to receive the encreasing community. The nest is one of the most curious objects in natural history, and contrived almost as artificially as that of the bees themselves. Their principal care is to seek out an hole that has been begun by some other animal, a field mouse, a rat, or a mole, to build their nests in. They sometimes build upon the plain, where they are sure of the dryness of their situation, but most commonly on the side of a bank, to avoid the rain or water that would otherwise annoy them. When they have chosen a proper place they go to work with wonderful assiduity. Their first labour is to enlarge and widen the hole, taking away the earth and carrying it off to some distance. They are perfectly formed for labour, being furnished with a trunk above their mouths, two saws on each side, which play to the right and

left against each other, and six strong muscular legs to support them. They cut the earth into small parcels with their saws, and carry it out with their legs or paws. This is the work of some days; and at length the outline of their habitation is formed, making a cavity of about a foot and an half every way. While some are working in this manner, others are roving the fields to seek out materials for their building. To prevent the earth from falling down and crushing their rising city into ruin, they make a sort of roof with their gluey substance, to which they begin to fix the rudiments of their building, working from the top downwards, as if they were hanging a bell, which, however, at length they close up at the bottom. The materials with which they build their nests, are bits of wood and glue. The wood they get where they can from the rails and posts which they meet with in the fields and elsewhere. These they saw and divide into a multitude of small fibres, of which they take up little bundles in their claws, letting fall upon them a few drops of gluey matter with which their bodies are provided, by the help of which they knead the whole composition into a paste, which serves them in their future building. When they have returned with this to the nest, they stick their load of paste on that part where they make their walls and partitions;

titions ; they tread it close with their feet, and trowel it with their trunks, still going backwards as they work. Having repeated this operation three or four times, the composition is at length flatted out until it becomes a small leaf of a grey colour, much finer than paper, and of a pretty firm texture. This done the same wasp returns to the field to collect a second load of paste, repeating the same several times, placing layer upon layer, and strengthening every partition in proportion to the wants or convenience of the general fabric. Other working wasps come quickly after to repeat the same operation, laying more leaves upon the former, till at length, after much toil, they have finished the large roof which is to secure them from the tumbling in of the earth. This dome being finished, they make another entrance to their habitation, designed either for letting in the warmth of the sun, or for escaping in case one door be invaded by plunderers. Certain however it is, that by one of these they always enter, by the other they sally forth to their toil ; each hole being so small that they can pass but one at a time. The walls being thus composed, and the whole somewhat of the shape of a pear, they labour at their cells, which they compose of the same paper-like substance that goes to the formation of the outside works. Their combs differ from those of bees, not
less

less in the composition than the position which they are always seen to obtain. The honeycomb of the bee is edgeways with respect to the hive; that of the wasp is flat, and the mouth of every cell opens downwards. Thus is their habitation contrived, story above story, supported by several rows of pillars which give firmness to the whole building, while the upper story is flat-roofed, and as smooth as the pavement of a room, laid with squares of marble. The wasps can freely walk upon these stories between the pillars, to do whatever their wants require. The pillars are very hard and compact, being larger at each end than in the middle, not much unlike the columns of a building. All the cells of the nest are only destined for the reception of the young, being replete with neither wax nor honey.

Each cell is like that of the bee, hexagonal; but they are of two sorts, the one larger for the production of the male and female wasps, the other less for the reception of the working part of the community. When the females are impregnated by the males, they lay their eggs, one in each cell, and stick it in with a kind of gummy matter to prevent its falling out. From this egg proceeds the insect in its worm-state, of which the old ones are extremely careful, feeding it from time to time till it becomes large, and entirely fills up its cell. But the

the wasp community differs from that of the bee in this, that among the latter the working bees take the parental duties upon them, whereas among the wasps the females alone are permitted to feed their young, and to nurse their rising progeny. For this purpose the female waits with great patience till the working wasps have brought in their provisions, which she takes from them, and cuts into pieces. She then goes with great composure from cell to cell, and feeds every young one with her mouth. When the young worms have come to a certain size they leave off eating, and begin to spin a very fine silk, fixing the first end to the entrance of the cell, then turning their heads, first on one side, then on the other, they fix the thread to different parts, and thus they make a sort of a door which serves to close up the mouth of the cell. After this they divest themselves of their skins after the usual mode of transformation, the aurelia by degrees begins to emancipate itself from its shell: by little and little it thrusts out its legs and wings, and insensibly acquires the colour and shape of its parent.

The wasp thus formed, and prepared for depredation, becomes a bold, troublesome, and dangerous insect: there are no dangers which it will not encounter in pursuit of its prey, and nothing seems to satiate its gluttony. Though
it

it can gather no honey of its own, no animal is more fond of sweets. For this purpose it will pursue the bee and the humble-bee, destroy them with its sting, and then plunder them of their honey-bag, with which it flies triumphantly loaded to its nest to regale its young. Wasps are ever fond of making their nests in the neighbourhood of bees, merely to have an opportunity of robbing their hives, and feasting on the spoil. Yet the bees are not found always patiently submissive to their tyranny, but fierce battles are sometimes seen to ensue, in which the bees make up by conduct and numbers what they want in personal prowess. When there is no honey to be had, they seek for the best and sweetest fruits, and they are never mistaken in their choice. From the garden they fly to the city, to the grocers shops, and butchers shambles. They will sometimes carry off bits of flesh half as big as themselves, with which they fly to their nest for the nourishment of their brood. Those who cannot drive them away, lay for them a piece of ox's liver, which being without fibres, they prefer to other flesh; and whenever they are found, all other flies are seen to desert the place immediately. Such is the dread with which these little animals impress all the rest of the insect tribes, which they seize and devour without mercy, that they vanish at their approach.

approach. Wherever they fly, like the eagle or the falcon, they form a desert in the air around them. In this manner the summer is passed in plundering the neighbourhood, and rearing up their young; every day adds to their numbers; and from their strength, agility, and indiscriminate appetite for every kind of provision, were they as long-lived as the bee, they would soon swarm upon the face of nature, and become the most noxious plague of man: but providentially their lives are measured to their mischief, and they live but a single season.

While the summer heats continue, they are bold, voracious, and enterprising: but as the sun withdraws, it seems to rob them of their courage and activity. In proportion as the cold increases, they are seen to become more domestic; they seldom leave the nest, they make but short adventures from home, they flutter about in the noon-day heats, and soon after return chilled and feeble.

As their calamities increase, new passions soon begin to take place; the care for posterity no longer continues, and as the parents are no longer able to provide their growing progeny a supply, they take the barbarous resolution of sacrificing them all to the necessity of the times. In this manner, like a garrison upon short allowance, all the useless hands are destroyed; the
young

young worms, which a little before they fed, and protected with so much assiduity, are now butchered and dragged from their cells. As the cold increases, they no longer find sufficient warmth in their nests, which grow hateful to them, and they fly to seek it in the corners of houses, and places that receive an artificial heat. But the winter is still insupportable; and, before the new year begins, they wither and die; the working wasps first, the males soon following, and many of the females suffering in the general calamity. In every nest, however, one or two females survive the winter, and having been impregnated by the male during the preceding season, she begins in spring to lay her eggs in a little hole of her own contrivance. This bundle of eggs, which is clustered together like grapes, soon produces two worms, which the female takes proper precaution to defend and supply, and these when hatched soon give assistance to the female, who is employed in hatching two more; these also gathering strength, extricate themselves out of the web that inclosed them, and become likewise assistants to their mother; fifteen days after, two more make their appearance; thus is the community every day increasing, while the female lays in every cell, first a male and then a female. These soon after become breeders in turn, till, from a single female, ten thousand wasps are seen produced before

before the month of June. After the female has thus produced her progeny, which are distributed in different districts, they assemble from all parts, in the middle of summer, and provide for themselves the large and commodious habitation which has been described above.

Such is the history of the social wasp; but, as among bees, so also among these insects, there are various tribes that live in solitude: these lay their eggs in an hole for the purpose, and the parent dies long before the birth of its offspring. In the principal species of the Solitary Wasps, the insect is smaller than the working wasp of the social kind. The filament, by which the corselet is joined to the body, is longer and more distinctly seen, and the whole colour of the insect is blacker than in the ordinary kinds. But it is not their figure, but the manners of this extraordinary insect that claim our principal regard.

From the end of May to the beginning of July, this wasp is seen most diligently employed. The whole purpose of its life seems to be in contriving and fitting up a commodious apartment for its young one, which is not to succeed it till the year ensuing. For this end it is employed, with unwearied assiduity, in boring an hole into the finest earth some inches deep, but not much wider than the diameter of its own body.

body. This is but a gallery leading to a wider apartment destined for the convenient lodgment of its young. As it always chuses a gravelly soil to work in, and where the earth is almost as hard as stone itself, the digging and hollowing this apartment is an enterprize of no small labour; for effecting its operations, this insect is furnished with two teeth, which are strong and firm, but not sufficiently hard to penetrate the substance through which it is resolved to make its way: in order therefore to soften that earth which it is unable to pierce, it is furnished with a gummy liquor which it emits upon the place, and which renders it more easily separable from the rest, and the whole becoming a kind of soft paste, is removed to the mouth of the habitation. The animal's provision of liquor in these operations is however soon exhausted; and it is then seen either taking up water from some neighbouring flower or stream in order to supply the deficiency.

At length, after much toil, a hole some inches deep is formed, at the bottom of which is a large cavity; and to this no other hostile insect would venture to find its way, from the length and the narrowness of the defile through which it would be obliged to pass. In this the solitary wasp lays its egg, which is destined to continue the species; there the nascent animal is to continue
for

for above nine months, unattended and immured, and at first appearance the most helpless insect of the creation. But when we come to examine, new wonders offer, no other insect can boast so copiously luxurious a provision, or such confirmed security.

As soon as the mother-wasp has deposited her egg at the bottom of the hole, her next care is to furnish it with a supply of provisions, which may be offered to the young insect as soon as it leaves the egg. To this end she procures a number of little green worms, generally from eight to twelve, and these are to serve as food for the young one the instant it awakens into life. When this supply is regularly arranged and laid in, the old one then, with as much assiduity as it before worked out its hole, now closes the mouth of the passage; and thus leaving its young one immured in perfect security, and in a copious supply of animal food, she dies, satisfied with having provided for a future progeny.

When the young one leaves the egg it is scarcely visible, and is seen immured among a number of insects, infinitely larger than itself, ranged in proper order around it, which, however, give it no manner of apprehension. Whether the parent, when she laid in the insect provision, contrived to disable the worms from resistance, or whether they were at first incapable

pable of any, is not known. Certain it is, that the young glutton feasts upon the living spoil without any controul; his game lies at his hand, and he devours one after the other as the calls of appetite incite him. The life of the young animal is therefore spent in the most luxurious manner, till its whole stock of worms is exhausted, and then the time of its transformation begins to approach; and then spinning a silken web, it continues fixed in its cell till the sun calls it from its dark abode the ensuing summer.

The wasps of Europe are very mischievous, yet they are innocence itself when compared to those of the tropical climates, where all the insect tribes are not only numerous, but large, voracious, and formidable. Those of the West Indies are thicker, and twice as long as the common bee; they are of a grey colour, striped with yellow, and armed with a very dangerous sting. They make their cells in the manner of an honeycomb, in which the young ones are hatched and bred. They generally hang their nests by threads, composed of the same substance with the cells, to the branches of trees, and the caves of houses. They are seen every where in great abundance, descending like fruit, particularly pears, of which shape they are, and as large as one's head. The inside is divided into three round stories, full of cells, each hexagonal,

like those of an honeycomb. In some of the islands, these insects are so very numerous, that their nests are stuck up in this manner, scarce two feet asunder, and the inhabitants are in continual apprehension from their accidental resentment. It sometimes happens, that no precautions can prevent their attacks, and the pain of their sting is almost insupportable. Those who have felt it think it more terrible than even that of a scorpion; the whole visage swells, and the features are so disfigured, that a person is scarcely known by his most intimate acquaintance.

C H A P. IV.

Of the Ichneumon Fly.

EVERY rank of insects, how voracious soever, have enemies that are terrible to them, and that revenge upon them the injuries done upon the rest of the animated creation. The wasp, as we have seen, is very troublesome to man, and very formidable to the insect tribe; but the ichneumon fly (of which there are many varieties) fears not the wasp itself; it enters its retreats, plunders its habitations, and takes possession of that cell for its own young, which the wasp had laboriously built for a dearer posterity.

Though

Though there are many different kinds of this insect, yet the most formidable, and that best known, is called the Common Ichneumon, with four wings, like the bee, a long slender black body, and a three-forked tail, consisting of bristles; the two outermost black, and the middlemost red. This fly receives its name from the little quadrupede, which is found to be so destructive to the crocodile, as it bears a strong similitude in its courage and rapacity.

Though this instrument is, to all appearance, slender and feeble, yet it is found to be a weapon of great force and efficacy. There is scarce any substance which it will not pierce; and, indeed, it is seldom seen but employed in penetration. This is the weapon of defence, this is employed in destroying its prey; and still more, by this the animal deposits her eggs wherever she thinks fit to lay them. As it is an instrument chiefly employed for this purpose, the male is unprovided with such a sting, while the female uses it with great force and dexterity, brandishing it when caught, from side to side, and very often wounding those who thought they held her with the greatest security.

All the flies of this tribe are produced in the same manner, and owe their birth to the destruction of some other insect, within whose body they have been deposited, and upon whose vitals they have preyed, till they came to maturity.

turity. There is no insect whatever, which they will not attack, in order to leave their fatal present in its body; the caterpillar, the gnat, and even the spider himself, so formidable to others, is often made the unwilling fosterer of this destructive progeny.

About the middle of summer, when other insects are found in great abundance, the ichneumon is seen flying busily about, and seeking proper objects upon whom to depose its progeny. As there are various kinds of this fly, so they seem to have various appetites. Some are found to place their eggs within the aurelia of some nascent insect, others place them within the nest, which the wasp had curiously contrived for its own young; and as both are produced at the same time, the young of the ichneumon not only devours the young wasp, but the whole supply of worms, which the parent had carefully provided for its provision. But the greatest number of the ichneumon tribe are seen settling upon the back of the caterpillar, and darting, at different intervals, their stings into its body. At every dart they deposit an egg, while the wounded animal seems scarcely sensible of the injury it sustains. In this manner they leave from six to a dozen of their eggs within the fatty substance of the reptile's body, and then fly off to commit farther depredations. In the mean time the caterpillar thus irreparably in-

jured, seems to feed as voraciously as before; does not abate of its usual activity; and, to all appearance, seems no way affected by the internal enemies that are preparing its destruction in their darksome abode. But they soon burst from their egg state, and begin to prey upon the substance of their prison. As they grow larger, they require a greater supply, till at last the animal, by whose vitals they are supported, is no longer able to sustain them, but dies; its whole inside being almost eaten away. It often happens, however, that it survives their worm state, and then they change into a chrysalis, enclosed in the caterpillar's body till the time of their delivery approaches, when they burst their prisons, and fly away. The caterpillar, however, is irreparably destroyed, it never changes into a chrysalis, but dies shortly after, from the injuries it had sustained.

Such is the history of this fly, which, though very terrible to the insect tribe, fails not to be of infinite service to mankind. The millions which it kills in a single summer, are inconceivable; and without such a destroyer the fruits of the earth would only rise to furnish a banquet for the insect race, to the exclusion of all the nobler ranks of animated nature.

C H A P. V.

Of the Ant.

THOUGH the number of two-winged flies be very great, and the naturalists have taken some pains to describe their characters and varieties; yet there is such a similitude in their forms and manners, that in a work like this, one description must serve for all. We now, therefore, come to a species of four-winged insects, that are famous from all antiquity, for their social and industrious habits, that are marked for their spirit of subordination, that are offered as a pattern of parsimony to the profuse, and of unremitting diligence to the sluggard.

In the experiments, however, which have been more recently made, and the observations which have been taken, much of their boasted frugality and precaution seems denied them; the treasures they lay up, are no longer supposed intended for future provision; and the choice they make in their stores, seems no way dictated by wisdom. It is, indeed, somewhat surprising, that almost every writer of antiquity should describe this insect, as labouring in the summer, and feasting upon the produce during

the winter. Perhaps, in some of the warmer climates, where the winter is mild, and of short continuance, this may take place; but in France and England these animals can have no manner of occasion for a supply of winter provisions, as they are actually in a state of torpidity during that season.

The Common Ants of Europe are of two or three different kinds; some red, some black, some with stings, and others without. Such as have stings, inflict their wounds in that manner; such as are unprovided with these weapons of defence, have a power of spurting, from their hinder parts, an acid pungent liquor, which, if it lights upon the skin, inflames and burns it like nettles.

The body of an ant is divided into the head, breast, and belly. In the head, the eyes are placed, which are entirely black, and under the eyes there are two small horns or feelers, composed of twelve joints, all covered with a fine filky hair. The mouth is furnished with two crooked jaws, which project outwards, in each of which are seen incisures, that look like teeth. The breast is covered with a fine filky hair, from which project six legs, that are pretty strong and hairy, the extremities of each armed with two small claws, which the animal uses in climbing. The belly is more reddish than the
rest

rest of the body, which is of a brown chestnut colour, shining as glass, and covered with extremely fine hair.

From such a formation, this animal seems bolder, and more active, for its size, than any other of the insect tribe, and fears not to attack a creature, often above ten times its own magnitude.

As soon as the winter is past, in the first fine day in April, the ant-hill, that before seemed a desert, now swarms with new life, and myriads of these insects are seen just awaked from their annual lethargy, and preparing for the pleasures and fatigues of the season. For the first day they never offer to leave the hill, which may be considered as their citadel, but run over every part of it, as if to examine its present situation, to observe what injuries it has sustained during the rigours of winter*, while they slept; and to meditate and settle the labours of the day ensuing.

At the first display of their forces, none but the wingless tribe appears, while those furnished with wings remain at the bottom. These are the working ants, that first appear, and that are always destitute of wings; the males and females, that are furnished with four large

* Memoires pour servir à l'Histoire des Insectes, par Charles de Geer.

wings each, are more slow in making their appearance.

Thus, like bees, they are divided into males, females, and the neutral or the working tribe. These are all easily distinguished from each other; the females are much larger than the males; the working ants are the smallest of all. The two former have wings; which, however, they sometimes are divested of; the latter never have any, and upon them are devolved all the labours that tend to the welfare of the community. The female also may be distinguished by the colour and structure of her breast, which is a little more brown than that of the common ant, and a little brighter than that of the male.

In eight or ten days after their first appearance, the labours of the hill are in some forwardness; the males and females are seen mixed with the working multitude, and pursued or pursuing each other. They seem no way to partake in the common drudgeries of the state; the males pursue the females with great assiduity, and in a manner force them to compliance. They remain coupled for some time, while the males thus united suffer themselves to be drawn along by the will of their partners.

In the mean time, the working body of the state take no part in their pleasures; they are
seen

seen diligently going from the ant-hill, in pursuit of food for themselves and their associates, and of proper materials for giving a comfortable retreat to their young, or safety to their habitation. In the fields of England, ant-hills are formed with but little apparent regularity. In the more southern provinces of Europe, they are constructed with wonderful contrivance, and offer a sight highly worthy a naturalist's curiosity. These are generally formed in the neighbourhood of some large tree and a stream of water. The one is considered by the animals, as the proper place for getting food; the other for supplying them with moisture, which they cannot well dispense with. The shape of the ant-hill is that of a sugar-loaf, about three feet high, composed of various substances, leaves, bits of wood, sand, earth, bits of gum, and grains of corn. These are all united into a compact body, perforated with galleries down to the bottom, and winding ways within the body of the structure. From this retreat to the water, as well as to the tree, in different directions, there are many paths worn by constant assiduity, and along these the busy insects are seen passing and repassing continually; so that from May, or the beginning of June, according to the state of the season, they work continually, till the bad weather comes on.

The chief employment of the working ants,

is in sustaining not only the idlers at home, but also finding a sufficiency of food for themselves. They live upon various provisions, as well of the vegetable as of the animal kind. Small insects they will kill and devour; sweets of all kinds they are particularly fond of. They seldom, however, think of their community, till they themselves are first satiated. Having found a juicy fruit, they swallow what they can, and then, tearing it in pieces, carry home their load. If they meet with an insect above their match, several of them will fall upon it at once, and having mangled it, each will carry off a part of the spoil. If they meet, in their excursions, any thing that is too heavy for one to bear, and yet, which they are unable to divide, several of them will endeavour to force it along; some dragging and others pushing. If any one of them happens to make a lucky discovery, it will immediately give advice to others; and then at once, the whole republic will put themselves in motion. If in these struggles, one of them happens to be killed, some kind survivor will carry him off to a great distance, to prevent the obstructions his body may give to the general spirit of industry.

But while they are thus employed in supporting the state, in feeding abroad, and carrying in provisions to those that continue at home, they are not unmindful of posterity. After a
few

few days of fine weather, the female ants begin to lay their eggs, and those are as assiduously watched and protected by the working ants, who take upon themselves to supply whatever is wanting to the nascent animal's convenience or necessity. They are carried, as soon as laid, to the safest situation, at the bottom of their hill, where they are carefully defended from cold and moisture. We are not to suppose, that those white substances which we so plentifully find in every ant-hill, are the eggs as newly laid. On the contrary, the ant's egg is so very small, that, though laid upon a black ground, it can scarcely be discerned. The little white bodies we see, are the young animals in their maggot state, endued with life, long since freed from the egg, and often involved in a cone, which it has spun round itself, like the silkworm. The real egg, when laid, if viewed through a microscope, appears smooth, polished and shining, while the maggot is seen composed of twelve rings, and is oftener larger than the ant itself.

It is impossible to express the fond attachment which the working ants shew to their rising progeny. In cold weather they take them in their mouths, but without offering them the smallest injury, to the very depths of their habitation, where they are less subject to the severity of the season. In a fine day they remove

them, with the same care, nearer the surface, where their maturity may be assisted by the warm beams of the sun. If a formidable enemy should come to batter down their whole habitation, and crush them by thousands in the ruin, yet these wonderful insects, still mindful of their parental duties, make it their first care to save their offspring. They are seen running wildly about, and different ways, each loaded with a young one, often bigger than the insect that supports it. I have kept, says Swammerdam, several of the working ants in my closet, with their young, in a glass filled with earth. I took pleasure in observing, that in proportion as the earth dried on the surface, they dug deeper and deeper to deposit their eggs; and when I poured water thereon, it was surprising to see with what care, affection, and diligence they laboured, to put their brood in safety, in the driest place. I have seen also, that when water has been wanting for several days, and when the earth was moistened after it a little, they immediately carried their young ones to have a share, who seemed to enjoy and suck the moisture.

When the young maggot is come to its full growth, the breast swells insensibly, it casts its skin, and loses all motion. All the members which were hidden before, then begin to appear, an aurelia is formed, which represents very
distinctly

distinctly all the parts of the animal, though they are yet without motion, and as it were wrapped up in swaddling-cloaths. When at length, the little insect has passed through all its changes, and acquired its proper maturity, it bursts this last skin, to assume the form it is to retain ever after. Yet this is not done by the efforts of the little animal alone, for the old ones very assiduously break open, with their teeth, the covering in which it is enclosed. Without this assistance the aurelia would never be able to get free, as M. de Geer often found, who tried the experiment, by leaving the aurelia to themselves. The old ones not only assist them, but know the very precise time for lending their assistance; for, if produced too soon, the young one dies of cold; if retarded too long, it is suffocated in its prison.

When the female has done laying, and the whole brood is thus produced, her labours, as well as that of the male, become unnecessary; and her wings, which she had but a short time before so actively employed, drop off. What becomes of her when thus divested of her ornaments is not well known, for she is seen in the cells for some weeks after. The males, on the other hand, having no longer any occupation at home, make use of those wings with which they have been furnished by nature, and fly away, never to return, or to be heard of more. It is

probable they perish with the cold, or are devoured by the birds, which are particularly fond of this petty prey.

In the mean time, the working ants having probably deposed their queens, and being deserted by the males, that served but to clog the community, prepare for the severity of the winter, and bury their retreats as deep in the earth as they conveniently can. It is now found that the grains of corn, and other substances with which they furnish their hill, are only meant as fences to keep off the rigours of the weather, not as provisions to support them during its continuance. It is found generally to obtain, that every insect that lives a year after it is come to its full growth, is obliged to pass four or five months without taking any nourishment, and will seem to be dead all that time. It would be to no purpose, therefore, for ants to lay up corn for the winter, since they lie that time without motion, heaped upon each other, and are so far from eating, that they are utterly unable to stir. Thus what authors have dignified by the name of a magazine, appears to be no more than a cavity, which serves for a common retreat when the weather forces them to return to their lethargic state.

What has been said with exaggeration of the European ant, is however true, if asserted of those of the tropical climates. They build an

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ant-hill with great contrivance and regularity, they lay up provisions, and, as they probably live the whole year, they submit themselves to regulations entirely unknown among the ants of Europe.

Those of Africa are of three kinds, the red, the green, and the black; the latter are above an inch long, and in every respect a most formidable insect. Their sting produces extreme pain, and their depredations are sometimes extremely destructive. They build an ant-hill of a very great size, from six to twelve feet high; it is made of viscous clay, and tapers into a pyramidal form. This habitation is constructed with great artifice; and the cells are so numerous and even, that an honeycomb scarce exceeds them in number and regularity.

The inhabitants of this edifice seem to be under a very strict regulation. At the slightest warning they will sally out upon whatever disturbs them; and if they have time to arrest their enemy, he is sure to find no mercy. Sheep, hens, and even rats are often destroyed by these merciless insects, and their flesh devoured to the bone. No anatomist in the world can strip a skeleton so cleanly as they; and no animal, how strong soever, when they have once seized upon it, has power to resist them.

It often happens that these insects quit their
retreat

retreat in a body, and go in quest of adventures. “ During my stay,” says Smith, “ at Cape
“ Corse Castle, a body of these ants came to
“ pay us a visit in our fortification. It was
“ about day-break when the advanced guard
“ of this famished crew entered the chapel,
“ where some negroe servants were asleep upon
“ the floor. The men were quickly alarmed at
“ the invasion of this unexpected army, and
“ prepared, as well as they could, for a defence.
“ While the foremost battalion of insects had
“ already taken possession of the place, the rear-
“ guard was more than a quarter of a mile
“ distant. The whole ground seemed alive,
“ and crawling with unceasing destruction.
“ After deliberating a few moments upon what
“ was to be done, it was resolved to lay a large
“ train of gunpowder along the path they had
“ taken: by this means millions were blown
“ to pieces, and the rear-guard perceiving the
“ destruction of their leaders, thought proper
“ instantly to return, and make back to their
“ original habitation.”

The order which these ants observe, seems very extraordinary; whenever they sally forth, fifty or sixty larger than the rest are seen to head the band, and conduct them to their destined prey. If they have a fixed spot where their prey continues to resort, they then form a vaulted gallery,

gallery, which is sometimes a quarter of a mile in length; and yet they will hollow it out in the space of ten or twelve hours.

C H A P. VI.

Of the Beetle, and its Varieties.

HITHERTO we have been treating of insects with four transparent wings, we now come to a tribe with two transparent wings, with cases that cover them close while at rest, but which allow them their proper play when flying. The principal of these are the Beetle, the May-Bug, and the Cantharis. These are all bred like the rest of their order, first from eggs, then they become grubs, then a chrysalis in which the parts of the future fly are distinctly seen, and lastly the animal leaves its prison, breaking forth as a winged animal in full maturity.

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 sustain, by rubbing or crushing against the sides of their abode. These, though

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 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 surprising 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. To give the history of all these animals, that are bred pretty much in the same way, would be insipid and endless; it will suffice
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to select one or two from the number, the origin of which may serve as specimens of the rest. I will, therefore, offer the history of the May-bug to the reader's attention; premising, that most other beetles, though not so long lived, are bred in the same manner.

The May-bug, or dorr-beetle, as some call it, 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 some years their necks are seen covered with a red plate, and in others, with a black; these, however, are distinct sorts, and their difference is by no means accidental. The fore legs are very short, and the better calculated for burrowing in the ground, where this insect makes its retreat. It is well known for its evening buzz to children; but still more formidably introduced to the acquaintance of husbandmen and gardeners, for in some seasons it has been found to swarm in such numbers, as to eat up every vegetable production.

The two sexes in the May-bug are easily distinguished from each other, by the superior length of the tufts, at the end of the horns, in the male. They begin to copulate in summer, and at that season they are seen joined together for a considerable time. The female being impregnated, quickly falls to boring an hole into the ground, where to deposit her burthen. This
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is generally about half a foot deep, and in it she places her eggs, which are of an oblong shape, with great regularity, one by the other. They are of a bright yellow colour, and no way wrapped up in a common covering, as some have imagined. When the female is lightened of her burthen, she again ascends from her hole, to live as before, upon leaves and vegetables, to buzz in the summer evening, and to lie hid, among the branches of trees, in the heat of the day.

In about three months after these eggs have been thus deposited in the earth, the contained 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 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 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,

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 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

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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 seen 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-cloaths.

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 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. As the animal is very often found in this state, it is supposed, by those unacquainted with its real history, that the old ones, of the former season, have buried themselves for the winter, in order to revisit the sun the ensuing summer. But the fact is, the old one never survives

vives the season, but dies, like all the other winged tribe of insects, from the severity of cold in winter.

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 only upon roots, and imbibing only the moisture of the earth, to visit the mildness of the summer air, to chuse the sweetest vegetables for their banquet, and to drink the dew of the evening. Wherever an attentive observer then walks abroad, he will see them bursting up before him in his pathway, like ghosts on a theatre. He will see every part of the earth, that had its surface beaten into hardness, perforated by their egression. When the season is favourable for them, they are seen by myriads buzzing along, hitting against every object that intercepts their flight. The mid-day sun, however, seems too powerful for their constitutions; they then lurk under the leaves and branches of some shady tree; but the willow seems particularly their most favourite food; there they lurk in clusters, and seldom quit the tree till they have devoured all its verdure. In those seasons which are favourable to their propagation they are seen in an evening as thick as flakes of snow, and hitting against every object

ject with a sort of capricious blindness. Their duration, however, is but short, as they never survive the season. They begin to join shortly after they have been let loose from their prison, and when the female is impregnated, she cautiously bores an hole in the ground, with an instrument fitted for that purpose, which she is furnished with at the tail, and there deposits her eggs, generally to the number of threescore. If the season and the soil be adapted to their propagation, these soon multiply as already described, and go through the noxious stages of their contemptible existence. This insect, however, in its worm state, though prejudicial to man, makes one of the chief repasts of the feathered tribe, and is generally the first nourishment with which they supply their young. Rooks and hogs are particularly fond of these worms, and devour them in great numbers. The inhabitants of the county of Norfolk, some time since, went into the practice of destroying their rookeries, but in proportion as they destroyed one plague, they were pestered with a greater; and these insects multiplied in such an amazing abundance, as to destroy not only the verdure of the fields, but even the roots of vegetables, not yet shot forth. One farm in particular was so injured by them in the year 1751, that the occupier was not able to pay his rent; and the landlord was not only content to lose his income for
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that year, but also gave money for the support of the farmer and his family. In Ireland they suffered so much by these insects, that they came to a resolution of setting fire to a wood, of some miles in extent, to prevent their mischievous propagation.

Of all the beetle kind this is the most numerous, and therefore deserves the chief attention of history. The numerous varieties of other kinds might repay the curiosity of the diligent observer, but we must be content in general to observe, that in the great out-lines of the history, they resemble those of which we have just been giving a description; like them, all other beetles are bred from the egg, which 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. They generally live a year at least before they change into an aurelia; in that state they are not entirely motionless, nor entirely swaddled up without form.

It would be tedious and 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 rather from their size, their manners, or their formation. That beetle which the Americans call

call the 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 directs 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 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.

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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 a 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 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 to 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

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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 lobsters claws.

To this class we may also refer the Glow-worm, that little animal which makes such a distinguished figure in the descriptions of our poets. No two insects can differ more than the male and female of this species from each other. The male is in every respect a beetle, having cases to its wings, and rising in the air at pleasure; the female, on the contrary, has none, but is entirely a creeping insect, and is obliged to wait the approaches of her capricious companion. The body of the female has eleven joints, with a shield breast-plate, the shape of which is oval; the head is placed over this, and is very small, and the three last joints of her body are of a yellowish colour; but what distinguishes it from all other animals, at least in this part of the world, is the shining light
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which it emits by night, and which is supposed by some philosophers, to be an emanation which she sends forth to allure the male to her company. Most travellers who have gone through sandy countries must well remember the little shining sparks with which the ditches are studded on each side of the road. If incited by curiosity to approach more nearly, he will find the light sent forth by the glow-worm; if he should keep the little animal for some time, its light continues to grow paler, and at last appears totally extinct. The manner in which this light is produced has hitherto continued inexplicable; it is probable the little animal is supplied with some electrical powers, so that by rubbing the joints of its body against each other it thus supplies a stream of light which if it allures the male, as we are told, serves for very useful purposes.

The Cantharis is of the beetle kind, from whence come cantharides, well known in the shops by the name of Spanish flies, and for their use in blisters. They have feelers like bristles, flexible cases to the wings, a breast pretty plain, and the sides of the belly wrinkled. Cantharides differ from each other in their size, shape, and colour, those used in the shops also do the same. The largest in these parts are about an inch long, and as much in circumference, but others are not above three quarters of an inch. Some are

of a pure azure colour, others of pure gold, and others again have a mixture of pure gold and azure colours: but they are all very brilliant, and extremely beautiful. These insects, as is well known, are of the greatest benefit to mankind, making a part in many medicines conducive to human preservation. They are chiefly natives of Spain, Italy, and Portugal; but they are to be met with also about Paris in the summer time, upon the leaves of the ash, the poplar, and the rose-trees, and also among wheat, and in meadows. It is very certain that these insects are fond of ash-leaves, insomuch that they will sometimes strip one of these trees quite bare. Some affirm, that these flies delight in sweet-smelling herbs, and it is very certain, that they are fond of honey-suckles, lilac, and wild-cherry shrubs; but some that have sought after them declare, they never could find them on elder-trees, nut-trees, and among wheat. We are told that the country people expect the return of these insects every seven years. It is very certain, that such a number of these insects have been seen together in the air, that they appeared like swarms of bees; and that they have so disagreeable a smell, that it may be perceived a great way off, especially about sunset, though they are not seen at that time. This bad smell is a guide for those who make it their business to catch them. When they are caught they

they dry them, after which they are so light, that fifty will hardly weigh a dram. Those that gather them, tie them in a bag, or a piece of linen cloth, that has been well worn, and then they kill them with the vapours of hot vinegar, after which they dry them in the sun, and keep them in boxes. These flies, thus dried, being chymically analysed, yield a great deal of volatile caustic salt, mixed with a little oil, phlegm, and earth. Cantharides are penetrating, corrosive, and, applied to the skin, raise blisters, from whence proceeds a great deal of serosity. They are made use of both inwardly and outwardly. However it is somewhat strange that the effects of these flies should fall principally upon the urinary passages; for though some authors have endeavoured to account for this, we are still in the dark, for all they have said amounts to no more, than that they affect these parts in a manner which may be very learnedly described, but very obscurely comprehended.

An insect of great, though perhaps not equal use in medicine, is that which is known by the name of the Kermes; it is produced in the excrescence of an oak, called the berry-bearing ilex, and appears at first wrapt up in a membranaceous bladder, of the size of a pea, smooth and shining, of a brownish red colour, and covered with a very fine ash-coloured powder. This bag teems with a number of reddish eggs

or insects, which being rubbed with the fingers, pour out a crimson liquor. It is only met with in warm countries in the months of May and June. In the month of April this insect becomes of the size and shape of a pea, and its eggs some time after burst from the womb, and soon turning worms, run about the branches and leaves of the tree. They are of two sexes, and the females have been hitherto described; but the males are very distinct from the former, and are a sort of small flies like gnats, with six feet, of which the four forward are short, and the two backward long, divided into four joints, and armed with three crooked nails. There are two feelers on the head a line and an half long, which are moveable, streaked and articulated. The tail, at the back part of the body, is half a line long, and forked. The whole body is covered with two transparent wings, and they leap about in the manner of fleas. The harvest of the kermes is greater or less in proportion to the severity of the winter; and the women gather them before sun-rising, tearing them off with their nails, for fear there should be any loss from the hatching of the insects. They sprinkle them with vinegar, and lay them in the sun to dry, where they acquire a red colour.

An insect, perhaps, still more useful than either of the former, is the **Cochineal**, which
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has been variously described by authors; some have supposed it a vegetable excrescence from the tree upon which it is found; some have described it as a louse, some as a bug, and some as a beetle. As they appear in our shops when brought from America, they 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, or ash-colour, which are accounted the best, and are brought to us from Mexico. The cochineal insect is of an oval form, of the size of a small pea, with six feet, and a snout or 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 immovable, 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 feeds upon uncultivated trees, without any assistance, whereas the domestic is carefully, at a stated season, removed to cultivated trees, where it feeds 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

trious 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 winter is past. These leaves are very thick and 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, or 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 in their nourishment; and until the females are fecundated by the males, which, as in the former tribe, differ very widely, from the females being winged insects, whereas the others only creep, and are at most stationary. When they are impregnated, they produce a new offspring, so that the propagator has a new harvest thrice a year. When the native Americans have gathered the cochineal, they
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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 the cochineal are only the females, for the males are a sort of fly, as already observed in the kermes. They are used both for dying and medicine, and are said to have much the same virtue as the kermes, though they are now seldom used alone, but are mixed with other things for the sake of the colour.

I shall end this account of the beetle tribe with the history of an animal which cannot properly be ranked under this species, and yet which cannot be more methodically ranged under any other. This is the insect that forms and resides in the gall-nut, the spoils of which are converted to such useful purposes. The Gall Insects are bred in a sort of bodies adhering to a kind of oak in Asia, which differ with regard to their colour, size, roughness, smoothness and shape, and which we call galls. They are not fruit, as some have imagined, but preternatural tumours,

owing to the wounds given to the buds, leaves, and twigs of the tree, by a kind of insects that lay their eggs within them. This animal is furnished with an implement, by which the female penetrates into the bark of the tree, or into that spot which just begins to bud, and there sheds a drop of corrosive fluid into the cavity. Having thus formed a receptacle for her eggs, she deposits them in the place, and dies soon after. The heart of the bud being thus wounded, the circulation of the nutritive juice is interrupted, and the fermentation thereof, with the poison injected by the fly, burns the parts adjacent, and then alters the natural colour of the plant. The juice or sap, turned back from its natural course, extravasates and flows round the egg; after which it swells and dilates by the assistance of some bubbles of air, which get admission through the pores of the bark, and which run in the vessels with the sap. The external coat of this excrescence is dried by the air, and grows into a figure which bears some resemblance to the bow of an arch, or the roundness of a kernel. This little ball receives its nutriment, growth, and vegetation, as the other parts of the tree, by slow degrees, and is what we call the gall-nut. The worm that is hatched under this spacious vault, finds in the substance of the ball, which is as yet very tender, a subsistence suitable to its nature; gnaws and digests it

it till the time comes for its transformation to a nymph, and from that state of existence changes into a fly. After this the insect, perceiving itself duly provided with all things requisite, disengages itself soon from its confinement, and takes its flight into the open air. The case, however, is not similar with respect to the gall-nut that grows in autumn. The cold weather frequently comes on before the worm is transformed into a fly, or before the fly can pierce through its inclosure. The nut falls with the leaves, and although you may imagine that the fly which lies within is lost, yet in reality it is not so; on the contrary, its being covered up so close is the means of its preservation. Thus it spends the winter in a warm house, where every crack and cranny of the nut is well stopped up; and lies buried as it were under a heap of leaves, which preserves it from the injuries of the weather. This apartment, however, though so commodious a retreat in the winter, is a perfect prison in the spring. The fly, roused out of its lethargy by the first heats, breaks its way through, and ranges where it pleases. A very small aperture is sufficient, since at this time the fly is but a diminutive creature. Besides, the ringlets, whereof its body is composed, dilate, and become pliant in the passage.

C H A P. VII.

Of the Gnat and the Tipula.

THERE are two insects which entirely resemble each other in their form, and yet widely differ in their habits, manners, and propagation. Those who have seen the Tipula, or Long-legs, and the larger kind of Gnat, have most probably mistaken the one for the other; they have often accused the tipula, a harmless insect, of depredations made by the gnat, and the innocent have suffered for the guilty; indeed the differences in their form are so very minute, that it often requires the assistance of a microscope to distinguish the one from the other: they are both mounted on long legs, both furnished with two wings and a slender body; their heads are large, and they seem to be hump-backed; the chief and only difference, therefore, is, that the tipula wants a trunk, while the gnat has a large one, which it often exerts to very mischievous purposes. The tipula is a harmless, peaceful insect, that offers injury to nothing; the gnat is sanguinary and predaceous, ever seeking out for a place in which to bury its trunk, and pumping up the blood from the animal in large quantities.

The gnat proceeds from a little worm, which
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is usually seen at the bottom of standing waters. The manner in which the insect lays its eggs is particularly curious; after having laid the proper number on the surface of the water, it surrounds them with a kind of unctuous matter, which prevents them from sinking; but at the same time fastens them with a thread to the bottom, to prevent their floating away, at the mercy of every breeze, from a place the warmth of which is proper for their production, to any other, where the water may be too cold, or the animal's enemies too numerous. Thus the insects, in their egg state, resemble a buoy, which is fixed by an anchor. As they come to maturity they sink deeper, and at last, when they leave the egg as worms, they creep at the bottom. They now make themselves lodgments of cement, which they fasten to some solid body at the very bottom of the water, unless, by accident, they meet with a piece of chalk, which being of a soft and pliant nature, gives them an opportunity of sinking a retreat for themselves, where nothing but the claws of a cray-fish can possibly molest them. The worm afterwards changes its form. It appears with a large head, and a tail invested with hair, and moistened with an oleaginous liquor, which she makes use of as a cork, to sustain her head in the air, and her tail in the water, and to transport her from one place to another. When the oil with which her tail

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is moistened begins to grow dry, she discharges out of her mouth an unctuous humour, which she sheds all over her tail, by virtue whereof she is enabled to transport herself where she pleases, without being either wet or any ways incommoded by the water. The gnat in her second state is, properly speaking, in her form of a nymph, which is an introduction or entrance into a new life. In the first place, she divests herself of her second skin; in the next she resigns her eyes, her antennæ, and her tail; in short, she actually seems to expire. However, from the spoils of the amphibious animal, a little winged insect cuts the air, whose every part is active to the last degree, and whose whole structure is the just object of our admiration. Its little head is adorned with a plume of feathers, and its whole body invested with scales and hair, to secure it from any wet or dust. She makes trial of the activity of her wings, by rubbing them either against her body, or her broad side-bags, which keep her in an equilibrium. The furbelow, or little border of fine feathers, which graces her wings, is very curious, and strikes the eye in the most agreeable manner. There is nothing, however, of greater importance to the gnat than her trunk, and that weak implement may justly be deemed one of nature's master-pieces. It is so very small, that the extremity of it can scarcely be discerned through
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the best microscope that can be procured. That part which is at first obvious to the eye, is nothing but a long scaly sheath under the throat. At near the distance of two thirds of it there is an aperture, through which the insect darts out four stings, and afterwards retracts them. One of which, however sharp and active it may be, is no more than the case in which the other three lie concealed, and run in a long groove. The sides of these stings are sharpened like two-edged swords; they are likewise barbed, and have a vast number of cutting teeth towards the point, which turns up like a hook, and is fine beyond expression. When all these darts are stuck into the flesh of animals, sometimes one after another, and sometimes all at once, the blood and humours of the adjacent parts must unavoidably be extravasated; upon which a tumour must consequently ensue, the little orifice whereof is closed up by the compression of the external air. When the gnat, by the point of her case, which she makes use of as a tongue, has tasted any fruit, flesh, or juice, that she has found out; if it be a fluid, she sucks it up, without playing her darts into it; but in case she finds the least obstruction by any flesh whatever, she exerts her strength, and pierces through it, if possibly she can. After this she draws back her stings into their sheath, which she applies to the wound in order to extract, as through a reed,

reed, the juices which she finds inclosed. This is the implement with which the gnat performs her work in the summer, for during the winter she has no manner of occasion for it. Then she ceases to eat, and spends all that tedious season either in quarries or in caverns, which she abandons at the return of summer, and flies about in search after some commodious ford, or standing water, where she may produce her progeny, which would be soon washed away and lost, by the too rapid motion of any running stream. The little brood are sometimes so numerous, that the very water is tinged according to the colour of the species, as green, if they be green, and of a sanguine hue, if they be red.

These are circumstances sufficiently extraordinary in the life of this little animal; but it offers something still more curious in the method of its propagation. However similar insects of the gnat kind are in their appearance, yet they differ widely from each other in the manner in which they are brought forth, for some are oviparous, and are produced from eggs; some are viviparous, and come forth in their most perfect form; some are males, and unite with the female; some are females, requiring the impregnation of the male; some are of neither sex, yet still produce young, without any copulation whatsoever. This is one

of the strangest discoveries in all natural history! A gnat separated from the rest of its kind, and inclosed in a glass vessel, with air sufficient to keep it alive, shall produce young, which also, when separated from each other, shall be the parents of a numerous progeny. Thus, down for five or six generations, do these extraordinary animals propagate without the use of copulation, without any congress between the male and female, but in the manner of vegetables, the young bursting from the body of their parents, without any previous impregnation. At the sixth generation, however, their propagation stops, the gnat no longer produces its like, from itself alone, but it requires the access of the male to give it another succession of fecundity.

The gnat of Europe gives but little uneasiness; it is sometimes heard to hum about our beds at night, and keeps off the approaches of sleep by the apprehension it causes; but it is very different in the ill-peopled regions of America, where the waters stagnate, and the climate is warm, and where they are produced in multitudes beyond expression. The whole air is there filled with clouds of those famished insects; and they are found of all sizes, from six inches long, to a minuteness that even requires the microscope to have a distinct perception of them. The warmth of the mid-day
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sun is too powerful for their constitutions; but when the evening approaches, neither art nor flight can shield the wretched inhabitants from their attacks; though millions are destroyed, still millions more succeed, and produce unceasing torment. The native Indians, who anoint their bodies with oil, and who have from their infancy been used to their depredations, find them much less inconvenient than those who are newly arrived from Europe; they sleep in their cottages covered all over with thousands of the gnat kind upon their bodies, and yet do not seem to have their slumbers interrupted by their cruel devourers. If a candle happens to be lighted in one of those places, a cloud of insects at once light upon the flame, and extinguish it; they are therefore obliged to keep their candles in glass lanthorns; a miserable expedient to prevent an unceasing calamity!

AN
H I S T O R Y
OF THE
Z O O P H Y T E S.
PART V.

C H A P. VIII.

Of Zoophytes in General.

WE are now come to the last link in the chain of animated nature, to a class of beings so confined in their powers, and so defective in their formation, that some historians have been at a loss whether to consider them as a superior rank of vegetables, or the humblest order of the animated tribe. In order therefore to give them a denomination, agreeable to their existence, they have been called Zoophytes, a name implying vegetable nature endued with animal life; and, indeed, in some the marks of the animal are so few, that it is difficult to give their place in nature with precision, or to tell whether it is a plant or an insect that is the object of our consideration.

Should it be asked what it is that constitutes the difference between animal and vegetable life, what it is that lays the line that separates those two great kingdoms from each other, it would be difficult, perhaps we should find it impossible, to return an answer. The power of motion cannot form this distinction, since some vegetables are possessed of motion, and many animals are totally without it. The sensitive plant has obviously a greater variety of motions than

than the oyster or the pholas. The animal that fills the acorn-shell is immoveable, and can only close its lid to defend itself from external injury, while the flower, which goes by the name of the fly-trap, seems to close upon the flies that light upon it, and that attempt to rifle it of its honey. The animal in this instance seems to have scarce a power of self-defence; the vegetable not only guards its possessions, but seizes upon the robber that would venture to invade them. In like manner, the methods of propagation give no superiority to the lower rank of animals. On the contrary, vegetables are frequently produced more conformably to the higher ranks of the creation; and though some plants are produced by cuttings from others, yet the general manner of propagation is from seeds, laid in the womb of the earth, where they are hatched into the similitude of the parent plant or flower. But a most numerous tribe of animals have lately been discovered, which are propagated by cuttings, and this in so extraordinary a manner, that, though the original insect be divided into a thousand parts, each, however small, shall be formed into an animal, entirely resembling that which was at first divided; in this respect, therefore, certain races of animals seem to fall beneath vegetables, by their more imperfect propagation.

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What, therefore, is the distinction between them, or are the orders so intimately blended as that it is impossible to mark the boundaries of each? To me it would seem, that all animals are possessed of one power, of which vegetables are totally deficient; I mean either the actual ability, or an awkward attempt at self-preservation. However vegetables may seem possessed of this important quality, yet it is with them but a mechanical impulse, resembling the raising one end of the lever, when you depress the other: the sensitive plant contracts and hangs its leaves, indeed, when touched, but this motion no way contributes to its safety; the fly-trap flower acts entirely in the same manner; and though it seems to seize the little animal that comes to annoy it, yet, in reality, only closes mechanically upon it, and this inclosure neither contributes to its preservation nor its defence. But it is very different with insects, even of the lowest order; the earth-worm not only contracts, but hides itself in the earth, and escapes with some share of swiftness from its pursuers. The polypus hides its horns; the star-fish contracts its arms, upon the appearance even of distant dangers; they not only hunt for their food, but provide for their safety, and however imperfectly they may be formed, yet still they are in reality placed many degrees above the highest vegetable of the earth,
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and are possessed of many animal functions, as well as those that are more elaborately formed.

But though these be superior to plants, they are very far beneath their animated fellows of existence. In the class of zoophytes, we may place all those animals, which may be propagated by cuttings, or in other words, which, if divided into two or more parts, each part in time becomes a separate and perfect animal; the head shoots forth a tail, and on the contrary, the tail produces an head; some of these will bear dividing but into two parts, such is the earth-worm; some may be divided into more than two, and of this kind are many of the star-fish; others still may be cut into a thousand parts, each becoming a perfect animal; they may be turned inside out, like the finger of a glove, they may be moulded into all manner of shapes, yet still their vivacious principle remains, still every single part becomes perfect in its kind, and after a few days existence, exhibits all the arts and industry of its contemptible parent! We shall, therefore, divide zoophytes according to their several degrees of perfection, namely, into Worms, Star-fish, and Polypi; contenting ourselves with a short review of those nauseous and despicable creatures, that excite our curiosity chiefly by their imperfections; it must not be concealed, however,

however, that much has of late been written on this part of natural history. A new mode of animal production, could not fail of exciting not only the curiosity, but the astonishment of every philosopher; many found their favourite systems totally overthrown by the discovery; and it was not without a wordy struggle, that they gave up what had formerly been their pleasure and their pride. At last, however, conviction became too strong for argument, and a question, which owed its general spread rather to its novelty, than to its importance, was given up in favour of the new discovery.

C H A P. IX.

Of Worms.

THE first in the class of zoophytes, are animals of the Worm kind, which being entirely destitute of feet, trail themselves along upon the ground, and find themselves a retreat under the earth, or in the water. As these, like serpents, have a creeping motion, so both, in general, go under the common appellation of reptiles; a loathsome, noxious, malignant tribe, to which man by nature, as well as by religion, has the strongest antipathy. But though worms, as well as serpents, are mostly without feet, and have been doomed to creep along the

earth on their bellies, yet their motions are very different. The serpent, as has been said before, having a back-bone which it is incapable of contracting, bends its body into the form of a bow, and then shoots forward from the tail; but it is very different with the worm, which has a power of contracting or lengthening itself at will. There is a spiral muscle, that runs round its whole body, from the head to the tail, somewhat resembling a wire wound round a walking-cane, which, when slipped off, and one end extended and held fast, will bring the other nearer to it; in this manner the earth-worm, having shot out, or extended its body, takes hold by the slime of the fore part of its body, and so contracts and brings forward the hinder part; in this manner it moves onward, not without great effort, but the occasions for its progressive motion are few.

As it is designed for living under the earth, and leading a life of obscurity, so it seems tolerably adapted to its situation. Its body is armed with small stiff sharp burrs or prickles, which it can erect or depress at pleasure; under the skin there lies a slimy juice, to be ejected as occasion requires, at certain perforations, between the rings of the muscles, to lubricate its body, and facilitate its passage into the earth. Like most other insects, it hath breathing-holes along the back, adjoining each ring; but it is with-
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out bones, without eyes, without ears, and, properly without feet. It has a mouth, and also an alimentary canal, which runs along to the very point of the tail. In some worms, however, particularly such as are found in the bodies of animals, this canal opens towards the middle of the belly, at some distance from the tail. The intestines of the earth-worm are always found filled with a very fine earth, which seems to be the only nourishment these animals are capable of receiving.

The animal is entirely without brain, but near the head is placed the heart, which is seen to beat with a very distinct motion, and round it are the spermatic vessels, forming a number of little globules, containing a milky fluid, which have an opening into the belly, not far from the head: they are also often found to contain a number of eggs, which are laid in the earth, and are hatched in twelve or fourteen days into life, by the genial warmth of their situation; like snails, all these animals unite in themselves both sexes at once, the reptile that impregnates, being impregnated in turn; few that walk out, but must have observed them with their heads laid against each other, and so strongly attached that they suffer themselves to be trod upon.

When the eggs are laid in the earth, which, in about fourteen days, as has been said, are

hatched into maturity, the young ones come forth very small, but perfectly formed, and suffer no change during their existence: how long their life continues is not well known, but it certainly holds for more than two or three seasons. During the winter, they bury themselves deeper in the earth, and seem, in some measure, to share the general torpidity of the insect tribe. In spring, they revive with the rest of nature, and on those occasions, a moist or dewy evening brings them forth from their retreats, for the universal purpose of continuing their kind. They chiefly live in a light rich and fertile soil, moistened by dews or accidental showers, but avoid those places where the water is apt to lie on the surface of the earth, or where the clay is too stiff for their easy progression under ground.

Helpless as they are formed, yet they seem very vigilant in avoiding those animals that chiefly make them their prey; in particular, the mole, who feeds entirely upon them beneath the surface, and who seldom ventures, from the dimness of its sight, into the open air; him they avoid, by darting up from the earth, the instant they feel the ground move; and fishermen, who are well acquainted with this, take them in what numbers they chuse, by stirring the earth where they expect to find them. They are also driven from their retreats
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under ground, by pouring bitter or acrid water thereon, such as that water in which green walnuts have been steeped, or a ley made of pot-ashes.

Such is the general outline of the history of these reptiles, which, as it should seem, degrades them no way beneath the rank of other animals of the insect creation; but we now come to a part of their history, which proves the imperfection of their organs, from the easiness with which these little machines may be damaged and repaired again. It is well known in mechanics, that the finest and most complicated instruments are the most easily put out of order, and the most difficultly set right; the same also obtains in the animal machine. Man, the most complicated machine of all others, whose nerves are more numerous, and powers of action more various, is most easily destroyed: he is seen to die under wounds which a quadrupede or a bird could easily survive; and as we descend gradually to the lower ranks, the ruder the composition, the more difficult it is to disarrange it. Some animals live without their limbs, and often are seen to reproduce them; some are seen to live without their brain for many weeks together; caterpillars continue to increase and grow large, though all their nobler organs are entirely destroyed within; some animals continue to exist, though cut in two, their nobler

parts preserving life, while the others perish that were cut away; but the earth-worm, and all the zoophyte tribe, continue to live in separate parts, and one animal, by the means of cutting, is divided into two distinct existences, sometimes into a thousand.

There is no phænomenon in all natural history more astonishing than this, that man, at pleasure, should have a kind of creative power, and out of one life make two, each completely formed, with all its apparatus and functions, each with its perceptions, and powers of motion and self-preservation, each as complete in all respects as that from which it derived its existence, and equally enjoying the humble gratifications of its nature.

When Des Cartes first started the opinion, that brutes were machines, the discovery of this surprising propagation was unknown, which might, in some measure, have strengthened his fanciful theory. What is life, in brutes, he might have said, or where does it reside? In some we find it so diffused, that every part seems to maintain a vivacious principle, and the same animal appears possessed of a thousand distinct irrational souls at the same time. But let us not, he would say, give so noble a name to such contemptible powers, but rank the vivifying principle in these with the sap that rises in vegetables, or the moisture that contracts a cord,

or

or the heat that puts water into motion! Nothing, in fact, deserves the name of soul, but that which reasons, that which understands, and by knowing God, receives the mark of its currency, and is minted with the impression of its great Creator.

Such might have been the speculations of this philosopher: however, to leave theory, it will be sufficient to say that we owe **the first** discovery of this power of reproduction in **animals** to Mr. Trembley, who first observed **it** in the polypus; and after him, Spalanzani and others found it taking place in the earth-worm, the sea-worm, and several other ill-formed **animals** of a like kind, which were susceptible of this new mode of propagation. This last philosopher has tried several experiments upon the earth-worm, many of which succeeded according to his expectation; every earth-worm, however, did not retain the vivacious principle with the same obstinacy; some, when cut in two, were entirely destroyed; others survived only in the nobler part; and while the head was living the tail entirely perished, and a new one was seen to burgeon from the extremity. But what was most surprising of all, in some, particularly in the small red-headed earth-worm, both extremities survived the operation; the head produced a tail with the anus, the intestines, the annular muscle, and the prickly beards; the tail part, on

the other hand, was seen to shoot forth the nobler organs, and in less than the space of three months sent forth a head, a heart, with all the apparatus and instruments of generation. This part, as may easily be supposed, was produced much more slowly than the former, a new head taking above three or four months for its completion, a new tail being shot forth in less than as many weeks. Thus two animals, by dissection, were made out of one, each with their separate appetites, each endued with life and motion, and seemingly as perfect as that single animal from whence they derived their origin.

What was performed upon the earth-worm, was found to obtain also in many of the vermicular species. The sea-worm, the white water-worm, and many of those little worms with feelers, found at the bottom of dirty ditches; in all these the nobler organs are of such little use, that if taken away, the animal does not seem to feel the want of them; it lives in all its parts, and in every part, and by a strange paradox in nature, the most useless and contemptible life is of all others the most difficult to destroy.



The Cuttle Fish.
 1 The Sea Star.
 2 The Sea Nettle.

C. Harris sculp.

C H A P. X.

Of the Star-fish.

THE next order of zoophytes is that of the Star-fish, a numerous tribe, shapeless and deformed, assuming at different times different appearances. The same animal that now appears round like a ball, shortly after flattens as thin as a plate. All of this kind are formed of a semi-transparent gelatinous substance, covered with a thin membrane, and, to an inattentive spectator, often appear like a lump of inanimate jelly, floating at random upon the surface of the sea, or thrown by chance on shore at the departure of the tide. But upon a more minute inspection, they will be found possessed of life and motion; they will be found to shoot forth their arms in every direction, in order to seize upon such insects as are near, and to devour them with great rapacity. Worms, the spawn of fish, and even muscles themselves, with their hard resisting shell, have been found in the stomachs of these voracious animals; and what is very extraordinary, though the substance of their own bodies be almost as soft as water, yet they are no way injured by swallowing these shells, which are almost of a stony hardness. They increase in size as all other

animals do. In summer, when the water of the sea is warmed by the heat of the sun, they float upon the surface, and in the dark they send forth a kind of shining light resembling that of phosphorus. Some have given these animals the name of sea-nettles, because they burn the hands of those that touch them, as nettles are found to do. They are often seen fastened to the rocks, and to the largest sea-shells, as if to derive their nourishment from them. If they be taken and put into spirit of wine, they will continue for many years entire, but if they be left to the influence of the air, they are, in less than four-and-twenty hours, melted down into limpid and offensive water.

In all of this species, none are found to possess a vent for their excrements, but the same passage by which they devour their food, serves for the ejection of their fæces. These animals, as was said, take such a variety of figures, that it is impossible to describe them under one determinate shape; but in general, their bodies resemble a truncated cone, whose base is applied to the rock to which they are found usually attached. Though generally transparent, yet they are found of different colours, some inclining to green, some to red, some to white, and some to brown. In some, their colours appear diffused over the whole surface, in some, they are often streaked, and in others often spotted. They
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are possess of a very slow progressive motion, and in fine weather, they are continually seen, stretching out and fishing for their prey. Many of them are possess of a number of long slender filaments, in which they entangle any small animals they happen to approach, and thus draw them into their enormous stomachs, which fill the whole cavity of their bodies. The harder shells continue for some weeks undigested, but at length, they undergo a kind of maceration in the stomach, and become a part of the substance of the animal itself. The indigestible parts are returned by the same aperture by which they were swallowed, and then the starfish begins to fish for more. These also may be cut in pieces, and every part will survive the operation; each becoming a perfect animal, endued with its natural rapacity. Of this tribe, the number is various, and the description of each would be tedious and uninteresting; the manners and nature of all, are nearly as described; but I will just make mention of one creature, which, though not properly belonging to this class, yet is so nearly related, that the passing it in silence would be an unpardonable omission.

Of all other animals, the Cuttle-fish, though in some respects superior to this tribe, possesses qualities the most extraordinary. It is about two feet long, covered with a very thin skin,

and its flesh composed of a gelatinous substance, which however within side is strengthened by a strong bone, of which such great use is made by the goldsmith. It is possessed of eight arms, which it extends, and which are probably of service to it in fishing for its prey; while in life, it is capable of lengthening or contracting these at pleasure; but when dead, they contract and lose their rigidity. They feed upon small fish, which they seize with their arms; and they are bred from eggs, which are laid upon the weeds along the sea-shore.

The cuttle-fish is found along many of the coasts of Europe, but are not easily caught, from a contrivance with which they are furnished by nature; this is a black substance, of the colour of ink, which is contained in a bladder generally on the left-side of the belly, and which is ejected in the manner of an excrement from the anus. Whenever therefore this fish is pursued, and when it finds a difficulty of escaping, it spurts forth a great quantity of this black liquor, by which the waters are totally darkened; and then it escapes, by lying close at the bottom. In this manner the creature finds its safety, and men find ample cause for admiration, from the great variety of stratagems with which creatures are endued for their peculiar preservation.

THE POLYPUS.

CHAP. XI.

Of the Polypus.

THOSE animals which we have described in the last chapter, are variously denominated. They have been called the Star-fish, Sea-nettles, and Sea-polypi. This last name has been peculiarly ascribed to them by the ancients, because of the number of feelers or feet of which they are all possess'd, and with which they have a slow progressive motion; but the moderns have given the name of Polypus to a reptile that lives in fresh water, by no means so large or observable. These are found at the bottom of wet ditches, or attached to the under surface of the broad-leaved plants that grow and swim on the waters. The same difference holds between these and the sea-water polypus, as between all the productions of the sea, and of the land and the ocean. The marine vegetables and animals grow to a monstrous size. The eel, the pike, or the bream of fresh-waters, is but small; but in the sea, they grow to an enormous magnitude. The herbs of the field are at most but a few feet high; those of the sea often shoot forth a stalk of an hundred. It is so between the polypi of both elements. Those of the sea are found from two feet in length to
three

three or four, and Pliny has even described one, the arms of which were no less than thirty feet long. Those in fresh waters, however, are comparatively minute; at their utmost size, seldom above three parts of an inch long, and when gathered up into their usual form, not above a third even of those dimensions.

It was upon these minute animals, that the power of dissection was first tried in multiplying their numbers. They had been long considered as little worthy the attention of observers, and were consigned to that neglect in which thousands of minute species of insects remain to this very day. It is true, indeed, that Reaumur observed, classed, and named them. By contemplating their motions, he was enabled distinctly to pronounce on their being of the animal, and not of the vegetable kingdom; and he called them polypi, from their great resemblance to those larger ones that were found in the ocean. Still, however, their properties were neglected, and their history unknown.

Mr. Trembley was the person to whom we owe the first discovery of the amazing properties and powers of this little vivacious creature; he divided this class of animals into four different kinds; into those inclining to green, those of a brownish cast, those of flesh colour, and those which he calls the polype de panache. The differences of structure in these, as also of colour,

lour, are observable enough; but the manner of their subsisting, of seizing their prey, and of their propagation, is pretty nearly the same in all.

Whoever has looked with care into the bottom of a wet ditch, when the water is stagnant, and the sun has been powerful, may remember to have seen many little transparent lumps of jelly, about the size of a pea, and flatted on one side; such also as have examined the under side of the broad-leaved weeds that grow on the surface of the water, must have observed them studded with a number of these little jelly-like substances, which were probably then disregarded, because their nature and history was unknown. These little substances, however, were no other than living polypi gathered up into a quiescent state, and seemingly inanimate, because either undisturbed, or not excited by the calls of appetite to action. When they are seen exerting themselves they put on a very different appearance from that when at rest; to conceive a just idea of their figure, we may suppose the finger of a glove cut off at the bottom; we may suppose also several threads or horns planted round the edge like a fringe. The hollow of this finger will give us an idea of the stomach of the animal, the threads issuing forth from the edges may be considered as the arms or feelers, with which it hunts for
its

its prey. The animal, at its greatest extent, is seldom seen above an inch and an half long, but it is much shorter when it is contracted and at rest; it is furnished neither with muscles nor rings, and its manner of lengthening or contracting itself more resembles that of the snail, than worms, or any other insect. The polypus contracts itself more or less, in proportion as it is touched, or as the water is agitated in which they are seen. Warmth animates them, and cold benumbs them; but it requires a degree of cold approaching congelation before they are reduced to perfect inactivity; those of an inch have generally their arms double, often thrice as long as their bodies. The arms, where the animal is not disturbed, and the season not unfavourable, are thrown about in various directions, in order to seize and entangle its little prey; sometimes three or four of the arms are thus employed, while the rest are contracted like the horns of a snail, within the animal's body. It seems capable of giving what length it pleases to these arms; it contracts and extends them at pleasure, and stretches them only in proportion to the remoteness of the object it would seize.

These animals have a progressive motion, which is performed by that power they have of lengthening and contracting themselves at pleasure; they go from one part of the bottom to another;

another; they mount along the margin of the water, and climb up the side of aquatic plants. They often are seen to come to the surface of the water, where they suspend themselves by their lower end. As they advance but very slowly, they employ a great deal of time in every action, and bind themselves very strongly to whatever body they chance to move upon as they proceed; their adhesion is voluntary, and is probably performed in the manner of a cupping-glass applied to the body.

All animals of this kind have a remarkable attachment to turn towards the light, and this naturally might induce an enquirer to look for their eyes; but however carefully this search has been pursued, and however excellent the microscope with which every part was examined, yet nothing of the appearance of this organ was found over the whole body; and it is most probable that, like several other insects which hunt their prey by their feeling, these creatures are unfurnished with advantages which would be totally useless for their support.

In the center of the arms, as was said before, the mouth is placed, which the animal can open and shut at pleasure, and this serves at once as a passage for food, and an opening for it after digestion. The inward part of the animal's body seems to be one great stomach, which is open at both ends; but the purposes which the
opening

opening at the bottom serves are hitherto unknown, but certainly not for excluding their excrements, for those are ejected at the aperture by which they are taken in. If the surface of the body of this little creature be examined with a microscope, it will be found studded with a number of warts, as also the arms, especially when they are contracted; and these tubercles, as we shall presently see, answer a very important purpose.

If we examine their way of living, we shall find these insects chiefly subsisting upon others, much less than themselves; particularly a kind of millepedes that live in the water, and a very small red worm, which they seize with great avidity. In short, no insect whatsoever, less than themselves, seems to come amiss to them: their arms, as was observed above, serve them as a net would a fisherman, or perhaps, more exactly speaking, as a lime-twigg does a fowler. Wherever their prey is perceived, which the animal effects by its feeling, it is sufficient to touch the object it would seize upon, and it is fastened without a power of escaping. The instant one of this insect's long arms is laid upon a millepede, the little insect sticks without a possibility of retreating. The greater the distance at which it is touched, the greater is the ease with which the polypus brings the prey to its mouth. If the little object be near, though irretrievably

irretrievably caught, it is not without great difficulty that it can be brought to the mouth and swallowed. When the polypus is unsupplied with prey, it testifies its hunger by opening its mouth; the aperture, however, is so small that it cannot be easily perceived; but when, with any of its long arms, it has seized upon its prey, it then opens the mouth distinctly enough, and this opening is always in proportion to the size of the animal which it would swallow; the lips dilate insensibly by small degrees, and adjust themselves precisely to the figure of their prey. Mr. Trembley, who took a pleasure in feeding this useless brood, found that they could devour aliments of every kind, fish and flesh as well as insects; but he owns they did not thrive so well upon beef and veal, as upon the little worms of their own providing. When he gave one of these famished reptiles any substance which was improper to serve for aliment, at first it seized the prey with avidity, but after keeping it some time entangled near the mouth, it let drop again with distinguishing nicety.

When several polypi happen to fall upon the same worm, they dispute their common prey with each other. Two of them are often seen seizing the same worm at different ends, and dragging it at opposite directions with great force. It often happens that while one is swallowing

lowing its respective end, the other is also employed in the same manner, and thus they continue swallowing each his part, until their mouths meet together; they then rest, each for some time in this situation, till the worm breaks between them, and each goes off with his share; but it often happens, that a seemingly more dangerous combat ensues, when the mouths of both are thus joined upon one common prey together: the largest polypus then gapes and swallows his antagonist; but what is very wonderful, the animal thus swallowed seems to be rather a gainer by the misfortune. After it has lain in the conqueror's body for about an hour, it issues unhurt, and often in possession of the prey which had been the original cause of contention; how happy would it be for men, if they had as little to fear from each other!

These reptiles continue eating the whole year, except when the cold approaches to congelation; and then, like most others of the insect tribe, they feel the general torpor of nature, and all their faculties are for two or three months suspended; but if they abstain at one time, they are equally voracious at another, and like snakes, ants, and other animals that are torpid in winter, the meal of one day suffices them for several months together. In general, however, they devour more largely in proportion to their size, and their growth is quick exactly as they

are fed; such as are best supplied, soonest acquire their largest size, but they diminish also in their growth with the same facility, if their food be taken away.

Such are the more obvious properties of these little animals, but the most wonderful still remain behind: their manner of propagation, or rather multiplication, has for some years been the astonishment of all the learned of Europe. They are produced in as great a variety of manners as every species of vegetable. Some polypi are propagated from eggs, as plants are from their seed; some are produced by buds issuing from their bodies, as plants are produced by inoculation, while all may be multiplied by cuttings, and this to a degree of minuteness that exceeds even philosophical perseverance.

With respect to such of this kind as are hatched from the egg, little curious can be added, as it is a method of propagation so common to all the tribes of insect nature; but with regard to such as are produced like buds from their parent stem, or like cuttings from an original root, their history requires a more detailed explanation. If a polypus be carefully observed in summer, when these animals are chiefly active, and more particularly prepared for propagation, it will be found to burgeon forth from different parts of its body several tubercles or
little

little knobs, which grow larger and larger every day; after two or three days inspection, what at first appeared but a small excrescence takes the figure of a small animal, entirely resembling its parent, furnished with feelers, a mouth, and all the apparatus for seizing and digesting its prey. This little creature every day becomes larger, like the parent, to which it continues attached; it spreads its arms to seize upon whatever insect is proper for aliment, and devours it for its own particular benefit; thus it is possessed of two sources of nourishment, that which it receives from the parent by the tail, and that which it receives from its own industry by the mouth. The food which these animals receive often tinctures the whole body, and upon this occasion the parent is often seen communicating a part of its own fluids to that of its progeny that grows upon it; while, on the contrary, it never receives any tincture from any substance that is caught and swallowed by its young. If the parent swallows a red worm, which gives a tincture to all its fluids, the young one partakes of the parental colour; but if the latter should seize upon the same prey, the parent polypus is no way benefited by the capture, but all the advantage remains with the young one.

But we are not to suppose that the parent is capable of producing only one at a time, several

veral young ones are thus seen at once, of different sizes, growing from its body, some just budding forth, others acquiring their perfect form, and others come to sufficient maturity, and just ready to drop from the original stem to which they had been attached for several days. But what is more extraordinary still, those young ones themselves that continue attached to their parent, are seen to burgeon, and propagate their own young ones also, each holding the same dependence upon its respective parent, and possessed of the same advantages, that have been already described in the first connection. Thus we see a surprising chain of existence continued, and numbers of animals naturally produced without any union of the sexes, or other previous disposition of nature.

This seems to be the most natural way by which these insects are multiplied; their production from the egg being not so common; and though some of this kind are found with a little bladder attached to their bodies, which is supposed to be filled with eggs, which afterwards come to maturity, yet the artificial method of propagating these animals, is much more expeditious, and equally certain: it is indifferent whether one of them be cut into ten, or ten hundred parts, each becomes as perfect an animal as that which was originally divided; but

it must be observed, that the smaller the part which is thus separated from the rest, the longer it will be in coming to maturity, or in assuming its perfect form. It would be endless to recount the many experiments that have been tried upon this philosophical prodigy; the animal has been twisted and turned into all manner of shapes; it has been turned inside out, it has been cut in every division, yet still it continued to move; its parts adapted themselves again to each other, and in a short time it became as voracious and industrious as before.

Besides these kinds mentioned by Mr. Trembley, there are various others which have been lately discovered by the vigilance of succeeding observers, and some of these so strongly resemble a flowering vegetable in their forms, that they have been mistaken by many naturalists for such. Mr. Hughes, the author of the Natural History of Barbadoes, has described a species of this animal, but has mistaken its nature, and called it a sensitive flowering plant; he observed it to take refuge in the holes of rocks, and when undisturbed, to spread forth a number of ramifications, each terminated by a flowery petal which shrunk at the approach of the hand, and withdrew into the hole from whence before it had been seen to issue. This plant however was no other than an animal of the polypus kind, which

which is not only to be found in Barbadoes, but also on many parts of the coast of Cornwall, and along the shores of the Continent.

C H A P. XII.

Of Lythophytes and Sponges.

IT is very probable that the animals we see, and are acquainted with, bear no manner of proportion to those that are concealed from us. Although every leaf and vegetable swarms with animals upon land, yet at sea they are still more abundant; for the greatest part of what would seem vegetables growing there are in fact nothing but the artificial formation of insects, palaces which they have built for their own habitation.

If we examine the bottom of the sea along some shores, and particularly at the mouths of several rivers, we shall find it has the appearance of a forest of trees under water, millions of plants growing in various directions, with their branches entangled in each other, and sometimes standing so thick as to obstruct navigation. The shores of the Persian gulph, the whole extent of the Red-sea, and the western coasts of America, are so choaked up in many places with these coraline substances, that though ships force a passage through them, boats

and swimmers find it impossible to make their way. These aquatic groves are formed of different substances, and assume various appearances. The coral plants, as they are called, sometimes shoot out like trees without leaves in winter; they often spread out a broad surface like a fan, and not uncommonly a large bundling head, like a faggot; sometimes they are found to resemble a plant with leaves and flowers; and often the antlers of a stag, with great exactness and regularity. In other parts of the sea are seen sponges of various magnitude, and extraordinary appearances, assuming a variety of phantastic forms like large mushrooms, mitres, fonts, and flower-pots. To an attentive spectator these various productions seem entirely of the vegetable kind; they seem to have their leaves and their flowers, and have been experimentally known to shoot out branches in the compass of a year. Philosophers, therefore, till of late, thought themselves pretty secure in ascribing these productions to the vegetable kingdom; and Count Marfigli, who has written very laboriously and learnedly upon the subject of corals and sponges, has not hesitated to declare his opinion, that they were plants of the aquatic kind, furnished with flowers and seed, and endued with a vegetation entirely resembling that which is found upon land. This opinion, however, some time after, began to be
shaken

shaken by Rumphius and Jussieu, and at last by the ingenious Mr. Ellis, who by a more sagacious and diligent enquiry into nature, put it past doubt, that corals and sponges were entirely the work of animals, and that like the honeycomb, which was formed by the bee, the coral was the work of an infinite number of reptiles of the polypus kind, whose united labours were thus capable of filling whole tracts of the ocean with those embarrassing tokens of their industry.

If in our researches after the nature of these plants, we should be induced to break off a branch of the coraline substance, and observe it carefully, we shall perceive its whole surface, which is very rugged and irregular, covered with a mucous fluid, and almost in every part studded with little jelly-like drops, which when closely examined, will be found to be no other than reptiles of the polypus kind. These have their motions, their arms, their appetites exactly resembling those described in the last chapter, but they soon expire when taken out of the sea, and our curiosity is at once stopped in its career, by the animals ceasing to give any marks of their industry; recourse therefore has been had to other expedients, in order to determine the nature of the inhabitant, as well as the habitation.

If a coraline plant be strictly observed, while

still growing in the sea, and the animals upon its surface be not disturbed, either by the agitation of the waters, or the touch of the observer, the little polypi will then be seen in infinite numbers, each issuing from its cell, and in some kinds, the head covered with a little shell resembling an umbrella, the arms spread abroad, in order to seize its prey, while the hinder part still remains attached to its habitation, from whence it never wholly removes. By this time it is perceived that the number of inhabitants is infinitely greater than was at first suspected; that they are all assiduously employed in the same pursuits, and that they issue from their respective cells, and retire into them at pleasure. Still, however, there are no proofs that those large branches which they inhabit are entirely the construction of such feeble and minute animals. But chemistry will be found to lend a clue to extricate us from our doubts in this particular. Like the shells which are formed by snails, muscles and oysters, these coraline substances effervesce with acids, and may therefore well be supposed to partake of the same animal nature. But Mr. Ellis went still farther, and examined their operations, just as they were beginning. Observing an oyster-bed which had been for some time neglected, he there perceived the first rudiments of a coraline plantation, and tufts of various kinds shooting from different parts

parts of this favourable soil. It was upon these he tried his principal experiment. He took out the oysters which were thus furnished with coralines, and placed them in a large wooden vessel, covering them with sea-water. In about an hour he perceived the animals, which before had been contracted by handling, and had shewn no signs of life, expanding themselves in every direction, and appearing employed in their own natural manner. Perceiving them therefore in this state, his next aim was to preserve them thus expanded, so as to be permanent objects of curiosity. For this purpose he poured, by slow degrees, an equal quantity of boiling water into the vessel of sea-water in which they were immersed. He then separated each polypus with pincers from its shell, and plunged each separately into small crystal vases, filled with spirit of wine mixed with water. By this means the animal was preserved entire, without having time to contract itself, and he thus perceived a variety of kinds, almost equal to that variety of productions which these little animals are seen to form. He has been thus able to perceive and describe fifty different kinds, each of which is seen to possess its own peculiar mode of construction, and to form a coralline that none of the rest can imitate. It is true indeed, that on every coralline substance there are a number of polypi found, no way resembling those which are the erectors of the

building; these may be called a vagabond race of reptiles, that are only intruders upon the labours of others, and that take possession of habitations, which they have neither art nor power to build for themselves. But in general, the same difference that subsists between the honeycomb of the bee, and the paper-like cells of the wasp, subsists between the different habitations of the coral-making polypi.

With regard to the various forms of these substances, they have obtained different names from the nature of the animal that produced them, or the likeness they bear to some well-known object, such as coralines, fungimadrepores, sponges, astroides, and keratophytes. Though these differ extremely in their outward appearances, yet they are all formed in the same manner by reptiles of various kinds and nature. When examined chemically, they all discover the marks of animal formation; the corals, as was said, dissolve in acids, the sponges burn with an odour strongly resembling that of burnt horn. We are left somewhat at a loss with regard to the precise manner in which this multitude of cells, which at last assume the appearance of a plant or flower, are formed. If we may be led in this subject by analogy, it is most probable, that the substance of coral is produced in the same manner that the shell of the snail grows round it; these little reptiles are each possessed of
a slimy

a slimy matter, which covers its body, and this hardening, as in the snail, becomes an habitation exactly fitted to the body of the animal that is to reside in it; several of these habitations being joined together, form at length a considerable mass, and as most animals are productive, in proportion to their minuteness, so these multiplying in a surprising degree, at length form those extensive forests that cover the bottom of the deep.

Thus all nature seems replete with life; almost every plant on land has its surface covered with millions of these minute creatures, of whose existence we are certain, but of whose uses we are entirely ignorant; while numbers of what seem plants at sea are not only the receptacles of insects, but also entirely of insect formation. This might have led some late philosophers into an opinion, that all nature was animated, that every, even the most inert mass of matter, was endued with life and sensation, but wanted organs to make those sensations perceptible to the observer: those opinions, taken up at random, are difficultly maintained, and as difficultly refuted; like combatants that meet in the dark, each party may deal a thousand blows without ever reaching the adversary. Those perhaps are wiser who view nature as she offers; who without searching too deeply

into the recesses in which she ultimately hides, are contented to take her as she presents herself, and storing their minds with effects, rather than with causes, instead of the embarrassment of systems, about which few agree, are contented with the history of appearances, concerning which all mankind have but one opinion.

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Bat, as big as a rabbit, ii. 5—by some reckoned among birds, 287—doubtful among naturalists whether beast or bird—now universally take place among quadrupedes—Pliny, Gesner, and Aldrovandus placed it among birds—scarce in any particular resembles the bird, except the power of sustaining itself in the air—description of the common sort in England—its intestines and skeleton, in some measure, resemble those of mankind—makes its first appearance early in summer, and begins its flight in the evening—is seen to skim along the surface of waters—feeds upon gnats, moths, and nocturnal insects of every kind, which it pursues open-mouthed—its flight laborious, irregular, and, if interrupted, not readily followed by a second elevation—usually taken, when striking against an object it falls to the ground—even in the summer, it sleeps the greatest part of the time—its retreat—continues in a torpid state during winter—is usually hanging by its hooked claws to the roofs of caves, unaffected by all change of weather—is destroyed particularly by the owl—the bat couples and brings forth in summer from two to five young at a time—the female has two nipples forward on the breast, as in the human kind, and this a motive for Linnæus to give it the title of a primas, to rank it in the same order with mankind—the female makes no nest for her young—when she begins to grow hungry, and finds a necessity of stirring abroad, she takes her little ones and sticks them by their hooks against the sides of her apartment, and there they immoveably cling, and patiently wait her return—
let's

less similitude to the race of birds than of quadrupeds—great labour in flying soon fatigues, and tires it in less than an hour—its petty thefts upon the fat of bacon—long-eared bat—horse-shoe bat—rhinoceros bat—a larger race of bats in the East and West Indies truly formidable—a dangerous enemy—when united in flocks they become dreadful—they are eat—the negroes of the African coasts will not eat them though starving—on the African coast they fly in such numbers, as to obscure the setting sun—the rousette, or great bat of Madagascar, is found along the coasts of Africa and Malabar, where it is often seen about the size of a large hen—destroys the ripe fruits, and sometimes settles upon animals, and man himself—destroys fowls and domestic animals, unless preserved with the utmost care, and often fasten upon the inhabitants, attack them in the face, and make terrible wounds—the ancients have taken their idea of harpies from these fierce and voracious creatures, equally deformed, greedy, uncleanly, and cruel—the bat, called the American vampyre—its description by Ulloa—purport of his account confirmed by various travellers, who all agree that it has a faculty of drawing blood from persons sleeping, and destroying them before they awake—a strong difficulty remains how they make the wound—Ulloa and Buffon's opinions, suppose the animal endowed with a strong power of suction; and that, without inflicting any wound, by continuing to draw, it enlarges the pores of the skin, so that the blood at length passes—they are one of the great pests of South America, iv. 125 to 136—Found in the holes deserted by the wood-pecker, v. 223, 224.

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Beak, how that of animals is produced, ii. 93.

Beam, by hunters meant that part which bears the antlers, iii. 105.

Beams, those of the sun shining upon the fire, put it out, and why—darting directly upon us, without the medium of the air, would burn us up at once, or blind us with effulgence, i. 311, 312.

Beards, Americans taking great pains to pluck theirs up by the roots, the under part, and all but the whiskers, therefore supposed to have no hair growing on that part—Linnæus himself has fallen into this mistake—different customs of men, in the manner of wearing their beards, ii. 89.

Bears, in cold frozen regions of the North not smaller than in milder countries, ii. 6—the North-American Indians anoint their skins with fat of bears, 218—The bears now and then make depredations upon the rein-deer, iii. 157—in Greenland do not change colour, 330—three different kinds—the black of America does not reject animal food, as believed—places where they are found—retreat of the brown bear—a vulgar error, that, during winter, the brown bear lives by sucking its paws; it seems rather to subsist then upon the exuberance of its former flesh—the male and female do not inhabit the same den, and seldom are seen together, but upon the accessions of genial desire—care of the female for her young—the bear, when tamed, seems gentle and placid; yet still to be distrusted, and managed with caution, being often treacherous and resentful without a cause—is capable of a degree of instruction—when come to maturity, can never be tamed—methods of taking them—their paws and hams a great delicacy—the white placed in the coldest climates, grows larger than in the temperate zones, and remains master of the icy mountains

mountains in Spitzbergen and Greenland—unable to retreat when attacked with fire-arms, they make a fierce and long resistance—they live upon fish and seals, their flesh is too strong for food—are often seen on ice-floats, several leagues at sea, though bad swimmers—the white sometimes jumps into a Greenlander's boat, and if it does not overset it, sits down calmly, and, like a passenger, suffers itself to be rowed along—hunger makes it swim after fish—often a battle ensues between a bear and a morse, or a whale, and the latter generally prove victorious, iv. 297 to 303.

Beasts are most fierce and cruel in all countries where men are most barbarous, ii. 303.

Beasts of chase, in the reigns of William Rufus, and Henry the First, it was less criminal to destroy one of the human species than a beast of chase—sacred edifices thrown down, and turned to waste, to make room for beasts of chase, iii. 102.

Beasts of prey, seldom devour each other—they chiefly seek after the deer or the goat—their usual method of hunting, ii. 295.

Beaver, known to build like an architect, and rule like a citizen, ii. 301—Its fore parts taste like flesh, and the hinder like the fish it feeds on, iii. 178—A remaining monument of brutal society—its qualities, taken from its fellows, and kept in solitude or domestic tameness—resists only when driven to extremity, and fights when its speed cannot avail—the only quadrupede that has a flat broad tail, covered with scales, serving as a rudder to direct its motions in the water—the sole quadrupede with membranes between the toes on the hind feet, and none on the fore feet—the only animal in its fore parts entirely resembling a quadrupede, and in its hinder parts approaches the nature of fishes, having a scaly tail—its description—has but one vent for the emission of excrements and urine—they assemble about the months of June and July

—make a society to continue the greatest part of the year—form a company of above two hundred—fix their abode by the side of a lake or river—cut with their teeth a tree thicker than a man's body—amazing works and mansion houses—convey their materials by water—mix clay and dry grass together, work it into a mortar, and with their tails plaister their work within and without—their walls perpendicular, and two feet thick—their piers four-score or an hundred feet long, and ten or twelve feet thick at the base—their dikes ten and twelve feet thick at the foundation—their apartments round, or oval, and divided into three stories, one above the other—visited too often by men, they work only in the night-time, or abandon the place, and seek a safer situation—four hundred reside in one mansion-house, divided into a number of apartments, having communication with each other—their works in the northern parts finished in August or September—in summer they are epicures—their provisions for the winter season—they drive piles into the earth, to fence and fortify their habitation against the wind and water—cut down branches from three to ten feet in length—the largest are conveyed to the magazines by a whole body—the smallest by one only—each taking a different way, and having a walk assigned him, that no one should interrupt another in his work—wood-yards larger or smaller, in proportion to the number in family—manner of catching them in snares, or by surprize—they swim with their mortar on their tails, and their stakes between their teeth—their works damaged by force of water, or feet of huntsmen, instantly repaired, iv. 147 to 156.

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considered as a beauty, except by the lovers of antiquity—less in the object than in the eye of the beholder—superior beauty of our ancestors not easily comparable, 244.

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Beds, the earth every where in beds over beds, and each of them maintaining exactly the same thickness, i. 54.

Bee, a ruminating insect, or seemingly so—its stomach is composed of muscular fibres, iii. 6—Operations studied for two thousand years are still incompletely known—Reaumur's account sufficiently wonderful—many of the facts held dubious by those conversant with the subject—some declared not to have existence in nature—three different kinds of bees—common working bees neither male nor female—queen bees lay all the eggs that are hatched in a season—structure of the working bee, particularly of its trunk, which extracts the honey from flowers—manner of building their cells—in one day, they make cells upon each other enough to contain three thousand bees—description of those cells—the combs made by insensible degrees, not at once, as some imagine—the cells for the young and for the drones—that for the queen bee the largest of all—those for honey are deeper than the rest—that not the only food upon which they subsist—manner of anticipating the progress of vegetation—the bee has a stomach for wax as well as honey—bee-bread—treacle for food of bees in winter—what part of the flower has the honey—sting of the bee—any wanting food, bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets some drops fall into the other's mouth—numerous as the multitude of bees appear
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in a swarm, they all owe their origin to one parent, called the queen bee—opening the body of a queen, the eggs at one time found to amount to five thousand—the queen easily distinguished from the rest—great fertility of the queen, and the great attentions paid to her, controverted by recent observers—they leave a cell to every egg, and destroy the rest—great care and affection for the young—in about twenty days after the egg was laid, the bee was completely formed, and fitted to undergo the fatigues of its state—the cell being prepared, the animal soon transformed into an aurelia different from that of the common caterpillar—when they begin to break their prisons, above a hundred are excluded in one day—dreadful battles often ensue between the young brood and their progenitors—signs previous to their migrations—after the migration, the queen being settled, the swarm follows, and in a quarter of an hour the whole body is at ease—sometimes sacrifice their queen; but never when the hive is full of wax and honey—the working sort kill the drones in the worm state, in the cell, and eject their bodies from the hive among the general carnage—upwards of forty thousand bees found in a single hive—instances of expedition in working—in the first fifteen days, they make more wax than during the rest of the year—a hive sending out several swarms in the year, the first always the best and most numerous—a kind of floating bee-house used in France, viii. 5 to 26.

Bees, in other countries—in Guadaloupe are less by half than in Europe, and have no sting—sometimes there are two or three queens to a swarm; then the weaker deserted for the more powerful protector—the deserted queen does not survive the defeat, is destroyed by the jealous rival; and till this be done, the bees never go out to work—at Guadaloupe their cells are in hollow trees, sometimes with a sort of waxen house, shaped like a pear, in which they lodge their honey, and lay their eggs—their honey never

congeals, is fluid as oil, and has the colour of amber—in the tropical climates are black bees without a sting—their wax is soft, and only used for medicinal purposes, not being hard enough for candles, as in Europe—whether the humble bees have a queen or not, there is one much larger than the rest, without wings, without hair, all over black, like polished ebony—this views all the works, from time to time—their habits—the honey gathered by the humble bees neither so fine, so good, nor the wax so clear, or so capable of fusion, as those of the common bees, viii. 23 to 30.

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Bell, when the stag cries, he is said to bell, iii. 105.

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Billitting, a name given by huntsmen to the excrement of the fox, iii. 304.

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degenerated into adoration—it is nimble of foot—
is esteemed by the Hottentots—assists them in at-
tending their flocks, and guarding them against in-
vaders—is taught to combat the enemies of the na-
tion, and every army of the Hottentots is furnished
with a herd of them—they procure the Hottentots
an easy victory before they strike a blow—lives in
the same cottage with its master, and when it dies,
a new one is chosen to succeed it by a council of
the old men of the village, and is then joined with
a veteran of its own kind, from whom it learns,
becomes social and diligent, and is taken for life
into friendship and protection—the bisons are found
to differ from each other in several parts of the
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world—some have horns, some are without—they are equally tractable and gentle when tamed—and are furnished with a fine, lustrous, soft hair, more beautiful than that of our own breed—their hump of different sizes, weighing from forty to fifty pounds, more or less—cuts and tastes somewhat like a dressed udder—the bisons of Malabar, Abyssinia, Madagascar, Arabia, Africa, and America—in the course of a few generations, the hump wears away—its description—the bison and the cow breed among each other—the grunting or Siberian cow, and the little African cow or zebu are different races of the bison, iii. 14 to 30.

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Bones, in the embryo, soft almost as the muscles and flesh—hard as the bones seem, the blood holds its current through them, as through other parts of the body—in old age, more solid, also more brittle, and why, ii. 178 to 180—Fossile bones found on the banks of the Ohio, in Peru, and Brasil, iv. 264, 265—See *Blood*, ii. 179. See *Bread*, ii. 199. See *Fish*, vi. 289, *et seq.*

Bonet-Chirois, Mr. Buffon's name of a monkey, supposed a variety of that called malbrouk, iv. 219.

Bonito, description of this fish, vi. 286.

Booby, name given by our seamen to birds of the penguin tribe, vi. 87.

Borandians, description of them, ii. 196.

Boristhenes, or Nieper, a river, its course and source, i. 195.

Borneo, island in the East Indies, where the barbyrouessa, or Indian hog, is principally found—hog of Borneo, the name given by travellers to the babi-rouessa, iii. 178.

Borneo, the natives hunt the ourang-outang in the same manner as the elephant or the lion, iv. 190.

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- Bosphorus*, (the Thracian) was the first appropriated, by granting to such as were in possession of its shore the right of fishing in it, i. 217.
- Bottom* of the sea in some parts not found, and why— that of the Red Sea, a forest of submarine plants— that of the sea near America covered with vegetables—a map of the bottom of the sea between Africa and America, by M. Buache, i. 269 to 271.
- Bowels* of the ruminating animals considered as an laboratory with vessels in it, iii. 3.
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- Brain* and spinal marrow the first seen in the embryo, ii. 134—Earth-worm entirely without it, viii. 99—some animals live without their brain for weeks, 101.
- Brambling*, bird of the sparrow kind, v. 280, 281.
- Bramins* of India, have a power of smelling equal to most creatures—they smell the water they drink though to us quite inodorous, ii. 165—have erected hospitals for the maintenance of all kinds of vermin, 207—also for such monkeys as are sick or disabled, iv. 219.
- Brazil*, black clothes worn there soon turn of an iron-colour—kept in the shops, preserve their proper hue, i. 293—duck described, vi. 117.
- Bread*, twelve ounces of it, and nothing but water, the common allowance, for four and twenty hours, among the primitive Christians of the East, ii. 120— that of the Laplanders composed of bones of fishes, pounded and mixed with the inside tender bark of the pine-tree, 199.
- Bream*, description of the sea-bream, vi. 279.
- Breasts* in women larger than in men—milk found in breasts of men as well as of women, ii. 94—black women's breasts, after bearing one child, hang down below the navel—it is customary among them to suckle the child at their backs, throwing the breast over the shoulder, 210.

Breath of the lion is very offensive, iii. 208—manner of breathing in fishes, vi. 153.

Breeze, constant breeze produced by the melting of snows, i. 323—from sea encreases gradually till twelve, sinks away, and totally hushed at five—upon its ceasing, the land breeze begins, encreases till twelve at night, and is succeeded in the morning by the sea-breeze—cause of these two breezes—sometimes these sea and land breezes come at all hours—the land and sea-breezes on the coasts of Malabar and at Congo, 326, 327.

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Britons, the ancient, considered the hare as an unclean animal, and religiously abstained from it, iv. 13—the cock a forbidden food among them, v. 144.

Broches, the horns of the stag the first year, iii. 105.

Brock, the stag of the third year, iii. 104.

Brown (sir Thomas) hoped one day to produce children by the same method as trees, ii. 23—his opinion upon the cause of blackness in human complexions, 217.

Brun (Le) giving a painter directions about the passions, places the principal expression of the face in the eye-brows, ii. 77.

Brush, the name given by huntsmen to the tail of the fox, iii. 304.

Brutes, in those countries where men are most barbarous and stupid, brutes are most active and sagacious, iv. 217.

Buache (Mr.) has given a map of the bottom of the sea between Africa and America, i. 271.

Bubalus, an animal partaking of the mixed natures of the cow, the goat, and the deer—its description—has often been called the Barbary cow, from which it differs widely, iii. 73, *et seq.*

Bubalus, properly a gazele of Africa, iii. 138.

Bubalus, of the ancients, supposed of the cow kind by Buffon, placed among the lower class of ruminant quadrupedes, iii. 17.

Buccinums, one or two of them viviparous, vii. 28.

Buck, capable of propagating at the age of one year—
—one buck sufficient for an hundred and fifty goats—
—becomes old before his seventh year, iii. 51—
hunting the buck and the stag performed in the same manner in England, 103—number of names invented by hunters for this animal—does not change his layer, like the stag—manner of hunting him is much the same as that of stag-hunting, 118.

Buck-goat produces with the ewe an animal that, in two or three generations, returns to the sheep, retaining no mark of its ancient progenitor, iii. 33.

Buffalo, of the varieties of the cow kind, but two are really distinct, the cow and the buffalo—they bear an antipathy to each other—they do not breed among each other, and no animals are more distinct and like each other less—are in abundance in Guinea and Malabar—it is a great swimmer—description of it—the veal of the young is not better eating than the beef of the old—they are natives of the warmer climates—yet are bred in several parts of Europe, particularly in Italy—the female produces one at a time—continues pregnant for twelve months—is afraid of fire—leather made of its hide is well known for thickness, softness, and impenetrability—guided by a ring thrust through its nose—milk of the female not so good as of the cow—two buffaloes yoked draw more than four strong horses—its flesh hard and blackish, disagreeable to taste and smell—this animal wild in many parts of India, and dangerous—manner of hunting them—when tamed, no animal more patient or humble—inferior in size only to the elephant, the rhinoceros, or hippopotamo.—the camelopard, or camel, if taller, neither so long, nor so corpulent—is fond of the water, and crosses the largest rivers without difficulty—has an aversion

sion to red colours that resemble flame—in those countries where they are in plenty no person dresses in scarlet—they make most use of their feet in combat, and rather tread their enemies to death than gore them, iii. 17 to 28.

Buffon, (M.) his theory of the earth, and a detail of it—questions that might be asked this most ingenious philosopher concerning his theory of the earth, i. 31 to 36—he has brought together a multitude of facts relative to the history of the earth, 37—his system about the rudiments of animals, ii. 17—objections against it, 18—thinks that women never become bald, 79—his description of the first sensations of a man just brought into existence, pointing out the steps by which he arrived at reality, 172.

Buffoon-bird, name our sailors give the Numidian crane—its peculiar gestures and contortions—the French call it *demoiselle*—it is a very scarce bird—the ancients have described a buffoon-bird, but not meant the Numidian crane, v. 348, *et seq.*

Bug, the May-Luz, viii. 65. See *Beebles*.

Bugs, their habits—described—are often found coupling tail to tail—manner of destroying them—they destroy fleas, and devour each other, vii. 256 to 260.

Bulbous, hair is so at the root, ii. 79.

Bulin, a sea-snail, performs the offices of male and female at the same time, vii. 29.

Bull, the gimerro, asserted to be between the ass and the bull, ii. 354.

Bullfinch, bird of the sparrow kind, v. 280, 281—may be taught to whistle a regular tune, 307.

Bull-head, description of this fish, vi. 281.

Bulls, the wild, in Spain, mean, despicable animals—have nothing of that sternness of aspect remarkable in our bulls, iii. 18.

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Bull's-eye, name given by sailors to a terrible hurricane—described, i. 335.

Bunting, bird of the sparrow kind, v. 280.

Burnet, his theory of the earth—a detail of that work, i. 21, 22.

Bustard, the largest land-bird that is a native of Britain.—inhabits the open and extensive plain—is much larger than the turkey, the male generally weighing from twenty-five to twenty-seven pounds—its description—its food—places where frequently seen in flocks of fifty or more—they have always centinels placed at proper eminences, ever on the watch, to warn the flock of the appearance of danger—are often run down by greyhounds—in what manner—seldom wander above twenty or thirty miles from home—the males have a pouch, holding near seven quarts of water—they change their mates at the season of incubation, about the latter end of summer—separate in pairs, if there be a sufficiency of females for the males; otherwise the males fight until one of them falls—in France, some of those victims of gallantry found dead in the fields—their nests—they lay two eggs, almost the size of a goose-egg—hatch for about five weeks—the young run about as soon as out of the shell—they assemble in flocks in October, and keep together till April—their food in winter—in parts of Switzerland, they are found frozen in the fields in severe weather—when taken to a warm place, they again recover—usually live fifteen years, and are incapable of being propagated in a domestic state, v. 173 to 177.

Butcher-bird, its description, with its habits—leads a life of continual combat—intrepidity of this little creature, in going to war with the pie, the crow, and the kestrel, all above four times bigger than itself—it fights upon the defensive, and often comes to the attack with advantage, particularly when the male and female unite to protect their young, and

to drive away the more powerful birds of rapine—in what manner they sally forth against them—sometimes the combat ends with the destruction of the assailant, and also of the defender—the most redoubtable birds of prey respect them, and they fly in their company without fearing their power, or avoiding their resentment—small birds are its usual food; and when it has killed the bird or insect, as asserted by the best authority, it fixes them upon some neighbouring thorn, and when thus spitted, pulls them to pieces with its bill—the smaller red butcher-bird migrates—the places where they are to be found—their nests, and the number of their eggs—the female feeds her young with caterpillars and other insects, but soon after accustoms them to flesh, procured by the male with great industry—their nature very different from other birds of prey in their parental care; for, instead of driving out their young from the nest to shift for themselves, they keep them with care, and even when adult do not forsake them—the whole brood thus live in a family together—each family afterwards live apart, and hunt in concert—upon the returning season of courtship, this union is at an end, the family parts for ever, each to establish a little household of his own—the manner of flying is always up and down, seldom direct or sideways—different kinds of this bird, v. 119 to 122.

Butter, the fat of the manati serves in all cases instead of butter, iv. 174.

Butterfly, some kinds actually live upon nothing, ii. 114 — one of the principal ornaments of oriental poetry—in those countries, the insect is larger and more beautiful than with us, vii. 337—easily distinguished from flies of every other kind by their wings—Linnæus has reckoned up above seven hundred and sixty different kinds, yet the catalogue is incomplete—number and beautiful colours of its wings—butterflies can discover their mates at more than a mile's distance—description of the head,

corselet, and body—the eyes have not all the same form; but the outward coat has a lustre, in which may be discovered all the colours of the rainbow—when examined closely, it has the appearance of a multiplying glass—the use of their horns or feelers as yet unknown—use of their trunks—difference between butterflies and moths—they often perceive the approach of the female at above two miles distance; by what sense is not easy to conceive—it has no organs for smelling—the female is larger than the male—if disturbed while united, the female flies off with the male on her back, entirely passive upon the occasion—after junction, they deposite their eggs and die—all females of this tribe are impregnated by the male by one aperture, and lay their eggs by another—every butterfly chuses for her brood, instead of the plant most grateful in its winged state, that it has fed upon in its reptile form—how they keep their eggs warm, and also entirely concealed—many do not lay till the winter warns them of their approaching end—some continue the whole winter in hollows of trees, and do not provide for posterity until the beginning of April, then leave their retreats, deposite their eggs, and die, vii. 363 to 373. See *Aurelia*, 360.

Buttock, in man, different from that of all other animals, ii. 96.

Buzzard, a sluggish inactive bird, often remains perched whole days upon the same bough—lives more upon frogs, mice, and insects, than upon birds more troublesome to seize—its manner of living in summer—so little capable of instruction, that it is a proverb to call one obstinately ignorant, a buzzard—the honey-buzzard, the moor-buzzard, and the hen-harrier, are of this stupid tribe, and differ chiefly in their size, v. 117.

Byron (Commodore) our last voyager that has seen the gigantic race of mankind, ii. 240.

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Capivi, the same animal as the capibara, iii. 175.

Carchakt, a fish said to pursue a shoal of herrings, and to swallow thousands at a gulp, vi. 151—it has generally gone under the name of the spermaceti whale, till Mr. Pennant made the distinction, borrowing its name from the French—seven distinctions in this tribe—description—the throat of this animal very formidable—with ease it could swallow an ox—it can at one gulp send a shoal of fishes down its enormous gullet—it terrifies the dolphins and porpoises so much, as often to drive them on shore—it contains two precious drugs, spermaceti and ambergrise—the oil of this fish is easily convertible into spermaceti, by boiling it with a ley of pot-ash, and hardening it in the manner of soap—candles are now made of it—the balls of ambergrise not found in all fishes of this kind, but chiefly in the oldest and strongest, 195 to 199.

Cogui, or the faki, is the largest monkey of the sagoim kind—its description, iv. 222.

Cajeta, a mountain near it, was split by an earthquake, i. 145.

Cairo, in what manner they produce there six or seven thousand chickens at a time, v. 151.

Caius, (Dr.) lived in the times of Queen Elizabeth, wrote the Natural History of Dogs, and divides the whole race into three kinds, the generous, the farm-kind, and the mongrel, iii. 264.

Calao, the horned Indian raven, v. 208.

Calcination, all animal substances, when calcined, are the same, vii. 101.

Calf, name given to the young of the hind, or the female of the stag, iii. 100.

Calf, or hind-calf; the stag called so the first year, iii. 104.

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- Callitrix*, the green monkey of St. Jago, of the ancient continent—its description, iv. 219.
- Callyonymus*, the dragonet—description of this fish, vi. 273.
- Calms* attended with deluges of rain—why, and where, i. 335.
- Camel*, a ruminating animal, iii. 5—camel and dromedary, not two distinct kinds, only a variety of the same, which has subsisted time immemorial—the only sensible difference between those two races, they produce with each other, and the mixed breed is considered the best—of the two the dromedary is far the most numerous—countries where the camel and dromedary are found—neither can subsist, or propagate, in the climates towards the North—Arabia the most adapted to the support and production of this animal—the camel the most temperate of all animals—it can continue to travel several days without drinking, and is often six or seven days without any sustenance—its feet formed to travel upon sand, and utterly unfit for moist or marshy places—many vain efforts tried to propagate the camel in Spain—they have been transported into America, but have multiplied in neither—they might perhaps produce in these countries, but would in a few years degenerate; their strength and their patience would forsake them; and, instead of enriching, become a burthen to their keepers—uses to which this animal is put among the Arabians—its education—it has a fifth stomach, as a reservoir, to hold a greater quantity of water than immediately wanted—when the camel finds itself pressed with thirst, it throws up a quantity of this water, by a simple contraction of the muscles, into the other stomachs—travellers, when straightened for water, have often killed their camels for what they expected to find within them—countries where commerce is carried on by means of camels—trading journies in caravans—their food—pursue their way when the guides are utterly astray—its patience
and

and docility when loaded—in what manner the female receives the male—one male left to wait on ten females, the rest castrated—they live from forty to fifty years—every part of this animal converted to some useful purpose—its very excrements are not useless—their burthen, iv. 280 to 289.

Camelion, its dimensions and appetites—has a power of driving the air it breathes over every part of the body—changes of its colour—it is an error that it assumes the colour of the object it approaches—description of it by Le Bruyn—it often moves one eye, when the other is at rest—sometimes one eye seems to look directly forward, while the other looks backward; and one looks upward, while the other regards the earth, vii. 137 to 142.

Camelopard described—dimensions of a young one—inhabits the deserts of Africa—no animal, from its disposition, or its formation, less fitted for a state of natural hostility—it lives entirely upon vegetables, and when grazing, spreads its fore legs wide to reach the pasture—known to the ancients, but rarely seen in Europe—often seen tame at Grand Cairo, in Egypt—Pompey exhibited at one time ten upon the theatre, iv. 277 to 279.

Camerarius, his description of the perfections a horse ought to possess, ii. 342.

Camlet made of the hair of animals about Angora, iii. 54.

Canada, above thirty thousand martins skins annually imported from that country into England, iii. 345.

Canals for the circulation of blood through the bones, are of different capacities, during the different stages of life, ii. 179, 180—canal of communication through which the blood circulates in the foetus, without going through the lungs, found open in some bodies when dissected, vii. 54.

Canary-bird, taught to pick up the letters of the alphabet at the word of command, to spell any person's name in company, v. 38—by the name,

originally from the Canary Islands—come to us from Germany, where they are bred in numbers—at what period brought into Europe is not known—about a century ago they were sold at very high prices, and kept only for the amusement of the great—in its native islands it is of a dusky grey colour, and so different from those seen in Europe, as to raise a doubt about its species—rules and instructions for breeding them in a domestic state—apparatus for breeding it in Germany—food the old ones must be supplied with, when the young ones are excluded—so prolific are these birds sometimes, that the female will be ready to hatch a second brood, before the first is able to quit the nest—this bird kept in company with the linnet or gold-finch, pairs, and produces a mixed breed, most like the canary-bird, and resembling it in its song, v. 302 to 307.

Canary boar described, iii. 182.

Cancerous breasts cured by the sucking of the rubeth, or the land-toad, vii. 93.

Candle quickly extinguished in an exhausted receiver, and why, i. 311.

Canions filled with water, and left to freeze, burst, i. 166.

Cantharis, well known in the shops by the name of Spanish flies, and for their use in blisters—their description, with the differences from each other—the countries where, and trees on which they are seen—it is reported, that the country people expect the return of these insects every seven years—their bad smell is a guide to those who catch them—they smell so disagreeable, as to be perceived at a great distance, especially about sun-set, though not seen at that time—they yield a deal of volatile caustic salt—their qualities—the effects fall principally upon the urinary passages—in what manner they are killed, viii. 75 to 77.

Cape de Verde islands—a south wind prevails in them during the month of July, i. 323.

Cape of Good Hope, a north-west wind blows there during the month of September, i. 323—customary to hunt the elephant for its teeth—in what manner—account of an unhappy huntsman, iv. 262.

Capibera, or *cabini*, an animal resembling an hog of about two years old—its description—some naturalists have called it the water-hog; and why—a native of South America, and chiefly frequenting the borders of lakes and rivers—like the otter it seizes the fish, upon which it preys, with its hoofs and teeth—lives also upon fruits, corn, and sugar-canes—its cry resembles the braying of an ass, more than the grunting of a hog—its only place of safety is the water, into which it plunges when pursued; and keeps so long at the bottom, that the hunter can have no hopes of taking it there—when young is easily tamed—its flesh has a fishy taste, but its head is said to be excellent, iii. 175 to 178.

Capon of Pharaoh supposed the true ibis—is a devourer of serpents, and follows the caravans that go to Mecca, to feed upon the offal of the animals killed on the journey, v. 343.

Capons taught to clutch a fresh brood of chickens throughout the year, v. 151.

Caracal, or the syagush, a native of the East Indies, resembles the lynx in size, iii. 239.

Caracol, a town situated at the foot of the Andes, i. 136.

Caraguata, a plant in the West Indies, which clings round the tree it happens to be near—it keeps away that nourishment designed to feed the trunk, and at last entirely destroys its supporter, ii. 4.

Carapo, the gymnotus, description of this fish, vi. 282.

Carassa, a volcano in South America, i. 92.

Caravan, a single lion of the desert often attacks an entire caravan, iii. 200—the assemblage called a caravan sometimes composed of numbers amounting to ten thousand, iv. 285.

Carcajou, name given by the North Americans to the glutton—its manner of killing the rein-deer, iii. 157.

Caribou, name the Americans give the rein-deer, iii. 142, 157.

Carli (Father) his account of the faithful services of monkies in Angola, where he went to convert the savage natives to Christianity, iv. 216.

Carnivorous animals seek their food in gloomy solitude, iii. 1—they are sharper than the ruminating animals, and why—their stomachs small, and their intestines short, 2—their intestines thin and lean, 4—except the dog, none will make a voluntary attack, but with the odds on their side, ii. 293—in proportion as each wants strength, it uses the assistance of patience, assiduity, and cunning, 294—all animals of this kind pursue in a pack, and encourage each other by their mutual cries, 296—support a state of famine for several weeks together, 297—milk in those animals is more sparing than in others, 310, & iii. 339.

Carnivorous birds seek for such as are of the size most approaching their own, v. 74. See *Birds*.

Carp, an experiment made with this fish in a large vase of water, under an air-pump, vi. 152—one found by Busion not less than a hundred years old—this discovery confirmed by other authors, 159—continues in the egg not above three weeks, 163—Mr. Tull famous for his invention of spaying carp to give it a fine flavour, 165—its description, 285—the method of fattening it in a damp cellar—it has been known thus to live for a fortnight, to grow exceedingly fat, and to get a superior flavour, 291.

Carriers,

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- Carriers*, pigeons used to carry letters, v. 257.
- Carrion-crow* resembles the raven in its appetites, its laying, and manner of bringing up its young, v. 203.
- Cartesius*, his theory of the winds, not so absurd as Lyfter's, i. 319.
- Carthageria*, in America—the heat of the climate affects the speech of its inhabitants, which is soft and slow, and their words generally broken—more than three parts of our army destroyed by the climate, in our unsuccessful attack upon it, i. 301.
- Cartamus*, or bastard saffron, strongly purgative to man—parrots very fond of it, v. 248.
- Cartilage*, the thyroid cartilage, ii. 93—cartilages in youth elastic, and pliant in age, become at last hard and bony; and why, 180.
- Cartilaginous fishes*—their general conformation—supposed they grow larger every day till they die—their internal structure—are possessed of a two-fold power of breathing—apertures by which they breathe—the cartilaginous shark, or ray, live some hours after they are taken—fishes of this tribe can remain under water, without taking breath; and can venture their heads above the deep, and continue for hours out of their native element—the season and manner of copulating—and of bringing forth—little difference between the viviparous and the oviparous kinds, in this class of fishes—five divisions of the cartilaginous fish, vi. 209 to 214.
- Cassowary*, a bird first brought into Europe by the Dutch from Java, in the East Indies, where only it is found—its description—the part which most distinguishes this animal is the head, which inspires some degree of terror—its internal parts described—it has the head of a warrior, the eye of a lion, the defence of a porcupine, and the swiftness of a courser—is not fierce in its natural character—how it defends itself—extraordinary manner of going—the Dutch assert that it can devour glass, iron, and stones,

stones, and even live and burning coals, without the smallest fear, or the least injury—the largest of its eggs is fifteen inches round one way, and twelve the other—places where this animal is found—it has not multiplied in any considerable degree, as a king of Java made a present of one to the captain of a Dutch ship, as a rarity, v. 62 to 69.

Catacombs of Egypt, ii. 255.

Catamountain, hunts for the hare or the rabbit, ii. 294—the ocelot of Mr. Buffon—its description, iii. 237—is one of the fiercest, and, for its size, one of the most destructive animals in the world, 243.

Catana, a city utterly overthrown by an earthquake, i. 103.

Cataphraſus, or kabassou, is one of the largest kinds of the armadilla, iv. 124.

Cataſt of the eye; Mr. Cheſelden having couched a boy of thirteen, who to that time had been blind, and at once having restored him to sight, curiously marked the progress of his mind upon the occasion, ii. 140.

Cataſts of the Rhine, and of the Nile—the cataract of the river Velino, in Italy, is above an hundred and fifty feet perpendicular, i. 206—one near Gottenburg in Sweden—other cataracts, 207.

Caterpillars, their differences from all other insects—all these animals are hatched from the eggs of butterflies—during winter, the greatest number of caterpillars are in an egg state—in the aurelia state, they are seemingly deprived of life and motion—some do not make any change at the approach of winter, but chuse themselves some retreat, and there remain quite motionless, and as insensible as if actually dead—caterpillars of this kind are found in great numbers together, enclosed in one common web that covers them all—there are some of the kind, whose butterflies live all the winter, and where—a single caterpillar eats double its own weight

weight of leaves in a day, and seems no way disordered by the meal—the body of the caterpillar anatomically considered—avidity with which they feed—number of their stigmata, or those holes through which the animal is supposed to breathe—it has eighteen lungs—the experiment of Malpighi to ascertain their use—all caterpillars spin at one time or another—many of them change their skins five or six times in a season—and in what manner—change into an aurelia—their retreats in that state, vii. 337 to 356—there are thousands of fishes, birds, and insects, that live chiefly upon caterpillars—a single sparrow and its mate, that have young ones, destroy above three thousand caterpillars in a week—some of the kind, fitted only to live upon leaves and plants, will eat each other, in preference to their vegetable food—the bodies of the larger kinds serve as a nest to various flies, that very carefully deposite their eggs in them—number of worms remain within the body of the caterpillar, devouring its entrails, without destroying its life—the ichneumon tribe is not the caterpillar's offspring, as supposed, but its murderers, 373 to 378.

Cat-fish, its description, vi. 280.

Cats, the wild, hunt for the squirrel or the mouse, ii. 294—the whole tribe seek their food alone, and never unite for mutual defence, nor for mutual support—and, except at certain seasons, are enemies to each other—all of the cat kind devour nothing but flesh, and starve upon any other provision—their greatest force lies in the claws—the cat goes with young fifty-six days, and seldom brings forth above five or six at a time—the male often devours the kittens—before they are a year old, they are fit to engender—the female seeks the male with cries; nor is their copulation performed without great pain, and why—cats hunt the serpents in the isle of Cyprus—any animal weaker than themselves, is to them an indiscriminate object of destruction —the

—the mouse is their favourite game, and they patiently watch a whole day, until the mouse appears—a flagrant mark by which the cat discovers its natural malignity—their eyes see better in darkness than light, and why—if the inhabitant quits the house, the cat still remains—is excessively fond of some plants, such as valerian, marum, and cat-mint—particularly loves fish—its sleep is very light—its hair sends forth shining sparks, if rubbed in the dark—the wild breed with the tame—description of the wild cat—inhabits the most mountainous and woody parts, lives mostly in trees, and feeds only by night—the cat was much higher in esteem among our ancestors than it is at present—laws of Howel, concerning the price of cats—cats were not naturally bred in our forests—of all quadrupedes, the wild cat is, perhaps, that whose intestines are proportionably the smallest and the shortest; and why—common to the new continent, as well as the old—the blue-cat—the lion-cat, or, more properly, the cat of Angora—the cats in Syria and Persia remarkable for their long soft hair, iii. 183 to 196—all the cat kind are kept off by the fires which the inhabitants light to preserve their herds and flocks—and they hunt rather by the sight than the smell—it happens that the lion pursues the jackal or the wild dog, while they are hunting upon the scent, and merely for themselves; the lion is then an unwelcome intruder upon the fruits of their toil—from thence, probably, has arisen the story of the lion's provider—the lion devours a great deal at a time, and generally fills himself for two or three days to come—in the deserts and forests, his most usual prey are the gazelles and the monkeys, 206, 207—the race of cats noxious in proportion to their power to do mischief—inhabit the most torrid latitudes of India, Africa, and America, and have never been able to multiply beyond the torrid zone—they seldom attack man, though provoked—of all animals these are the most fullen, and, to a proverb, untameable, 240—different classes of the kind,

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Caviar, the inhabitants of Norway prepare from eggs found in the body of the porpessie, a savoury liquor, which makes a delicate sauce, and is good when eaten with bread, vi. 205—it is made with the roe of sturgeon—more in request in other countries of Europe than with us—and is a considerable merchandize among the Turks, Greeks, and Venetians—manner of making it, 254.

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- Causes*, the investigation of final causes a barren study; and, like a virgin dedicated to the deity, brings forth nothing, i. 19.
- Causitic*, cantharides yield a great deal of volatile caustic salt, viii. 77.
- Cayman*, a sort of crocodile, vii. 108.
- Cayopolin*, a kind of opopssum—its description, iv. 232.
- Cea*, an island washed away with several thousand inhabitants, i. 124.
- Cells* made by the bees, viii. 10.
- Cenere*, a mount of recent appearance, i. 151.
- Centinel*, some animals carefully avoid their enemies, by placing sentries to warn of danger, and know how to punish such as neglect their post, or are unmindful of the common safety, ii. 298—when the marmots venture abroad, one is placed as a sentry, upon a lofty rock, iv. 41—the bustards have centinels placed upon proper eminences, where always on the watch, they warn the flock of the smallest appearance of danger, v. 174—the flamingo does the same, vi. 12.
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- Centrisceus*, a kind of cartilaginous fish, vi. 264.
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- Cerigo*, an island of the Archipelago, where many wild asses are found, ii. 346.
- Cetaceous fishes*, the whale and its varieties resemble quadrupedes in their internal structure, and in some of their appetites and affections—they are constrained every two or three minutes to come up to the surface to take breath, as well as to spout out through their nostril (for they have but one) that water which they sucked in while gaping for their prey—the senses of these animals superior to those of other fishes, and it is most likely that all animals
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- Cheese*, the inhabitants of Canada use no other than the milk of the hind, or the female of the stag, iii. 114—those of Lapland little and well tasted—never breed mites, 153.
- Cheney*, suspected the quantity of water on the earth daily decreasing, i. 169.
- Cheops*, the oldest measure of the human figure in his monument, in the first pyramid of Egypt, ii. 243.
- Chefelden*, after couching a boy of thirteen for a cataract, blind from his infancy, and at once restoring him to sight, curiously marked the progress of his mind upon the occasion, ii. 140.
- Chevrotin*, or little *Guinea deer*, the least of all cloven-footed quadrupeds, and perhaps the most beautiful—is most delicately shaped—its description—native of India, Guinea, and the warm climates between the tropics—the male in Guinea has horns; but the female is without any—they chiefly abound in Java and Ceylon, iii. 76. *et seq.*
- Chicken*, an amazing history of it in the egg, by Malphigi and Haller, ii. 25, *et seq.*—in what manner six or seven thousand are produced at a time, at Grand Cairo—capons clutch a fresh brood of chickens throughout the year, v. 151.
- Child*, history of the child in the womb, ii. 36—children of negroes able to walk at two months old; at least to move from one place to another—skin of children newly brought forth, is always red, and why—the size of a new-born infant about twenty inches, and its weight twelve pounds, 51—in cold countries continue to be suckled for four or five years together, 54—child's growth less every year, till the time of puberty, when it seems to start up of a sudden, 56—in some countries speak sooner
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- Climates*, calamities in those where air is condensed by cold, i. 304—cause obvious and sufficient to produce blackness of negroes—complexions of different countries darken in proportion to the heat of the region, ii. 214 to 216—next to human influence, the climate has the strongest effects upon the nature and form of quadrupedes, 301—those excessively hot, unfavourable to horses, 334—in general, water fowls of no peculiar climate, vi. 96.
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- Glove-trees*, cut down by the Dutch at Ternate to raise the price of the spice—soon had reason to repent of their avarice, i. 303.
- Clouds*, the fore-runners of a terrible hurricane, called by sailors the bull's eye, i. 335—dashing against each other, produces electrical fire—water evaporates, and rising forms clouds—theory upon it—that of Dr. Hamilton—the author's theory of evaporation, 343 to 345—at once pour down their contents, and produce a deluge—reflecting back images of things on earth, like mirrors, 352.
- Clupea*, or *herring*, its description, vi. 285.
- Coaiti*, a monkey of the new continent, described, iv. 221.
- Coan*, the name of a dwarf lately dead at Chelsea, ii. 233.
- Coast* of Italy is bordered with rocks of marble of different kinds—those of France, from Brest to Bourdeaux, also Spain and England, composed of rocks, i. 253—of the sea, have peculiar winds, 325, *et seq.*—deadly winds all along those of the Persian Gulph, and those of India, 335.
- Coatimondi*, extreme length of its snout—its description—very subject to eat its own tail—its habits, iv. 309, *et seq.*

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Cobra di Capello, a kind of serpent, vii. 176, 184, 198.

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Cock, of all birds the cock the oldest companion of man, and first reclaimed from the forest—species of cock from Japan, covered over with hair instead of feathers—the western world had the cock from Persia—Aristophanes's cock the Persian bird—it was one of the forbidden foods among the ancient Britons—Persia, that first introduced it to us, no longer knows it in its natural form—countries where it is wild—peculiarities, in a wild condition—another peculiarity in those of the Indian woods, their bones, when boiled, are black as ebony—the Athenians had cock-matches as we—no animal of greater courage, when opposed to his own species—in China, India, the Philippine Islands, and over the East, cock fighting the sport and amusement of kings and princes—cocks in China as bold, or bolder, than ours—and of more strength with less weight—its great courage proceeds from being the most fallacious of all birds—a single cock suffices for a dozen hens; and is the only animal whose spirits are not abated by indulgence—soon grows old; and in three or four years becomes unfit for purposes of impregnation—how long cocks live, left to themselves, not well ascertained—Aldrovandus makes their age to be ten years—are injured, as Linnæus asserts, by elder-berries, v. 143 to 153—the black chiefly found in heathy mountains and piny forests, v. 177—cock of the wood. See *Wood-cock*.

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Colchis, in Asia Minor. See *Pheasants*.

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change of colour in the hair obtains, in some degree, in all quadrupedes, iii. 328—different in several parts of the fur of the sable, 347.

Comets, their number much greater than that of the planets—they roll in orbits—experience has not sufficiently confirmed the truth of the investigation about their returning periods, i. 5.

Complexion, extremity of cold not less productive of a tawny than that of heat—not easy to conceive how the sun whitens wax and linen, and darkens the human complexion—the sun not the only cause of darkening it, ii. 217.

Comte's (Le) account of an ape he saw in the streights of Molucca, iv. 185.

Concretions, scarce an animal, or a part of their bodies, in which concretions are not formed—experience has found but few cures by the efficacy of these concretions—often prove fatal to the animal that bears them, iii. 71, *et. seq.*

Condamine (La) describes a fish possessed of the powers of the torpedo, every way resembling a lamprey, vi. 242.

Condoma, anomalous animal of the goat kind—its description, iii. 75.

Condor, possesses, in a higher degree than the eagle, all the qualities that render it formidable to the feathered kind, to beasts, and to man himself—is eighteen feet across the wings extended, according to Acosta, Jarcilasso, and Desmarchais—the beak so strong as to pierce the body of a cow; two of them able to devour it—they do not abstain from man himself—fortunately there are few of the species—the Indians believe that they will carry off a deer, or a young calf, in their talons, as eagles would a hare or a rabbit; and that their sight is piercing, and their air terrible; that they seldom frequent the forests, as they require a large space for the display of their wings—they come down to the sea shore at certain seasons, when their prey fails upon land; they then
feed

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- feed upon dead fish, and such nutritious substances as are thrown upon the shore—their countenance not so terrible as old writers have represented—those who have seen this animal, say the body is as large as that of a sheep—many instances of its carrying away children—circumstantial account of this bird by P. Feuillée, the only traveller who has accurately described it—countries where it is found—in the deserts of Pachomac, where it is chiefly, men seldom venture to travel—its flesh as disagreeable as carrion, v. 90 to 95.
- Conepate*, an animal resembling the skink in all things except size, iii. 353.
- Congar* of America, resembles the tiger in natural ferocity, though far inferior in its dimensions, iv. 305.
- Congelation*, the heat of blood in man and other animals is about thirty degrees above congelation; but in the marmout and other animals which seem to sleep the winter, the heat of the blood is not above ten degrees above congelation, iv. 43.
- Congo*, the land and sea breezes there, i. 328—the inhabitants of, desire ardently to prostitute their wives and daughters to strangers, ii. 68.
- Constantinople*, its cats—name given to the genetts, and why, iii. 359.
- Continent* of America—that part under the line is cool and pleasant, ii. 215.
- Coot*, description of that bird—residence and nest—sometimes swims down the current, till it reaches the sea—dangers encountered in this voyage, vi. 33 to 36.
- Copel*, manner of making that vessel, i. 154.
- Copulation*, natural instinct for the proper times—instances of it, ii. 310—gnats produce young without copulation, viii. 88.
- Coquallin*, the Brasilian squirrel, so called by Buffon, iv. 25.

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- Coral*, the common red never met with in the fossil world, i. 43.
- Coral-serpent*, described, vii. 198.
- Coral-plants*, their various appearances—opinion of count Marfigli upon corals—Mr. Ellis proves it the work of reptiles of the polypus kind—principal experiment to this purpose, viii. 121 to 125.
- Coralines*, called *fungi madreporæ*, viii. 126.
- Cordyle*, the tockay and the tejuguacu fill up the chasm between the crocodile and the African iguana, vii. 136.
- Coret*, a sea-snail, performs the offices of male and female at the same time, vii. 29.
- Coriander* used in dressing a hare in the true Roman taste, iv. 14.
- Corin*, name of the third variety of gazelles, by Mr. Buffon, iii. 68.
- Cormorant*, its description and food—remarkably voracious, with a sudden digestion—its form disagreeable—its voice hoarse and croaking—all its qualities obscene—no wonder Milton makes Satan personate this bird—objection against this passage of Milton's *Paradise Lost*, vindicated—fishes in fresh waters, and in the depths of the ocean—builds in cliffs of rocks, and in trees—preys in the day-time, and by night—once used in England for fishing, and in what manner—how educated in China, for the purposes of fishing—the best fisher of all birds—sometimes has caught the fish by the tail—the fins prevent its being swallowed in that position—how it manages the fish in this case, vi. 58 to 63—remarked for the quickness of its flight, 67.
- Corn*, the flying squirrel is apt to do a great deal of damage in the corn-fields, iv. 35.
- Cornaro* lived an hundred years, with a constitution naturally feeble, ii. 185.
- Cornea* of a flea. See *Flea* and *Flies*.

- Cornwall*, pilchards make that coast a place of resort, vi. 302.
- Coromandel*, dreadful tempests wholly unknown along its coasts, i. 324—amazing size of oysters along that coast, vii. 47.
- Corrira*, or the runner, a bird of the crane kind—its description, vi. 19.
- Corruption*, excessive cold preserves bodies from it—and a great degree of dryness produced by heat—earth, if drying and astringent, produces the same effect—bodies never corrupt at Spitsbergen, though buried for thirty years—men and animals buried in the sands of Arabia, preserved from corruption for ages, as if actually embalmed—bodies buried in the monastery of the Cordeliers at Thoulouse, preserved from corruption—bodies previously embalmed, buried in the sands of Chorosan, in Persia, preserved from corruption for a thousand years, ii. 252 to 254—amazing preservation from it, in a mummy lately dug up in France, 260.
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- Cotopaxi*, volcano in South America, described by Ulloa, i. 92—more than three geographical miles above the surface of the sea, 140.
- Cotteberg*, in Hungary, deep mines there, i. 47.
- Cotton-tree*, the seed intoxicates parrots, as wine does man, v. 248.
- Gottus*, the bull-head—description of this fish, vi. 281.
- Couando*, much less than the porcupine—its description, iv. 108.
- Cougar*, the red tiger, by Mr. Buffon—extremely common in South America—in what manner the Indians encounter it, iii. 226 to 229.
- Coulterneb*, remarkable bird of the Penguin kind. See *Puffin*, vi. 89, *et seq.*
- Cows* allured by music, ii. 156—of ruminant animals, the cow kind deserves the first rank—meanest peasants in Germany, Poland, and Switzerland,

kill one cow at least for their own table—salted and hung up, is preserved as a delicacy the year round—cows want the upper fore-teeth—in no part of Europe cows grow so large, yield more milk, or more readily fatten, than in England—make no particular distinction in their herbage, indiscriminately devouring the proper quantity—it gives back more than it takes from the soil—the age of the cow known by the teeth and horns—the number of its teeth—have eight cutting-teeth in the lower jaw—manner of renewing them—the horns more surely determine this animal's age, and how—while this animal lives, the horns lengthen—wants in udder what it has in neck—the larger the dewlap, the smaller the quantity of its milk—the kind to be found in every part of the world—large in proportion to the richness of the pasture—Africa remarkable for the largest and smallest cattle of this kind; as also India, Poland, and Switzerland—among the Eluth Tartars, the cow is so large, that a tall man only can reach the tip of its shoulder—of all quadrupedes, the cow most liable to alteration from its pasture—the breed of the Isle of Man, and most parts of Scotland, much less than in England; also differently shaped—the breed improved by foreign mixture, adapted to supply the imperfections of our own—such as purely British, far inferior in size to those of the continent, iii. 7 to 12—the cow, the urus, and the bison, animals of the same kind—difference in size not so remarkable as those in its form, hair, and horns—many considered as a different kind, and names given them as a distinct species, when in reality all the same—only two varieties of the kind really distinct, the cow and the buffalo—they bear an antipathy to each other—scarce a part of the world where the cow kind is not found—variety of the horns—those in Iceland are without horns—the Barbary cow, or zebu—of all animals, the cow most extensively propagated—an inhabitant of the frozen fields of Iceland, and the burning deserts of Lybia—other animals preserve their nature or their form

form with inflexible perseverance—the cows suit themselves to the appetites and conveniencies of mankind—no animal has a greater variety of kinds, none more humble and pliant—the cow and bison breed among each other—the cow does not breed with the buffalo—no animals more distinct, or have stronger antipathies to each other—the cow goes nine months with young—the grunting, or Siberian cow, and the little African, or zebu, are different races of the bison—animals of the cow kind, by naturalists extended to eight or ten sorts, reduced to two—in animal of the cow kind, by no naturalist described—the description of it, iii. 14 to 31—the Greeks compared the eyes of a beautiful woman to those of a cow, 67—it eats two hundred and seventy-six plants, and rejects two hundred and eighteen, 163.

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Crab (violet) of the Caribbee islands, described—their food—their nippers, the principal instrument for seizing and cutting their food—catch such hold, that the limb is lost sooner than the grasp—thus it gets off, leaving its claw fastened upon the enemy—the claw performs its duty, and keeps a minute fastened upon the finger, while the crab makes off—it loses no great matter by a leg or an arm; as they grow again, the animal becomes perfect as before—fatiguing and amazing march from the mountains to the sea-shore, to deposit the spawn, from which, soon after, millions of little crabs are seen slowly travelling up the mountains—wait the benefit of sea water for their delivery—change their shells—have under their stomachs four white stones, which gra-

dually decrease as the shell hardens, and when come to perfection, are not to be found—season, and manner in which they are caught—in Jamaica they are in great plenty, and considered as one of the greatest delicacies—many of this kind found poisonous, vi. 335 to 342—soldier-crab, seen every year descending from the mountains to the sea-shore, to deposit its spawn, and to provide itself with a new shell—contest between them for some well-looking, favourite shell, for which they are rivals—strike with their claws—beat each other, till the weakest is obliged to yield, and give up the object of dispute—when taken, sends forth a feeble cry, endeavouring to seize the enemy with its nippers—not much esteemed for its flesh, 343 to 345.

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which

which they ascend when they fly—though unseen themselves, they have distinct vision of every object below—extraordinary length and contorsion of its windpipe—use made of their clangorous sound—they rise but heavily, are shy birds, and seldom let the fowler approach them—their depredations usually in the darkest nights; when they enter a field of corn, and trample it down, as if crossed over by a regiment of men—corn their favourite food; scarce any other comes amiss to them—Redi's experiments to this purpose—a little falcon pursues, and often disables it—method used on such occasions by those fond of hawking—barbarous custom of breeding up cranes to be thus baited—easily tamed—Albertus Magnus says, it has a particular affection for man—the female distinguished from the male, by not being bald behind—never lays above two eggs at a time—the young are soon fit to fly; and unfledged, they run with such swiftness, that a man cannot easily overtake them—Aldrovandus assures us one was kept tame for above forty years—the vulgar bear the crane a compassionate regard—prejudices in its favour—a heinous offence in some countries to kill a crane, 330 to 339—distinctions between the crane and the stork, 340.

Crane, the *Balearic*, from the coast of Africa, and the Cape de Verd islands—its description—habits—has been described by the name of sea-peacock—real *Balearic Crane* of Pliny—foreign birds of the crane kind described; the *jabiru*, the *jabiruguacu*, the *anhima*—the buffoon bird, or *Numidian crane*, described, v. 344 to 348—place where the crane kind seem to have formed their general rendezvous, vi. 8—the *flamingo* the most remarkable of all the kind, the tallest, bulkiest, and most beautiful—described, 9—small birds of the crane kind, vi. 20.

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Cricetus, the *German rat*, by Mr. Buffon called the hamster—its description—is the greatest pest in the countries where found, and every method made use of to destroy it—its hole a curious object for contemplation; shews a skill superior to the rest of the rat kind—description of it—their storehouses—contain two bushels of good grain in each apartment—means of finding out their retreats—produce young twice or thrice a year, and bring five or six at a time—their devastations produce a famine—they destroy each other—their fur very valuable, iv. 76 to 79.

Cricket, a ruminating insect, or seemingly so, iii. 6 —difference from the grasshopper—their voice—food—never drink—sound of drums and trumpets make them forsake their situation, vii. 316 to 319.

Cricket (mole) described—thought to be amphibious—the number of their eggs—most detested by gardeners—its devastations—precautions of the female against the black beetle—their care and assiduity in the preservation of their young, vii. 319 to 321.

Croches, in the head of a stag, iii. 105.

Crocodile, extraordinary combat between this animal and the tiger, iii. 229—the ichneumon discovers and destroys its eggs—kills its young, and sometimes entering the mouth of the crocodile, when sleeping on the shore, effectually destroys it, 350—the eggs it lays in the sand at a time, often amount to three or four hundred, 352—the places where found, together with their dimensions—description—several examples of taking a man out of a canoe from his companions, notwithstanding all opposition and assistance—terrible even upon land—its depredations—combats between the crocodile and the tiger—in what manner it seizes its prey—how a negroe

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negroe ventures to attack this animal in its own element—manner of taking it in Siam—often managed like a horse; a curb put into its mouth, and the rider directs it as he likes—manner of taking it along the rivers of Africa—pools of water where bred as we breed carp in our ponds—in Egypt, and other long-peopled countries, this animal solitary and fearful—in the river San Domingo, they are most inoffensive; children play with them, and ride about on their backs; beat them without receiving the smallest injury—probable opinion, its musky substance amassed in glands under the legs and arms—its flesh—the eggs to the savages most delicate morsels—all breed near fresh waters—precautions in laying their eggs—the female having introduced her young to their natural element, she and the male become their most formidable enemies—the open-bellied crocodile, thought viviparous—has a false belly like the opossum, for the young to creep out and in, as danger or necessity requires—their age—produced to fight at the amphitheatre at Rome, vii. 107 to 126.

Croppers, a kind of pigeons, v. 259.

Crossbill, bird of the sparrow kind, v. 280, 282.

Croft fox, animal between the dog and fox, iii. 316.

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Crown, in the head of a stag, iii. 105.

Crows fetch and carry with the docility of a spaniel, v. 196—the *carrion-crow* resembles the raven in appetites, laying, and manner of bringing up its young—the *Royston crow*, 203.

Cruelty, teaching the arts of cruelty, equivalent to committing them, v. 147.

Crustaceous, animals of the lobster kind, vi. 325.

Cub, the fox is so called during the first year, iii. 304—born blind, like those of the dog, 306.

Cuckoo, fables invented of this bird, now sufficiently refuted—where it resides in winter, or how provides for its supply during that season, still undiscovered

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—this bird somewhat less than a pigeon, shaped like a magpie, and of a greyish colour—is distinguished from all other by its round prominent nostrils—discovers itself in our country early in the spring, by its well-known call—its note heard earlier or later, as the season is more or less forward, and the weather inviting—from the chearful voice of this bird, the farmer instructed in the real advancement of the year—history and nature of this bird still in great obscurity—its call an invitation to courtship, used only by the male, generally perched upon a dead tree, or bare bough, repeating his song, which he loses when the genial season is over—his note pleasant, though uniform—the female makes no nest—repairs to the nest of some other bird, generally the water-wag-tail or hedge-sparrow, and, after devouring the eggs of the owner, lays hers in their place—usually lays but one—this the little foolish bird hatches with great assiduity, and when excluded, fondly thinks the great ill-looking changeling her own—to supply this voracious creature, the credulous nurse toils with unwearied labour, not sensible she is feeding up an enemy to her race—the stomach of this bird is enormous, and reaches from the breast-bone to the vent—its food—naturally weak and fearful—the smaller birds form a train of pursuers; the wry-neck, in particular, the most active in the chace—supposed, in winter, to lie hid in hollow trees, or to pass into warmer climates—story of a cuckoo found in a willow log, in winter—probable opinion concerning its residence in winter—Brisson makes not less than twenty-eight sorts of this bird; and talks of one of Brasil, as making a horrible noise in the forests, v. 232 to 237—follows a very different trade from what its nurse endeavoured to teach it; and, according to Pliny, in time destroys its instructor, vi. 114.

Cuckow-spit, or Froth-worm, its description, vii. 325.

Cud, the hare, the rabbit, and the squirrel, placed by Picrius

Pierius among those that chew the cud—how far true, is not determined, iv. 3.

Caguacu apara, name in Brasil for the roe-buck, iii. 129.

Cummin seed, formerly used in dressing a hare in true Roman taste, iv. 14.

Cur, the *Cur-fox*, iii. 308.

Curischaff, a lake where the sturgeon is found in greatest numbers, vi. 251.

Curlew, a small bird of the crane kind—its dimensions—places where found—manner of procuring its food—its habits—its nest, and number of eggs—a bird of passage, vi. 20 to 25—season of courtship, 28.

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Current of air, driven through a contracted space, grows more violent and irresistible, i. 331.

Cusco, Garcilasso de la Vega asserts the air is so dry and so cold there, that flesh dries like wood, without corrupting, ii. 251.

Custom,

Custom, the form of the face seems rather the result of custom, ii. 219.

Cuttle-fish, its description—contrivance with which it is furnished by nature, when under a difficulty of escaping, viii. 107, *et seq.*

Cybotus, a lofty mountain swallowed by an earthquake, i. 150.

Cynocephalus, the *Magot* of Buffon, the last of the ape kind—its description—is a native of Africa and the East, iv. 194.

Cyprinus, or the carp, vi. 285.

Czar of Russia. See *Peter* of Russia.

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Dam, in the rapacious kinds, leads her young forth for months together; it is not so with those of the hare kind, iv. 6.

Dampier, the celebrated navigator, has added more to natural history than half the philosophers before him—the first who informed us of the distinctions between such turtles as are malignant and such as are wholesome, vi. 362—saw one at Jamaica that measured six feet broad, 364—his curious observations on the winds in warm climates, i. 326—observes the flamingos, when seen in the day, always appear drawn up in a long close line of two or three hundred together, and present, at the distance of half a mile, the exact representation of a long brick wall—they always appoint one of the number as a watch, vi. 12—says their flesh is well tasted, 14.

Damps, of various natures in mines—the fulminating fort, i. 74, 75.

Dance, hares taught to dance to music, iv. 9.

Dancer, a dog of the mongrel kind, iii. 264.

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- Danube*, has seven openings into the Euxine sea, i. 122—proceeds from the Alps, 132—its course—the Turks and Christians have fleets of men of war upon it, 195—it receives thirty lesser rivers, 202—the huso, or isinglass fish, caught in great quantities in this river, vi. 256.
- Dara*, its inhabitants use ostriches as horses, v. 57.
- Darien*, an isthmus—has a particular hog called warree—described by Wafer, iii. 182.
- Darkness*, surprising how far the eye accommodates itself to it, ii. 147—remarkable instance of it, in a gentleman, a major under Charles the First, 148.
- Daubenton*, gives a complete history of a dwarf, ii. 234, *et seq.*
- Deaf men*, often found to see the force of those reasonings, which they could not hear, understanding every word as it was spoken, ii. 82—one born deaf, must necessarily be dumb—instances of two young men, who, born deaf, were restored to hearing—a person born deaf, by time and pains taught to write, read, speak, and, by the motion of the lips, to understand what is said—instances of it, 160 to 163.
- Deafness*, one of the most common disorders in old age—way to know this defect, either internal or external, ii. 159.
- Death*, a young man, born deaf and dumb, knew nothing of death, and never thought of it till the age of twenty-four, when he began to speak of a sudden, ii. 162—a spectre which frights us at a distance, but disappears when we come to approach it—uncertainty of the signs of death, 190 to 193.
- Deer*, annually shedding horns, and their permanence in the sheep, draws a distinct line between their kinds, iii. 33—the little Guinea deer, the least of all cloven-footed quadrupedes, and most beautiful—its description, 76—the male in Guinea has horns, but the female is without—they abound in Java
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and Ceylon, 77—all of the deer kind want the gall bladder, 86—a downy substance like velvet upon the skin covering the skull of a deer, when the old horn is fallen off, 88—their horns grow differently from those of sheep or cows—they are furrowed along the sides, and why, 89—the bran deer, or the brown deer, called by the ancients tragelaphus, found in the forests of Germany, 113—the new continent of America produces animals of the deer kind, in sufficient plenty, 114.

Deer (fallow) no animals more nearly allied than the stag and fallow deer, yet they never herd nor engender together, nor form a mixed breed—each form distinct families, and retain an unalterable aversion—the fallow deer rarely wild in the forests; are in general bred in parks, and their flesh is preferred to that of any other animal—a herd of them divides into two parties, and engage each other with great ardour and obstinacy—both desirous of gaining a favourite spot of the park for pasture, and of driving the vanquished into the more disagreeable parts—manner of their combats—are easily tamed—and browse closer than the stag—they seek the female at their second year—their strength, cunning, and courage inferior to those of the stag—we have in England two varieties of the fallow deer; one brought from Bengal, the other from Norway—flesh of the French fallow deer, has not the fatness nor the flavour of that fed upon English pasture—Spanish and Virginian fallow deer—deer without horns, their description, iii. 115 to 121.

Deer (rein) the most extraordinary, and most useful—native of the icy regions of the North—it answers the purposes of a horse—attempts made to accustom it to a more southern climate, in a few months it declines and dies—answers the purposes of a cow in giving milk; and of the sheep in furnishing warm cloathing to the people of Lapland and Greenland—description of the rein deer—its rutting time,

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time, and that of shedding its horns—difference between this deer and the stag—it is not known to the natives of Siberia—Americans call it caribou—herdsmen of Lapland known to possess a thousand rein deer in a single herd—it subsists upon moss—and makes the riches of the people of Lapland—gnats and gadflies very formidable to this deer in Lapland—female brings forth in May—its milk thinner than that of the cow; sweeter and more nourishing, iii. 138 to 146— is of two kinds in Lapland—it draws sledges—can go about thirty miles without halting, and without dangerous effort—generally castrated by the Laplanders—one male left to six females—begin to breed when two years old—go with young eight months, and bring two at a time—fondness of the dam, remarkable—live but fifteen or sixteen years—manner in which the Laplanders kill them—scarce any part of this animal not converted to peculiar uses—the Laplanders find their necessities supplied from the rein deer alone—in what manner—diseases of this animal—the blood of the rein deer preserved in small casks, for sauce with the marrow in spring—the horns converted into glue—the sinews make the strongest sewing thread—the tongues a great delicacy—the intestines, washed like our tripe, in high esteem among the Laplanders—bears make depredations upon the rein deer—glutton its most dangerous and successful persecutor—only method of escape from this creature, 150 to 158—in what manner the rein deer is killed by it, 369—the wolf never attacks a rein deer that is haltered in Lapland, and why, 297.

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- Demofeille*, name given by the French to the Numidian bird, v. 348.
- Denmark*. See *Henry IV.* ii. 156.
- Depona*, a large serpent, native of Mexico, vii. 209.
- Derbent*, pastures in these plains excellent for rearing horses, ii. 332.
- Derbyshire*, description of the nest of an eagle found in the peak of Derbyshire, v. 84.
- Derham*, by a microscope, discovered in the eye of a mole, the parts known in other animals, iv. 87.
- Desman*, one of the three distinctions of the musk rat—a native of Lapland, iv. 73.
- Devil*, the Swedish Laplanders consult him, ii. 197.
- Devil* (sea) or fishing frog, described, vi. 259.
- Dew*, compensates the want of showers in Egypt, i. 333—hares quench their thirst with it, iv. 7.
- Dewlap*, of two zebras, seen by the author, the skin hung loose below the jaw upon the neck, in a kind of dewlap, ii. 364—the cow wants in udder what it has in neck, and the larger the dewlap, the smaller the quantity of its milk, iii. 13.
- Diableret*, a mountain in France suddenly fallen down—its ruins covered an extent of a league square, i. 146.
- Dictionaries* of Arts and Sciences, a fault that has infected most of them, ii. 282.
- Diet*, of a thin sparing kind, remarkable among quadrupeds, as well as the human species, to produce hair, iii. 329.
- Digester*, an instrument—meat and bones put into it, dissolved into a jelly in six or eight minutes, i. 288.
- Digestion*, these organs in birds are in a manner reversed, v. 15—not perfect in birds that live upon mice, lizards, or such like food, 128—performed by some

some unknown principle in the stomach, acting in a manner different from all kinds of artificial maceration—this animal power lodged in the maw of fishes, vi. 148, 149.

Diseases, of the rein deer—the manner in which the Laplanders cure them, iii. 155, *et seq.*

Disorders, infectious, propagated by the effluvia from diseased bodies, i. 305 — most of those incident to mankind, says Bacon, arise from the changes of the atmosphere, vi. 158—fishes have their disorders, 317.

Diver, (the great northern) a bird of the smaller tribe of the penguin kind—the grey speckled diver, the scarlet-throated diver, vi. 89.

Divers, known to descend from twenty to thirty fathom, i. 269 — of all those who have brought information from the bottom of the deep, Nicolas Pesce the most celebrated—account of his performances by Kircher, 274 to 278—some known to continue three quarters of an hour under water without breathing—they usually die consumptive—manner of fishing for pearls, vii. 54, *et seq.*

Dodo, its description—among birds, as the sloth among quadrupedes, an unresisting animal, equally incapable of flight or defence—native of the Isle of France—the Dutch first discovered and called it the nauseous bird—travellers deem its flesh good and wholesome—it is easily taken—three or four dodos enough to dine a hundred men—whether the dodo be the same bird with that described under the name of the bird of Nazareth, remains uncertain, v. 69 to 71.

Doe, the female of the deer kind, iii. 118.

Dogs, always running with their noses to the ground, supposed of old the first that felt infection, i. 298—no other animal of the carnivorous kind will make a voluntary attack, but with the odds on their side, ii. 293—the Arabian horses out-run them, 319—in the dog kind the chief power lies in the under jaw, iii. 185

iii. 185—in Syria, remarkable for the fine glossy length and softness of their hair, 196—in tropical climates, lose the delicacy of their scent, and why—the lion, tiger, panther, and ounce, all natural enemies to the dog, 243—dog kind not so solitary as those of the cat, 250—their proper prey are animals unfitted for climbing,—they can live for some time upon fruits and vegetables, 251—description of the dog—knows a beggar by his cloaths, by his voice, or his gestures, and forbids his approach, 252—the dog most susceptible of change in its form, 257—all dogs are of one kind, which the original of all, which the savage dog, whence such a variety of descendants, is no easy matter to determine—the shepherd's the primitive animal of his kind—those wild in America and Congo, as those of Siberia, Lapland, Iceland, of the Cape of Good Hope, of Madagascar, Calicut, and Malabar, resemble the shepherd's dog—those in Guinea, at the second or third generation, forget to bark—dogs of Albany, of Greece, of Denmark, and of Ireland, larger and stronger than any other—shepherd's dog, transported into temperate climates, and among people entirely civilized, from influence of climate and food alone, become a mastiff, a mastiff, or a hound—*Turkish dog*—*great Danish dog*—*great Irish wolf dog*—the *little Danish dog*—their variety now in England much greater than in the time of queen Elizabeth—Dr. Caius divides the whole race into three kinds—the generous; the farm kind; the mongrel, 258 to 264—three shepherds dogs reckoned a match for a bear, and four for a lion—three of them overcame a lion in the time of king James the First—the famous poet, lord Surry, the first who taught dogs to set—the *pug dog*—the *English bull dog*—the *lion dog*, originally from Malta—its description—the *Molossian dogs* of the ancients, according to Mr. Buffon—*Epirotic dogs*, mentioned by Pliny—*Indian dogs*, mentioned by Ælian—his description of a combat between a dog and a lion—the bravest of the kind

— the nobler kind of dogs, of which such beautiful ancient descriptions, now utterly unknown, 268 to 274
 — puppies eyes not open till ten or twelve days old
 — dog's teeth amount to forty-two—this animal capable of reproducing at the age of twelve months
 — goes nine weeks with young, and lives about twelve years—other particulars concerning dogs—
 many kinds of birds the dogs will not touch—dogs and vultures living wild about Grand Cairo in Egypt, continue together in an amicable manner, and are known to bring up their young in the same nest—dogs bear hunger for a long time—a bitch, forgotten in a country-house, lived forty days, without any other sustenance than the wool of a quilt she had torn in pieces, 279 to 282—the wild, hunt in packs—unknown, such as he was before the protection of man—some, from a domestic state, have turned savage, and partaken of the disposition of the wolf, and attack the most formidable animals of the forest—are easily tamed, and quickly become familiar and submissive, 256—experiments to prove the wolf and the fox not of the same nature with the dog, but of a species perfectly distinct—animals in this country bred between a dog and a fox, 276—a dog set at liberty, in his savage fury flew upon every animal, fowls, dogs, and men, 278—the dog and wolf so much alike internally, that anatomists can scarce perceive the difference—a young dog shudders at the sight of a wolf—dogs and wolves so different in their dispositions, that no animals have a more perfect antipathy, 286—by instinct, without education, dogs take care of flocks and herds—shew no appetite to enjoy their victory when the wolf is killed, but leave him where he falls, 287 and 295—Catesby asserts the wolf was the only dog used by the Americans, before the Europeans came among them, and that they have since procreated together; thus proving the dog and the wolf of the same species, 298—unfurmoutable antipathy between the dog and the jackall—they never part without an engagement, 313—famished dogs more hairy

hairy than those whose food has been more plentiful, 329—all kinds pursue the hare by instinct, and follow it more eagerly than other animals, iv. 4—few dogs dare to encounter the otter, 143—some purposely trained for discovering the retreat of the otter, 144.

Dog-butchers all over China, and shambles for selling their flesh—wherever a dog-butcher appears, all the dogs of the place are in full cry after him—along the coasts of Guinea, their flesh is esteemed a delicacy by the negroes; they give a cow for a dog, iii. 275.

Dolphin caught in the Red Sea, known by a ring to be the same taken before in the Mediterranean, i. 245—
—allured by music, ii. 155—
—not easy to assign a cause why the ancients have invented so many fables on the subject—their boundings in the water have taught mariners to prepare for a storm—old painters and sculptors have drawn them wrong; the poets have adopted the error—Pliny has asserted, they instantly die when taken out of the water; Rondelet assures us he has seen a dolphin carried alive from Montpellier to Lyons—their motions the gambols of pleasure, or the agitations of terror, not well known—in fairer weather they herd together, and pursue shoals of various fish with impetuosity, vi. 200 to 203.

Dolphin, is also the name of the ophidium, or the gilt-head, vi. 277.

Don, or *Tanais*, a river—its course, i. 195—the sturgeon is caught in great quantities at its mouth, vi. 251.

Dorado, supposed a ruminating fish, iii. 5—
—a fish of the spinious kind, the most voracious—its description—the flying-fish is chiefly sought by it—warfare carried on between them, vi. 310, *et seq.*

Doree, description of this fish, vi. 281.

Dormouse, the mercury of the thermometer plunged into the body of a living dormouse, never rose beyond

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its pitch in air, and sometimes sunk above a degree, iv. 43—the greater sort Mr. Buffon calls the *lair*; the middle size he calls the *levet*; and the less he denominates the *muscardin*—their descriptions—agree in being stupified like the marmout during winter—their nests and provision—they bring forth three or four young at a time, but once a year, in the spring, 72, *et seq.*

Dorr-beetle, or *May-bug*, viii. 65 to 68. See *Beetle*.

Dottrel, small bird of the crane kind, vi. 21.

Doves, the *ring-dove*, v. 259—the *turtle-dove*, 256—the *stock-dove*, 252, 257. See *Pigeon*.

Donc, a monkey of the antient continent, so called in Cochinchina, where it is a native—its description—forms part of the chain by which the monies of one continent are linked with those of the other, iv. 220.

Draco volans, a flying ball of fire, i. 354.

Drag, name given by the huntsmen to the tail of the fox, iii. 304.

Dragons, the whole race dwindled down to the flying lizard, vii. 142.

Dragon-fly, or the *libella*, described, vii. 286.

Dragonet, description of this fish, vi. 278.

Dress, the first impressiion generally made arises from dress, ii. 91.

Drill of Purchas, an ape of the ouran-outang kind, iv. 177.

Dromedary, a sort of camel, iv. 280 to 288.

Drone, a ruminating insect, or seemingly so, iii. 6.

Drones, the second sort of bees, supposed to be the males, viii. 6—their cells, 12—the working bees kill the drones in the worm state, in the cell, and eject them from the hive, among the general carnage, 24.

Drugs and Plasters in the tropical climates lose their virtue, and become verminous, i. 293.

Drum, among the Swedish Laplanders every family has one for consulting the devil, ii. 197—hares taught to beat the drum, iv. 9.

Dryness, a great degree of it produced by heat, preserves from corruption, ii. 252.

Duck, when ducks are caught, the men keep a piece of turf burning near their mouths, and breathe upon it, lest the fowl smelling them, should escape, v. 11—of the numerous tribes of the duck kind, no more than five breed here, 31—Plutarch assures us, Cato kept his family in health, feeding them with duck, whenever they threatened to be out of order, vi. 100—its eggs often laid under a hen—seems a heedless, inattentive mother—of the tame duck, ten different sorts; and of the wild, Brisson reckons above twenty—the most obvious distinction between the wild and tame ducks—difference between wild ducks among each other—sea, and pond ducks—names of the most common birds of the duck kind, among ourselves, and of the most noted of the foreign tribe—their habits, nests, and number of eggs—are, in general, birds of passage—their flesh—the ducks flying in the air, often lured down from their heights by the loud voice of the mallard from below—what part of the lake they generally choose—what can employ them all day, not easy to guess—manner of making and managing a decoy to take them—the American wood-duck—general season for catching them in decoys, from the end of October till February—taking them earlier prohibited by an act of George the Second, imposing a penalty of five shillings for every bird destroyed at any other season—amazing quantity of ducks sent to supply the markets of London—manner of taking them frequently practised in China, vi. 114 to 125.

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able subsistence for his family, during a summer of famine, out of an eagle's nest, by robbing the eaglets of food—eagles killed a peasant who had robbed their nests—there is a law in the Orkney islands, which entitles any person that kills an eagle to a hen out of every house in the parish in which the plunderer is killed—the nest of the eagle is usually built in the most inaccessible cliff of the rock—description of one found in the Peak of Derbyshire—it hatches its eggs for thirty days—very rare to find three eaglets in the same nest; and it is asserted, that the mother kills the most feeble, or the most voracious—it is believed they live above an hundred years, and that they die, not of old age, but from the beaks turning inward upon the under jaw, and preventing their taking any food—an eagle endured hunger for twenty-one days, without any sustenance whatever—they are first white, then inclining to yellow, and at last light brown—age, hunger, captivity, and diseases, make them whiter—those kept tame are fed with every kind of flesh, fresh or corrupting; and upon a deficiency of that, bread, or any other provision, will suffice—it is dangerous approaching them, if not quite tame; and they sometimes send forth a loud, piercing, lamentable cry, which renders them still more formidable—they drink but seldom, and perhaps, when at liberty, not at all—the bald eagle an inhabitant of North Carolina—breeds in that country all the year round—manner in which the eggs are hatched—characteristics and habitudes of this animal—its nest is large enough to fill the body of a cart, and commonly full of bones half eaten, and putrid flesh, the stench of which is intolerable, v. 78 to 87.

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tions about its conformation—of all quadrupedes,
the elephant the strongest, and largest; yet neither
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fierce, nor formidable—in its native deserts seldom alone, being a social, friendly creature—the oldest conducts the band; the next in seniority brings up the rear—order maintained in dangerous marches—never so far asunder as to be incapable of reciprocal assistance—their invasions the more disagreeable, there being no means of repelling them; since an attempt to molest a drove would certainly be fatal—manner of going against him who offers the insult—do no personal injury when suffered to feed uninterrupted—molested by man, they seek all occasions to be revenged—where they like best to live in their natural state—cannot live far from water; and always disturb it before they drink—often fill their trunk with water, to cool it, or by way of play to spurt it out like a fountain—equally distressed by the extremes of heat and cold—swim from the continent into islands some leagues distant—frequently migrate from one country to another, and why—their food of the vegetable kind, loathing all sort of animal diet—one finding a spot of good pasture, invites the rest to partake of it—precautions by negroes and Indians against them—they often break through their fence, destroy the harvest, overturn their habitations, and then retreat in order, as they made the irruption—looks with attention and friendship at its master—its ears wipe its eyes, and cover them against the dust and flies—it likes music, learns to beat time, move in measure, and join its voice to the sound of the drum and trumpet—is pleased with the odours that delight man—the orange flower particularly grateful to its taste and smell—picks up flowers, and is pleased with the scent—seeks the most odoriferous plants for food—prefers the coco, the banana, the palm, and the fago tree to all others—eats plants to the roots—their sense of touching most delicate—description of its trunk—serving all the purposes of a hand—breathes, drinks, and smells through the trunk—takes a pin from the ground, unties knots of a rope, unlocks a door, and writes with a pen, iv.

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tower, combat as from an eminence, and fling down their weapons with double force—nothing more dreadful, or more irresistible, than such moving machines, to men unacquainted with the modern arts of war—Romans quickly learned the art of opening their ranks to admit the elephant, and separating it from assistance, compelled its conductors to calm the animal's fury, and to submit—sometimes, instead of obeying, turned upon those it was employed to assist—one elephant is known to consume as much as forty men in a day—they are now chiefly employed in carrying or drawing burthens throughout the peninsula of India—it can, with ease, draw more than six horses can remove—it carries upon its back three or four thousand weight; and upon its tusks it can support near a thousand—when pushed, it moves as swiftly as a horse at full gallop—it travels fifty or sixty miles a day; and, hard pressed, almost double that quantity—heard trotting on at a great distance—its track is deeply impressed on the ground, and from fifteen to eighteen inches in diameter—used in India as executioners, and with what dexterity they perform the horrid task—sometimes they impale the criminal on their enormous tusks—two surprising instances how sensible it is of neglect—the keeper despising its endeavours in launching a ship, the animal redoubled its efforts, fractured its skull, and died upon the spot—revenge one of them took upon a taylor who pricked its trunk with a needle at Deli—is mindful of benefits—instance of it—at the Cape of Good Hope they are hunted for the sake of their teeth—in what manner—account of an unhappy huntsman—teeth of the elephant found in a fossil state—two great grinding teeth, and part of the tusk of an elephant, discovered at the depth of forty-two yards, in a lead mine in Flintshire, 258 to 263—tusks of the elephants that come from Africa seldom exceed two hundred and fifty pounds—it is defeated by the rhinoceros, 264, 265.

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of its trunk, justly deemed one of nature's masterpieces—implement with which the gnat performs its work in summer—places where it spends the winter—the little brood so numerous, that the water is tinged with the colour of the species—some gnats oviparous, others viviparous, and come forth in a perfect form; some are males, and unite with the female; some are females, requiring the male; others are of neither sex, and produce young without copulation—at the sixth generation their propagation stops, the gnat no longer reproduces its likeness, but requires the male to renew its fecundity—produced in multitudes beyond expression in America; and found of all sizes, from six inches long, to a minuteness beyond the perception of the common eye—native Indians, anointed with oil, sleep in cottages covered with thousands of gnats, and have not their slumbers interrupted by these cruel devourers, viii. 84 to 90.

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not apt to curdle in the stomach—flesh of the goat, properly prepared, ranked by some not inferior to venison—is never so good and so sweet, in our climate, as mutton—no man can attend above fifty goats at a time—flesh of the goat found to improve between the tropics—remarkable varieties in this kind—that of Natolia, by Mr. Buffon called *goat of Angora*—its description—the *Assyrian goat* of Gesner—chiefly kept about Aleppo—*little goat of America*, the size of a kid; has hair as long as the ordinary breed—*Juda goat*, not larger than a hare—common in Guinea, Angola, and the coast of Africa—*blue goat*, at the Cape of Good Hope—its description, iii. 49 to 55—boundaries between the goat and deer kind difficult to fix—*Bezoar goat*, the *pasan*, found in the mountains of Egypt, &c. 69—*African wild goat* of Grimmius, fourth anomalous of the kind—its description, 75—goats eat four hundred and forty-nine plants, and reject a hundred and twenty-six, 163—in Syria, remarkable for their fine, glossy, long, soft hair, 196.

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Guinea-pig, by Brisson placed among the rabbit kind—native of the warmer climates—rendered domestic, and now become common every where—its description—in some places a principal favourite; often displacing the lap-dog—manner of living among us—most helpless and inoffensive, scarce possessed of any courage—their animosity exerted against each other; often fight obstinately, and the stronger destroys the weaker—no natural instinct; the female sees her young destroyed, without attempting to protect them—suffer themselves to be devoured
by

by cats—fed upon recent vegetables, they seldom drink—sometimes gnaw cloaths, paper, or other things of the kind—drink by lapping—confined in a room, seldom cross the floor, but keep along the wall—never move a-breast together—chiefly seek the most intricate retreats, and venture out only when all interruption is removed, like the rabbits—in cold weather more active—a very cleanly animal—their place must be regularly cleaned, and a new bed of hay provided for them once a week—the young falling into the dirt, or other ways decomposed, the female takes an aversion to them, and never permits them to visit her more—her employment, and that of the male, consists in smoothing their skins, disposing their hair, and improving its gloss; and take this office by turns—do the same to their young, and bite them when refractory—reared without artificial heat—no keeping them from fire in winter, if once permitted to approach it—manner of sleeping—the male and the female watch one another by turns—generally capable of coupling at six weeks old—time of their gestation—the female brings forth from three to five at a time; not without pain—the female admits the male the very day she has brought forth, and again becomes pregnant—suckles her young about twelve or fifteen days; and suckles the young of others, though older, to drain her, to the disadvantage of her own—produced with eyes open, and in twelve hours equal to the dam in agility—capable of feeding upon vegetables from the beginning—their disputes for the warmest place, or most agreeable food—manner of fighting—flesh indifferent food—difficultly tamed—suffer no approaches but of the person who breeds them—manner of eating—drink seldom, and make water often—grunt like a young pig—appear to chew the cud, iv. 52 to 59.

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Hæmorrhoids, a kind of serpent, vii. 198.

Hail, Cartesians say, is a frozen cloud half melted and frozen again in its descent—the most injurious meteor known in our climate—hail-stones fourteen inches round—struck out an eye of a young man, and killed him on the spot—a dreadful shower, recorded by Mezeray, fell in 1510; the hail-stones were of a blueish colour, and some weighed an hundred pounds—the fishes were great sufferers in that general calamity, i. 348 to 351.

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mouth—live seven or eight years, and come to perfection in one year—females live longer—Mr. Buffon makes a doubt of it—seldom heard to cry, except when seized or wounded—their cry nearly like the squalling of a child—are easily tamed—though never so young, regain their native freedom at the first opportunity—have a good ear, and been taught to beat the drum, dance to measure, and go through manual exercise—make themselves a form where the colour of the grass resembles that of their skin, open to the south in winter, and to the north in summer—sore hunted, will start a fresh hare, and squat in its form—some enter holes like the rabbit, by hunters termed going to vault—as it tires, treads heavier, and its scent is stronger—young hares tread heavier than old—male makes doublings of greater compass than the female—divided by hunters into mountain and meased hares—mode of expression, the more you hunt, the more hares you shall have, and why—what animals persecute the hare—its enemies so various, that it seldom reaches the short-term limited by nature—in countries near the north pole, they become white, and are often in great troops of four or five hundred—their skins sold for less than seven shillings a hundred—the fur known to form a considerable article in the hat manufacture—found also entirely black, in much less quantity than the former—some have been seen with horns, but rarely—those in hot countries smaller than ours—those in the Milanese the best in Europe—scarce a country where not found, from the torrid zone to the polar circle—natives of Guinea kill numbers at a time; in what manner—the Jews, ancient Britons, and Mahometans, all considered it as an unclean animal, and religiously abstained from it—hare and rabbit distinct kinds—refuse to mix with each other—an instance—laws made for the preservation of them, iv. 1 to 16.

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into Normandy, is drawn in an old bas-relief, embarking with a hawk on his fist, and a dog under his arm—in those days, it was sufficient for noble-men's sons to wind the horn, and carry the hawk fair—this diversion in such high esteem among the great all over Europe, that Frederic, emperor of Germany, wrote a treatise upon hawking—this amusement now much given over in this kingdom, and why—in the reign of James I. Sir Thomas Monson gave a thousand pounds for a cast of hawks—in the reign of Edward III. it was made felony to steal a hawk—to take its eggs was punished by imprisonment for a year and a day, with a fine at the king's pleasure—in the reign of Elizabeth, the imprisonment reduced to three months, the offender to lie in prison till he got security for his good behaviour during seven years—in earlier times, the art of gunning was but little used, and the hawk was then valuable for its affording diversion, and procuring delicacies for the table, not otherwise to be obtained—distinctive marks of the tribe called the long-winged hawks—their names and descriptions—have attachment to their feeder, and docility the baser race are strangers to—names of hawks of the baser race—those of the generous breed remarkable for courage, swiftness, and docility, in obeying the commands and the signs of their master—account of the manner of training a hawk—falconers had a language peculiar, in which they conversed and wrote, v. 105 to 112.

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- Hortensius*, the orator, the first who had peacocks served up at an entertainment in Rome, v. 155.
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- Hound*, *barrier*, and *beagle*, all of the same kind—*grey-matin* hound, transported to the North, becomes a great Danish dog; and this, sent into the South, becomes a grey-hound of different sizes; and the same, transported into Ireland, the Ukraine, Tartary, Epirus, and Albania, becomes the great wolf-dog, known by the name of the *Irish wolf-dog*—the *blood-hound*, a dog of the generous kind—and likewise the *gaze-hound*, and the *grey-hound*—the blood-hound a dog of great use, and in high esteem among our ancestors—its employ—the gaze-hound hunted, like our grey-hound, by the eye, not by the scent, iii. 262, 266.
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Hunger, every animal endures the wants of sleep and hunger with less injury to health than man—hunger kills man sooner than watchfulness—more dreadful in its approaches than continuance—dreadful effects of hunger, related to the author by the captain of a ship, who was one of six that endured it in its extremities—different opinions concerning the cause of hunger—few instances of men dying, except at sea, of absolute hunger—those men whose every day may be considered as an happy escape from famine, at last die of a disorder caused by hunger—the number of such as die in London of hunger supposed not less than two thousand in a year—method of palliating hunger among the American Indians, ii. 113 to 121—instances of amazing patience in hunger, 200.

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Huoina, the hyæna, iii. 317.

Hurco, (Aufidius) charged by Pliny with being the first who fattened peacocks for the feasts of the luxurious, v. 154.

I N D E X.

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Hus, in Greek signifies a sow, and *houina* derives from it, iii. 317.

Husé, the isinglass fish, caught in great quantities in the Danube, from October to January—furnishes the commodity called isinglass—often above four hundred pounds weight—its flesh salted is better tasted, and turned red like salmon, vi. 255, 256.

Hyæna, no words give an idea adequate to this animal's figure, deformity, and fierceness—more savage and untameable than any quadrupede—its description—defends itself against the lion, is a match for the panther, and attacks the ounce, which it seldom fails to conquer—an obscene and solitary animal—its first howl sometimes mistaken for the voice of a man a-moaning—its latter like the violent efforts of reathing—whence it first took its name—native of the torrid zone, resides in the caverns of mountains, the clefts of rocks, or dens it has formed under earth—taken ever so young, it never can be tamed—sometimes attacks man, and carries off cattle—its eyes shine by night; and it is asserted that it sees better by night than by day—scrapes up graves, and devours dead bodies, how putrid soever—absurdities of the ancients about this animal, iii. 316 to 320.

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Jabiru, and *jabiru* and *jabira-guacu*, birds of the crane kind, natives of Brasil—their descriptions, v. 346.

Jackalls, hunt in a pack, and encourage each other by mutual cries—what has given rise to the report of its being the lion's provider, ii. 296—travellers have mistaken the jackall for the fox, iii. 308—one of the commonest wild animals in the East; yet scarce any less known in Europe; or less distinctly described by natural historians—its description—its cry a lamentation resembling that of human distress—is more noisy in its pursuits than the dog, more voracious than the wolf—never goes alone, but always in a pack of forty or fifty together—seems little afraid of man; pursues its game to the doors, without apprehension—enters insolently into sheep-folds, yards, and stables, and finding nothing else, devours leather harnesses, boots, and shoes—scratches up new made graves, and devours the corpse, how putrid soever—the corpse how dug up—follows armies, and keeps in the rear of caravans—the most putrid substances it greedily devours—hides in holes by day, and appears abroad at nightfall—hunts by the scent—irreconcilable antipathy between it and the dog—no wonder it be voracious, and why—is as stupid as impudent—instance of it—Indian peasants often chase it as we do foxes, 309 to 313.

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James, the hermit, said to have lived an hundred and four years, ii. 121.

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Japanese, description of that people, ii. 204.

Jaw, the upper, thought by many quite immoveable; that it moves in man, an easy experiment will evince—has its proper muscles behind the head for thus raising and depressing it—under jaw in the embryo much advanced before the upper; in the adult it hangs more backward—and in a Chinese face it falls still more backward than with us; the difference is thought half an inch, the mouth being shut naturally—a professor at Edinburgh was subject to have his jaw dislocated—the under jaw has often an involuntary quivering motion; and often a state of langour produces another, that of yawning, a very sympathetic kind of languid motion—ridiculous instance of this sympathetic affection commonly practised upon the famous M^cLaurin, ii. 82, 83.

Jay, one of the most beautiful of the British birds—its description—feeds upon fruits, kills small birds, and is extremely docile, v. 213—lays its eggs in the holes deserted by the wood-pecker, 223.

Ibex, a native of the Alps, the Pyrenees, and the mountains of Greece—its description, iii. 58.

Ibis, the Egyptians paid divine honours to this bird, v. 342—different opinions concerning the ancient and modern ibis—Maillet's observations to this purpose—the true ibis thought a bird of the vulture kind, called by some the capon of Pharoah, 343.

Ice, very elastic, i. 167—floats of it diffused into plains of above two hundred leagues in length—and mountains of it rising amidst them—flat ice, and mountain ice—their formation—mountains of it presenting the resemblance of a glory, 227, 229.

Ichneumon, by some injudiciously denominated the cat of Pharoah, one of the boldest and most useful animals of the weasel-kind—used in Egypt for the same purposes as cats in Europe—description—discovers and destroys the eggs of the crocodile—serpents its most natural food—grows fast and dies soon—

fool—easily strangles a cat stronger and larger than itself—countries where found—attacks every living thing it is able to overcome, and fears not the force of the dog, nor the claws of the vulture—takes the water like an otter, and will continue under much longer—not able to support the rigour of our winters—one from the island of Ceylon climbed up the walls and the trees with very great ease—this animal one of those formerly worshipped by the Egyptians, iii. 348 to 352.

Ichneumon fly, its weapon of defence—flies of this tribe owe their birth to the destruction of some other insect, within whose body they have been deposited, and upon whose vitals they have preyed, till they came to maturity—of all others the most formidable to insects of various kinds—it makes the body of the caterpillar the place for depositing its eggs—the tribe is not the caterpillar's offspring, as was supposed, but its murderers—description—whence its name—fears not the wasp, and plunders its habitations—various appetites of the various kinds of this fly—the millions of insects this fly kills in a summer inconceivable, viii. 47 to 50.

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to the sea—peculiar preparation for spawning—the young from eggs—the female remains at the place where produced—they are excluded till they come forth—has her family playing about her, and conducts them in triumph to the ocean—its food—some continue in fresh water till they die—a single brood the extent of the female's fertility, two years being the limit of her existence—best season for them the months of March, April, and May—are usually taken in nets with salmon; sometimes in baskets at the bottom of the river—old custom for the city of Gloucester annually to present the king with a lamprey pie—a senator of Rome used to throw into his ponds such of his slaves as displeased him, to feed the lampreys, vi. 243 to 248.

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Layers of the earth regularly disposed, but not of the same kind in every place—enumeration of layers of earth in a well dug at Amsterdam, and of another dug at Marly—a layer, as far as it extends, always maintains the same thickness—proceeding to considerable depths, every layer is thicker—are sometimes very extensive, and often found to spread over a space of some leagues in circumference, i. 52 to 54—remarkable layers of earth round the city of Modena. 263.

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- Leaves*, two of a fig-tree, by experiment, imbibed from the earth two ounces of water in five hours and a half, i. 131.
- Leech*, different kinds—its description—takes a large quantity of food—has no anus or passage to eject it from the body when digested—in what it differs from the rest of the reptile tribe—the leech used in medicine—a girl of nine years old killed by leeches—best way of applying leeches, vii. 276 to 282.
- Legs*, a man without legs or hands performed astonishing feats of dexterity, iv. 235.
- Leming*, a bold animal of the rat kind, native of Scandinavia—often pours down in myriads from the northern mountains, and, like pestilence, destroys all the productions of the earth—Laplanders believe they drop from the clouds—their description—they move, in a square, forward by night, and lying still by day—whither their motions are turned, nothing can stop them; a fire, a deep well, a torrent, does not turn them out of their direction—they never retreat—interrupted by a boat across a river, they go over it—stopped by a stack of hay or corn, they gnaw their way through; and obstructed by a house they cannot get through, continue before it till they die—eat nothing prepared for human subsistence—never enter a house to destroy provisions—passing through a meadow, destroy it in a short time, and leave it with the appearance of being burnt up, and strewed over with ashes—a man imprudently attacking one of them, the animal furiously flies at him, barking somewhat like a puppy, fastens, and does not easily quit its hold—their leader forced out of the line, after a long defence, and separated from the rest, sets up a plaintive cry, not of anger, and hangs

hangs itself on the fork of a tree—they destroy and devour each other—after incredible devastations, they separate into armies, opposed with deadly hatred, and move along the coasts of the larger lakes and rivers—the Laplanders form prognostics from the manner of their arrangement—what prognostics—the divisions continue their engagements and animosity until one party be overcome; then they disappear, and it is supposed, that, having nothing to subsist on, they devour each other—their carcasses sometimes infect the air for miles around, and produce malignant disorders—they seem also to infect the plants, the cattle often dying in the places where they passed—the male larger and more beautifully spotted than the female—are extremely prolific—breeding does not hinder their march, some carrying one young in their mouth, and another on their back—are greatly preyed upon by the ermine, and even by the rein-deer—dogs and cats detest their flesh, but the Laplanders esteem it good eating, and devour it greedily, iv. 80 to 85.

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- Liboya*, the greatest of the serpent kind, vii. 158.
- Lichen rangiferinus*, the food of the rein-deer, a moss in Lapland of two kinds; the white in the fields, and the black on the trees, iii. 143, 147.
- Lidme*, name of the eleventh variety of gazelles, by Mr. Buffon, iii. 73.
- Life*, formerly supposed producible only by oviparous and viviparous generation; but later discoveries induce many to doubt whether animal life may not be produced merely from putrefaction, ii. 20—the beginning of our lives, as well as the end, is marked with anguish, 44—that of infants very precarious, till the age of three or four—instances of it, 54—the duration of life in general nearly the same in most countries, 187—the most useless and contemptible of all others, the most difficult to destroy, viii. 104.
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Line, upon the approach of the winter months under the line, the whole horizon seems wrapt in a muddy cloud, i. 352—in America, all that part of the continent which lies under the line is cool and pleasant, ii. 215—in general, as we approach the line, we find the inhabitants of each country grow browner, until the colour deepens into perfect blackness, 216.

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Lions, those of mount Atlas have not the strength or ferocity of those of Bildulgerid or Zaara—species of this animal diminishing daily—Mr. Shaw observes, the Romans carried fifty times as many lions from Lybia in one year, for their amphitheatres, as are in the whole country at this time—the same remark made with regard to Turkey, Persia, and the Indies; where the lions diminish in their number daily—those inhabiting the peopled countries of Morocco or India, scared away with a shout—the keepers play with him, plague, and chastise him without a cause; he bears it with composure, but his anger once excited, the consequences are terrible—an instance from Labat—numberless accounts assure his anger noble, his courage magnanimous, and his natural ferocity seldom exerted against his benefactors—he has spared the lives of those thrown to be devoured by him, afforded them part of his subsistence, and sometimes abstains from food himself to support them—necessity alone makes him cruel—the manner of hunting them by Hottentots, and others—reported that he sustains hunger a long time, but thirst he cannot support—some believe him in a continual fever—he drinks as often as he finds water, and laps it—he requires about fifteen pounds of raw flesh in a day—he rather hunts for a fresh spoil, than returns to that he had before—his breath is offensive, and his urine insupportable—horses for hunting them of that sort called charossi; all others fly at the sight of him, iii. 198 to 210—the lion prefers the flesh of camels to other food—is also fond of that of young elephants—when old, finding men and quadrupedes together, he attacks the latter, and never

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Lobster, a ruminating fish, iii. 5—very voracious, though without warmth in its body, or red blood in its veins—whatever it seizes upon, and has life, perishes, however well defended—they devour each other, and, in some measure, eat themselves; changing their shell and stomach every year, the old stomach is the first morsel to glut the new—at first sight, the head may be mistaken for the tail—its description—the food of the young—the molting season—how they change their shells—many die under this operation—speedy growth of the new shell; and of itself after the change—the claws of unequal magnitude, and why—at certain seasons they never meet without an engagement—wonders this extraordinary creature offers to imagination—are endowed with a vital principle, that furnishes out such limbs as have been cut away—varieties of this animal with differences in the claws, little in the habits or conformation—the shell black when taken, but turns red by boiling—common way of taking the lobster, vi. 325 to 334.

Locust, the great brown *locust* seen in several parts of England in 1748; in some southern kingdoms they are still formidable—description of this insect—in what manner they take the field—their devastations—are still more noxious when dead—instance of it—account of their devastations in Russia, Poland, Lithuania, and Barbary—transformations—eaten by the natives in many kingdoms of the East; and caught in small nets for that purpose—their taste—are considered as a great delicacy in Tonquin, by the rich and the poor—must have been a common food with the Jews—description of the great *West-Indian locust*, the most formidable, vii. 308 to 315.

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- Longevity*, persons remarkable for it, ii. 185, 186.
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- Lori*, the longest of all animals, in proportion to its size—description—a native of the island of Ceylon, iv. 226.
- Loricaria*, description of this fish, vi. 284.
- Lories*, a kind of parrot, v. 240.
- Louse*, its description—whether distinguished by the parts of generation into males and females, not yet discovered—the lousy disease frequent among the ancients, vii. 246 to 250.
- Louje*, (wood) the description—of great use in medicine, vii. 260, 261.
- Luminous* appearance of the waves in the night, the cause, i. 231.
- Lump-fish*, its description—flung into a pail of water, will stick so close to the bottom, that on taking the fish by the tail, the pail and several gallons of water may be lifted—their flesh, vi. 260.
- Lungs*, animals before birth make no use of their lungs, iv. 159—no anatomist has described the lungs of the lamprey, vi. 245—caterpillars have eighteen lungs, and live several days in the exhausted receiver of the air-pump, vii. 347.
- Lybia*, its inhabitants use ostriches as horses—also at Joar—instance of it at the factory of Podore, v. 57.
- Lyboija*, a serpent of Surinam, thirty-six feet long, vii. 157.
- Lynx*, distinguished from the ounce, and described—first striking distinction between it and those of the panther-kind is the tail—each hair of this animal is of three different colours—about the size of the ounce—chiefly met with in the cold northern countries—those of the new continent are smaller than in Europe—formerly called *lupus cervarius*, but for what reason hard to guess—in its nature it exactly resembles the cat, is bigger, and near two feet long,

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- Maire*, (James Le) a traveller who confirms the existence of giants in America, ii. 240.
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- Malacopterigii*, the barbarous Greek name given to the soft-finned fish; the prickly-finned sort termed *Acanthopterigii*, vi. 275.
- Malaballo*, a volcano in South America, i. 92.
- Malbrouk*, a monkey of the ancient continent—its description—the Bramins have hospitals for such as are sick, or disabled, iv. 219.
- Maldivia islands*, have lands in them at one time covered with water, and at another free, i. 261.
- Malebranche*, grounds his beautiful theory of monstrous productions upon a famous instance related by him; and some theory from which he deduces the effects of imagination upon the fœtus, ii. 225.

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Mares, their exportation prohibited by a law in Arabia, ii. 324—studs in Persia of ten thousand white mares, with hoofs so hard that shoeing is unnecessary, 326—a law in England, prohibiting the exportation of mares and stallions; and one similar to this obtained so early as the times of Athelstan, 339.

Marikina, a monkey of the sago kind, with a mane round the neck, and a bunch of hair at the end of the tail, like a lion, iv. 222.

Mariners, to multiply their numbers, queen Elizabeth enjoined that her subjects should fast from flesh on Fridays and Saturdays, ii. 119.

Marle, different sorts found in a well dug at Marly, i. 53.

Marmosc, only differs in size from the opposum, being less; instead of the bag to receive the young, has only two longitudinal folds, within which the premature young, continue to suck—when first produced not above the size of a bean; but stick to the teat until they arrive at maturity, iv. 232.

Marmout,

Marmout, or *marmotte*, a ruminating animal, iii. 5—
 a native of the Alps—its description—is easily
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 obey the voice of its master—it has an antipathy
 to the dog—strength and agility—ludicrous saying
 that the Savoyards, the only chimney-sweepers of
 Paris, have learned their art from the marmotte
 they carry about for shew—is apt to gnaw the fur-
 niture—other affections of this animal—its food—is
 cleanly, but has a disagreeable scent—sleeps during
 winter—form of its hole resembles the letter Y—
 manner of making it—they live together, and work
 in common to make their habitations snug and con-
 venient—when they venture abroad, one is placed
 as a centinel upon a lofty rock—Mr. Buffon says
 it does not sleep during winter, is rather in a torpor,
 a stagnation of all faculties—its heat not more than
 ten degrees above congelation—the flesh said to
 have a wild taste, and to cause vomiting—countries
 where it is found—inhabitants of the Alps do not
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Martin, its description—the most beautiful of all
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iii. 340, 341—resembles the ermine and polecat, and like them is fond of honey, 331—seldom meets the wild-cat without a combat—wild-cat not a match for the martin—kept tame by Gesner and Mr. Buffon—often slept for two days, and then was two or three days without sleeping—the yellow-breasted more common in France than England—in that retreat the female brings forth her young, three or four at a time—and they come with the eyes closed—how she compensates for her deficiency of milk—this animal more common in North America than in Europe—found in all northern parts of the world, from Siberia to China, and Canada—in every country hunted for their furs, very valuable, and chiefly so when taken in the beginning of winter—one part of its skin most esteemed—twelve thousand of these skins annually imported into England from Hudson's-bay, and thirty thousand from Canada—small birds alarm the spot where the dam keeps her young, and direct the hunter in his pursuit, 342 to 345—its nest generally the tenement of the squirrel, taking possession, and killing the owner—the white-breasted keeps near houses and villages; the yellow keeps in woods, leads a savage life, iv. 29—seizes also the flying squirrel, 35.

Martin, a bird of the swallow tribe, v. 308.

Marum, cats excessively fond of this plant, iii. 191.

Mastiff, one of the three descendants of the shepherd's dog—chiefly a native of England; when transported into Denmark, becomes the little Danish dog, iii. 263—the Dutch mastiff, 264.

Mastiff-fox, second variety of foxes, less than the greyhound-fox, and stronger than the cur-fox, iii. 308.

Maturity, attained to by slow steps, announces a slow march to old age—as true in other animals as in man and vegetables, ii. 184—sooner arrived at in India than in Europe, 206.

Maw, in fishes, possesses the power of digesting, vi. 149.

- Maximin*, (the emperor) a prodigy of strength—several instances of it—by birth a Thracian; from being a simple herdsman he rose by the gradations of office, until he came to be emperor of Rome, was above nine feet in height, and the best proportioned man in the empire—was killed by his own soldiers, while sleeping, ii. 108.
- May-bug*, or *dorr-beetle*, described, viii. 65 to 70. See *Beetle*.
- Measled hares*, distinguished from mountain hares, they keep in low grounds, their flesh moist, white, and flabby, iv. 11.
- Mechanism*, which regulates the number of our years, admits no change in its laws, and can be affected only by long fasting, or great excess, ii. 186.
- Medaurc*, the brass helmet dug up there fits a common man, yet is allowed to have been left there at the overthrow of Asdrubal, ii. 243.
- Media*, has pastures in its plains excellent for rearing horses, ii. 332.
- Medicine*, many of its salutary purposes obtainable from some parts of the ostrich, v. 58—also from many parts of quadrupedes, iii. 64.
- Mediterranean sea*, always receiving, and never discharging water, is no way fuller than before—in what manner some account for this, i. 245, 246—water spouts seen in it—description of them by Tournefort, 364—solutions offered for this phenomenon by Mr. Buffon and Dr. Stewart, 367—this sea one of the smoothest and most gentle in the world, 249. -
- Medusa*, name given by Linnæus to a small insect, thought the simple food of the great Greenland whale—walfischoas, the name given to it by the Icelander, vi. 182.
- Meibomius*, has collected some few remains of ancient music, which do not leave room to regret what is lost, ii. 155.

Membrane, the nictitating membrane in birds—veils the eye at pleasure, whilst the eye-lid continues open, v. 9.

Me. & mines, in Somersetshire, account of them by Mr. Locke, i. 72.

Menstruum, that body which is most fluid and penetrating, is likely to be the menstruum of one less so—Marriotte's experiment shews that water will act as a menstruum upon air, i. 344—cold diminishes the force of menstrooms, and often promotes evaporation, 345.

Merlin, the smallest of the hawk or falcon-kind, scarce larger than a thrush, displays a degree of courage rendering him formidable to birds far above his size—kills a partridge or a quail at a single pounce from above, v. 109—the pursuit of the lark by a couple of merlins is a most delightful spectacle, 115.

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- Mew*, said of flags when they cast their heads, iii. 105.
- Mice*, have burrowed in the backs of hogs, while fattening in the sty, without being felt, iii. 164—and rats cannot endure the scent of the genette, 360—in 1580, at Hallontide, an army of mice over-run the marshes near Southminster, and eat up the grass to the roots; but soon after they were all devoured by a number of strange painted owls, v. 133.
- Mico*, the least and most beautiful monkey of the fagoin kind—its description by Mr. La Condamine, iv. 222.
- Microscope*, encreases the magnitude of an object, and that of its motion also, ii. 19—the pupil and humours of the eye of the mole discovered by it, iv. 87.
- Migrating* fishes, the herring and the pilchard take the most adventurous voyages—stated returns, and regular progress of the migrating fishes, one of the most extraordinary circumstances in the history of nature, vi. 295 to 297.
- Migration*, causes of migrations of birds—in what manner they perform them—at what times—rather follow weather than country, and go on as they perceive the atmosphere more suitable to their wants and dispositions—migration of some swallows, and retreat of others into old walls, to avoid the rigour of winter, wrap this subject in great obscurity, v. 29, *et seq.*—of bees, several signs previous to it, viii. 21.
- Milan*, hares bred in the Milanese, thought the best in Europe, iv. 13.
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- Mire-drum*, the bittern, described, vi. 2 to 5. See *Bittern*.
- Mistletoe*, a plant thought propagated by seeds voided by birds, v. 281.
- Mississippi*, a great river in North America—its source and length, i. 201—receives forty rivers, 203.
- Mists* continually rise upon approach of the winter months, under the line, i. 352—called frost-smoke—raises blisters on several parts of the body, in the regions round the poles, 360.
- Mite-fly*, not found in Lapland, iii. 153.
- Miume*, a river in America—enormous skeletons lately discovered near it, iv. 264.
- Mock-bird*, description of the American mock-bird—its habits—can assume the tone of every animal in the wood, from the wolf to the raven—no bird in the forest it has not at times deceived by mimicking its call, v. 288.
- Mock-suns*, meteors, and other phænomena, in the northern regions, i. 352:
- Mococo*, first of the maki kind, which is the last of the monkeys—its description—a native of Madagascar—its qualities, iv. 224—eats its own tail, and seems to feel no pain—some other monkeys do the same, 309.
- Modena*, a city in Italy—its remarkable wells—other rarities round it, i. 263.
- Mogul*, in the Indian language, signifies a white man, ii. 206.
- Mold*, black, or garden-earth, the first layer on the surface of the globe—is formed from animal and vegetable bodies decayed—soil fertile, in proportion to the quantity that putrified mold bears to the gravelly mixture, i. 48, 49.
- Mole*, a ruminating insect, or seemingly so, iii. 6—no quadrupede fatter, none with a more sleek glossy skin—an utter stranger in Ireland—formed to live under

under the earth—its description—the ancients, and some moderns, of opinion, that the mole was blind; but Derham, by a microscope, discovered all the parts of the eye known in other animal—a mole let loose in the midst of a field, like a ghost on a theatre, instantly sinks into the earth; and an active labourer, with a spade, pursues it in vain—peculiar advantage of the smallness of its eyes—when once buried in the earth, it seldom stirs out—it chuses the looser, softer grounds—chiefly preys upon worms and insects—is most active, and casts up most earth, immediately before rain, and in winter, before a thaw—in dry weather, it seldom forms hillocks—readily evades the pursuit of animals stronger and swifter than itself—its greatest calamity is an inundation—in some places considered by the farmer as his greatest pest—couples towards spring, and the young found about the beginning of May—generally four or five at a time—description of the mole-hill, in which the female has brought forth her young—is scarcely found, except in cultivated countries—the varieties are but few—that of Virginia is black, mixed with a deep purple—that of Poland is white—Agricola says he saw hats made of mole-skins, the finest and most beautiful imaginable, iv. 85 to 93.

Mossian breed of dogs, and its perfections, set forth by Nemesianus, iii. 272.

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Mongoose, of the maki kind, the last of the monkeys—its description—is a native of Madagascar, iv. 225.

Monkey, they sometimes fall a prey to the lion in deserts and forests, iii. 207—one general description will not serve for all the animals of the monkey kind, iv. 177—La Condamine asserts it would take up a volume to describe the differences of monkeys found along the river of Amazons; and we are sure that every one of these is different from those on the African coast—an elaborate description of each must be useless and tiresome, their numbers being very great, and their differences very trifling—those of two cantons never found to mix—of all kinds less than the baboon, have less power of doing mischief, and their ferocity diminishes with their size—do nothing desired without beating; their fears once removed, they are the most insolent headstrong animals in nature—in their native woods, are the pests of other animals, and the masters of the forest where they reside—the tiger nor the lion will not venture to dispute dominion with creatures, who, from the tops of trees, with impunity carry on an offensive war, and by their agility escape all pursuit—birds have not less to fear from their continual depredations; such being their petulant delight in mischief, that they fling the eggs against the ground, when wanting appetite to devour them—one only animal in the forest ventures to oppose them, that is the serpent—larger snakes often wind up the trees where they reside, and happening to surprize them sleeping, swallow them whole, before they can make defence—they generally inhabit the tops of trees, and the snakes cling to the branches nearer the bottom; in this manner they are near each other, like enemies in the same field of battle—some supposed their vicinity rather argued mutual friendship, 203 to 206—father Labat has seen them playing their gambols upon those branches on which the snakes were reposing, and jumping over them,

them, without receiving any injury—they provoke the snake, as the sparrows twitter at a cat—when attacked, they shew perfect skill in defending and assisting each other—they regularly begin hostilities against those who enter their woods—they take most desperate leaps, and seldom come to the ground—one being wounded, the rest come round, put their fingers into the wound, as desirous of sounding its depth—the blood flowing in any quantity, some stop it, while others get leaves, chew, and thrust them into the opening—are often killed in numbers before they make a retreat, with the same precipitation as they at first came on—in this retreat the young are clinging to the back of the female, who jumps away, seemingly unembarrassed by the burthen—usual way of taking them alive—the monkey not killed outright, does not fall; but clinging to some branch, continues, when dead, its last grasp, and remains where shot, untill it drops by putrefaction—skinned and served up at negroe-feasts, so like a child, an European is shocked at the sight—the negroes seeing Europeans buy young and tame monkies, with equal care brought rats to the factors for sale, and were greatly disappointed, finding no purchaser—negroes cannot comprehend advantages arising from educating or keeping animals, who come in companies to lay waste fields of corn or rice, or plantations of sugar-canes—they carry off what they are able, and destroy ten times more—manner of their plundering—are under a kind of discipline, exercised among themselves—account to this purpose by Margrave—one species, by Mr. Buffon, called the ouarine, remarkable for loudness and distinctness of voice—use to which they convert it—are generally together in companies, march in exact order, and obey the voice of some chieftain, remarkable for his size and gravity—chief food of the tribe—extraordinary manner of managing an oyster, 207 to 213—manner of drawing crabs from the water—no snare, however nicely baited, takes a monkey of the West-Indian islands—female brings

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forth one, and sometimes two at a time—rarely breed when brought into Europe—the male and female never tired of fondling their young, and instruct it with no little assiduity—often severely correct it, if stubborn, or disinclined to profit by their example—manner of carrying their young in the woods—dexterity in passing from one tree to another, by forming a kind of chain, locking tail in tail, or hand in hand—one amused itself for hours imposing upon the gravity of a cat, and playing its pranks among rabbits—faithful services which father Carli received from the monkies in Angola, where he went to convert the savage natives to Christianity—savages of Africa and America suppose monkies to be men; idle, slothful, rational beings, capable of speech and conversation, but obstinately dumb, for fear of being compelled to labour—monkies of Africa most expert and entertaining—shew a greater degree of cunning and activity—three marks by which monkies of the new continent are distinguished from those of the old—Mr. Buffon makes but nine species of monkies belonging to the ancient continent, and eleven to the new—their names, with their descriptions—the *red African*, the *patas*, second sort of the ancient continent—the *white nose* or *moustoc*, of the ancient continent, most beautiful; its description—the *green* of St. Jago, also called *callatrix*, is of the ancient continent—its description—some of the kind eat their own tail, and seem to feel no pain—the Bramins have hospitals for those that happen to be sick, or disabled, those monkies of the new continent with muscular holding tails, are called *sapajous*, and those with feeble useleſs tails, are called *sagoins*—the *fox-tailed monkey*—*makies*, the last of the kind—their description, iv. 214 to 223.

Monkey-bezoar, a factitious conerete, iii. 71. See *Bezoar*.

Monoculus, the arboreſcent water-flea—its description—arc of a blood-red colour; and sometimes in such multitudes on ſtanding waters, as to make them appear

pear all over red, whence the water has been thought turned into blood—its branching arms, and the motion made with them in the water deserve great attention, vii. 261 to 263.

Monsoons, so called from a famous pilot of that name, who first used them in navigation with success—in the ocean between Africa and India, those of the east winds begin in January, and end at the commencement of June; in August, or September, the contrary takes place; and the west winds blow for three or four months, i. 324—moonsoons prevail, at different seasons, throughout the Indies, 325.

Monsters, after a catalogue of them, Linnæus particularly adds the slender waists of the women of Europe, ii. 223.

Monstreus productions, father Malbranche's ingenious theory of—remarkable instance related by him, ii, 225.

Montaigne, well known to have disliked those men who shut one eye in looking upon an object, ii. 86.

Moose-deer, name in America for the elk, iii, 130—its description, 134.

Mormyrus, description of this fish, vi. 286,

Morocco, the original horses there much smaller than the Arabian breed, ii. 332.

Moron, a kind of salamander, thought venomous, vii, 129.

Morse, an animal of the seal kind, might be ranked among the fishes, ii. 287—generally frequents the same places where seals reside in—different from the rest in a very particular formation of the teeth—resembles a seal, except that it is much larger—are rarely found, but in the frozen regions near the pole—formerly more numerous than at present—the Greenlanders destroyed them more before those seas were visited by European ships upon the whale fishery, than now—its teeth generally from two to three feet long—the ivory more esteemed than that of

- the elephant—the fishers have formerly killed three or four hundred morfes at once; their bones are still lying in prodigious quantities along those shores they chiefly frequented, iv. 169, 170.
- Mofchitoes*, excessive torments caused by them—houses forsaken on their account, i. 136, 137.
- Mofs*, the only support of the rein-deer in Lapland—of two sorts, white and black, iii. 143.
- Mother-of-pearl*, taken from the pearl oyster, vii. 51.
- Moths*, difference from butterflies, vii. 369—all the tribe of female motlis lay their eggs soon after they leave the aurelia, 372.
- Motion*, keeps the water of the sea sweet, i. 224—destroys numbers of viler creatures, 232—constant motion of the waters of the sea westward, 241—principal differences between serpentine and vermicular motion, vii. 165, 166—some vegetables possessed of motion, viii. 93—and many animals totally without it—in what manner animals of the worm kind move, 97, *et seq.*
- Moufflon*, the sheep in a savage state, a bold, fleet creature, able to escape from greater animals, or oppose the smaller with arms received from nature, iii. 36—its description, 46.
- Mountains*, rising from places once level, i. 20—give direction to the courses of the air, 316—how formed, and for what designed—upon our globe, considered as angles of small lines in the circumference of a circle, 128 to 130—countries most mountainous, are most barren and uninhabitable, 135—some vallies are fertilized by earth washed down from great heights, 151—the more extensive the mountain, the greater the river, 132—tops of the highest mountains bare and pointed, and why, 144—tops of land-mountains appear barren and rocky; of sea-mountains, verdant and fruitful, 271—the highest in Africa, those called *of the moon*, giving source to the Niger and Nile in Africa, the greatest and highest under the line, 132—some rise three miles perpendicular

perpendicular above the bottom of the ocean, 136—highest in Asia; mount Caucasus makes near approaches to the Andes in South America, 142—burning, in Europe, 83—in Asia, 91—in the Molucca islands—in Africa—in America, those of the Andes—those of Arequipa, Carassa, Malahallo, and Cotopaxi—description of the latter by Ulloa; and an eruption of it, 92.

Mouse, the most feeble, and most timid of all quadrupeds, except the Guinea-pig—never rendered quite familiar; though fed in a cage, retains its apprehensions—no animal has more enemies, and few so incapable of resistance—the owl, cat, snake, hawk, weasel, and rat destroy them by millions—brings forth at all seasons, and several times in the year; its usual number from six to ten—these in a fortnight strong enough to shift for themselves—places where chiefly found—Aristotle, having put a mouse with young into a vessel of corn, some time after found a hundred and twenty sprung from that original—its life lasts two or three years—the species found in all parts of the ancient continent, and has been exported to the new—Gesner minutely describes the variety of mouse-traps—long-tailed field-mouse—short-tailed field-mouse—has a store against winter, a bushel at a time—a description of the shrew-mouse, iv. 67 to 71.

Moufoc, or *white nefe*, monkey of the ancient continent; a beautiful little animal—its description, iv. 220.

Mouth of hares lined with hair—the only animals that have it on the inside, iv. 8—the snails of the trochus kind have none—mouth of garden, water, and sea-snails, vii. 31.

Mucous liquor, giving the joints an easy and ready play, ii. 181.

Mugil, the mullet, description of this fish, vi. 281.

Mule, reputed barren, though Aristotle says it is sometimes prolific, ii. 344—engendered between a horse

- horse and a she-ass, or a jack-ass and a mare, 354—
inhabitants of mountainous countries cannot do
without them—how they go down the precipices of
the Alps and Andes—a fine mule in Spain worth
fifty or sixty guineas—common mule very healthy—
lives thirty years and more, 355— in South Ame-
rica, destroyed by a bat called vampyre, iv. 136.
- Mullus*, or *surmulet*, description of this fish, vi. 280.
- Multivalve* shells, third division of shells by Aristotle,
vii. 11—two principal kinds of multivalve shell-
fish, moving and stationary, 56.
- Mummy*, formerly a considerable article in medicine—
Paræus wrote a treatise on the inefficacy of mummy
in physic—counterfeited by the Jews, and how—
the method of seeking for mummies—found in the
sands of Arabia, in Egypt, in wooden coffins, or in
cloaths covered with bitumen, ii. 255, 256—re-
markable mummy dug up at Auvergne, in France,
260—an injection of petreoleum inwardly, and a
layer of asphaltum without, suffice to make a mum-
my, 263.
- Muralto*, has given the anatomy of the lamprey, but
made no mention of lungs, vi. 245.
- Muræna*, the eel, its description, vi. 282.
- Murena* of the ancients, not our lamprey, vi. 243.
- Muscardin*, name of the lesser dormouse by Mr. Buf-
fon, iv. 72.
- Muscle*, the shell-fish, its description—its organs of
generation are what most deserve to excite our
curiosity—it endeavours to become stationary, and
to attach itself to any fixed object it happens to be
near—its enemies—it is supposed that those threads,
which are usually called the beard of the muscle,
are the natural growth of the animal's body, and by
no means produced at pleasure, as Reamur supposes
—its instrument of motion, by which it contrives to
reach the object it wants to bind itself to—its food
—some of this kind have been found a foot long—
the natives of Palermo sometimes make gloves and
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stockings of its beards—the places where found—it requires a year for the peopling a muscle-bed, vii. 38 to 44.

Muscles, to judge of the strength of animals by the thickness of their muscles inconclusive, ii. 110—those of the hare are strong, and without fat, iv. 4— the pectoral muscles of quadrupedes trifling in comparison to those of birds—in quadrupedes, as in man, the muscles moving the thighs and hinder parts are strongest, while those of the arms are feeble—in birds, the contrary obtains, v. 8—those of the shark preserve their motion after being separated from the body, vi. 221.

Muscovy-duck, or the *musk-duck*, so called from its musky smell, vi. 117.

Music, said by the ancients, to have been invented from the blows of different hammers on an anvil—from the remains of ancient music, collected by Meibomius, one might suppose nothing powerful in what is lost—in all countries, where music is in its infancy, the half tones are rejected—many barbarous nations have their instruments of music; and the proportion between their notes is the same as in ours—all countries pleased with music; and where they have not skill to produce harmony, they substitute noise—its effects, the ancients give us many strange instances of them upon men and animals—and the moderns likewise—madness cured by it—remarkable instance in Henry IV. of Denmark—it is now well known that the stories of the bite of the tarantula, and its cure by music, are all deceptions—instance of it—fishes are allured by music—horses and cows likewise, ii. 152 to 157—the elephant appears delighted with music, iv. 241—father Kircher has set the voices of some birds to music, v. 129.

Musk, among the numerous medicines procurable from quadrupedes, none, except the musk and hartshorn, have preserved a degree of reputation, iii. 64—a doubt whether the animal producing it be a hog, an

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ox, a goat, or a deer—no animal so justly the reproach of natural historians as that which bears the musk—it has been variously described, and is known very imperfectly—the description given by Grew—formerly in high request as a perfume—has for more than a century been imported from the East—is a dusky reddish substance, like coagulated blood—a grain of it perfumes a whole room—its odour continues for days, without diminution, and no substance known has a stronger or more permanent smell—in larger quantity it continues for years; and scarce wasted in weight, although it has filled the atmosphere to a great distance with its parts—the bags of musk from abroad supposed to belong to some other animal, or taken from some part of the same, filled with its blood and enough of the perfume to impregnate the rest—it comes from China, Tonquin, Bengal, and often from Muscovy—that of Thibet reckoned the best, and of Muscovy the worst, iii. 81 to 86.

Musk-rat, three distinctions of it, iv. 73—it is called *stinkard* by the savages of Canada, 75.

Musky smell, does not make the characteristic marks of any kind of animals, iii. 30.

Musmon, or *mufflon*, resembles a ram, its description, iii. 46.

Myoides, a broad thin skin covering the whole upper fore-part of the body, its effect in women with child, ii. 95.

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Nails, how formed in man, ii. 93—those of some of the learned men in China longer than their fingers—savages that let them grow long, use them in slaying animals, 97.

Nanquin, a river in Asia, receives thirty rivers, i. 202.

Narwhal, the sea-unicorn—its description—errors concerning the teeth of this animal—the most harmless

less and peaceful inhabitant of the ocean—the Greenlanders call it the forerunner of the whale; and why—its food—is a gregarious animal—a century ago its teeth considered the greatest rarity in the world—were believed to belong to a very different animal—for some time after the narwhal was known, the deceit was continued—they far surpass ivory in its qualities, vi. 190 to 195.

Natalian goat, a remarkable variety in the goat-kind, iii. 53.

Nature lavish of life in the lower orders of creation, ii. 45—she has kindly hid our hearts from each other, to keep us in good humour with our fellow-creatures, 87—has brought man into life with more wants and infirmities than the rest of her fellow-creatures, 112—in a course of ages shapes herself to constraint, and assumes hereditary deformity—instances of it, 219—has contracted the stomachs of animals of the forest, suitable to their precarious way of living, 114—has left no part of her fabric destitute of inhabitants, v. 1—and by supplying a variety of appetites, has multiplied life in her productions, 72—what might have led some late philosophers into the opinion that all nature was animated, viii. 127.

Nautilus, a sea-snail, most frequently seen swimming—its shell very thin, and easily pierced, vii. 33—its description—it is certain that it sometimes quits its shell, and returns to it again—peculiarity for which it has been most distinguished, 34, 35.

Nazareth bird, whether the dodo or not, is uncertain, v. 71.

Neck, fishes have none—birds, in general, have it longer than any other kind of animals, ii. 93—in women, it is proportionably longer than in men, 99.

Nectarium, the part of a flower from which the honey is extracted, viii. 14.

Negroes of the Leeward islands, by the smell alone, distinguish the footsteps of a Frenchman from those
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of a negro, ii. 165—several of them have white beards, and black hair—described—their features not deformed by art, 209—the women's breasts, after bearing one child, hang down below the navel, and are thrown over the shoulder to suckle the child at their backs, 210—the jet black claim the honour of hereditary resemblance of our common parent—an argument sufficient to prove the contrary—two white negroes the issue of black parents, 221—shew their terror and surprize, when they first see a horse, 318—of the Afriean coasts regard the bat with horror, and will not eat it, though ready to starve, iv. 132—happy to see numbers of monkies destroyed, because they dread their devastations, and love their flesh—cannot comprehend advantages arising to Europeans from educating or keeping monkies—and having seen young and tame monkies bought, have offered rats for sale to our factors, and been greatly disappointed at finding no purchaser, 210—distractedly fond of the flesh of the shark, vi. 223—their manner of killing it, 221.

Negroland, or Nigritia, the plague not known in it, i. 307—its inhabitants are the darkest of all blacks, ii. 217.

Nerves, wherever they go, or send their branches in number, these parts are soonest begun, and most completely finished, ii. 134.

Nefs, a river near Bruges in Flanders—great quantities of trees found in its mouth,, at the depth of fifty feet, i. 262.

Nest, of every species of birds has a peculiar architecture—where eggs are numerous, the nest must be warm, v. 22—different places which birds choose for their nests, 23—description of the nest of an eagle found in the Peak of Derbyshire, 84—of the bald eagle, large enough to fill the body of a cart, 87—hanging nests in Brasil, 224—made in such manner, as to have no opening but at the bottom, 226—the Chinese get those of the swallows from the rocks, and sell them in great numbers in the East

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Nettles, how used to teach capons to clutch a fresh brood of chickens throughout the year, v. 152.

Nettles of the sea, name given by some to the star-fish, viii. 106.

New Providence, one of the Bahama islands—the Philosophical Transactions give account of poisonous qualities in the fish found on the coast of this island—all kinds at different times dangerous; one day serving for nourishment, and the next proving fatal, vi. 318.

Newton, (Sir *Isaac*) observes all birds, beasts, fishes, insects, trees, and vegetables, with their parts, grow from water; and, by putrefaction, return to water again, i. 154—discovered the true cause of the theory of the tides, 235—with peculiar sagacity discovered the cause of the remarkable tides at Tonquin, 241—curious optical remarks, 256, 272.

Nicola Pesce, a celebrated diver—his performances related by Kircher—he often swam over from Sicily into Calabria, carrying letters from the king—frequently known to spend five days in the midst of the waves, without any other provisions than the fish he caught there, and ate raw, i. 274.

Nieper, or Boristhenes, a river rising in the middle of Muscovy, and running three hundred and fifty leagues to empty itself in the Black Sea, i. 195.

Niger, this river has a course of several hundred miles from its source at the mountains of the moon, i. 132—asserted that it is lost in the sands before it reaches the ocean, 210.

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- Nile*, its course—its sources ascertained by missionaries—takes its rise in the kingdom of Goiam—receives many lesser rivers—Pliny mistaken, in saying that it received none—the cause of its annual overflowings—time of their encrease and decrease more inconsiderable now than in the time of the ancients, i. 198.
- Noise*, the mind predisposed to joy, noise fails not to encrease into rapture—and those nations which have not skill enough to produce harmony, readily substitute noise—loud and unexpected, disturbs the whole frame; and why, ii. 154.
- Noort*, (Oliver Van) a traveller who confirms the existence of giants, ii. 240.
- Norfolk*, along its coasts the sea has gained fifty yards in some places, and lost as much in others, i. 258.
- Norway*, the sea has formed several little islands from its main land, i. 260—there are lands in it at one time covered with water, and another free, 261—the last history of that kingdom does not intimate that asses have yet reached that country, ii. 353—the isatis, a species between the dog and the fox, found in this country, iii. 315—the first great bank for herrings was along these shores, vi. 301.
- Nose*, that of the Grecian Venus such as would appear at present an actual deformity, ii. 69—the form of the nose, and its advanced position, peculiar.

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- Nostrils*, wide, add a great deal to the bold and resolute air of the countenance, ii. 81—of the cetaceous tribe, vi. 168—two in the great Greenland whale, 178.
- Note* of the sloth, according to Kircher; an ascending and descending hexachord, uttered only by night, iv. 319.
- Notoneta*, the common water-fly—swims on its back, to feed on the under-side of plants growing in water, vii. 326.
- Numidia*, the plague not known in it once in an hundred years, i. 307—its race of horses much degenerated, ii. 327.
- Numidian* bird, or Guinea-hen, described, v. 172.
- Numidian* crane, its peculiar gestures and contortions, v. 348.
- Nux vomica*, ground and mixed with meal, the most certain poison, and least dangerous to kill rats, iv. 66—fatal to most animals, except man, v. 153.
- Nyl-gharu*, an animal between the cow and the deer, native of India—its description—disposition and manners of one brought over to this country—its manner of fighting—at all our settlements in India they are considered as rarities, iv. 294 to 296.

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- Oaks* of Hatfield Chace Levels, as black as ebony, very lasting and close grained, sold for fifteen pounds a-piece, i. 266.
- Objects*, we see them in an inverted position, ii. 135
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- not the feeling only, but the colour and brightness of objects, contribute to form an idea of the distance at which they appear—the power of seeing objects at a distance rarely equal in both eyes—in near-sighted persons, the best eye sees every object the largest, ii. 143 to 145.
- Oby*, in Tartary, a river of five hundred leagues, running from the lake of Kila into the Northern Sea, i. 196—receives above sixty rivers, 202.
- Ocean* occupies considerably more of the globe than the land, i. 212—its different names—all the rivers in the world flowing into it, would, upon a rude computation, take eight hundred years to fill it to its present height, 213—savages consider it as an angry deity, and pay it the homage of submission, 216—when England loses its superiority there, its safety begins to be precarious, 217—the bays, gulphs, currents, and shallows of it much better known and examined than the provinces and kingdoms of the earth, and why—opinions concerning its saltness, and that of Boyle particularly, 218—winds never change between the tropics in the Atlantic and Ethiopic Oceans, 317—each has its insects—and its vegetables, ii. 6.
- Ocelot*, or cat-a-mountain, its description—of the panther-kind—one of the fiercest, and, for its size, one of the most destructive animals in the world—its unceasing appetite rather for the blood than the flesh of their prey—it generally is on the tops of trees, like our wild cats, iii. 237 to 244.
- Ocotzintzcan*, a kind of pigeon, one of the most splendid tenants of the Mexican forests, v. 261.
- Odours* diffused by the air as the fluid they swim in, i. 312.
- Ohio*, several enormous skeletons five or six feet beneath the surface on the banks of that river, lately discovered, iv. 264.
- Oil*, train-oil the drink of the Laplanders, ii. 199—the oil of the fish cachelot is very easily converted

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- Old-man's-beard*, a kind of moss growing in Brasil, v. 226.
- Olearius*, invited by the monarch of Persia to a sport of wild asses, ii. 346.
- Olive* colour, the Asiatic of that colour claims the honour of hereditary resemblance to our common parent—an argument sufficient to prove the contrary, ii. 221.
- Oliver*, (*William*) the first who discovered that the application of fallad-oil cured the viper's bite effectually, vii. 189.
- Onager*, or the wild ass, is in still greater abundance than the wild horse, ii. 345.
- Ondatra*, one of the three distinctions of the musk-rat—a native of Canada—creeps into holes where others seemingly less cannot follow—the female has two distinct apertures, one for urine, the other for propagation—this animal in some measure resembles the beaver—its manner of life during winter, in houses covered under a depth of eight or ten feet of snow—savages of Canada cannot abide its scent, call it stinkard—its skin very valuable, iv. 73 to 75.
- Onza*, or ounce, of the panther-kind, iii. 235—the onca of Linnaus, 236.
- Oplidium*, the gilt-head, by sailors called the dolphin, its description, vi. 277.
- Opposim*, the female's belly found double—when pursued, she instantly takes her young into a false belly nature has given her, and carries them off, or dips in the endeavour, ii. 309—
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North and South America, of the size of a small cat, and of the monkey-kind—its description, iv. 176—a minute description of it—the young, when first produced are very small, and immediately on quitting the real womb, they creep into the false one, but the time of continuance is uncertain—Ulloa has found five young hidden in the belly of the dam, alive and clinging to the teat, three days after she was dead—chiefly subsists upon birds, and hides among the leaves of trees, to seize them by surprize—cannot run with any swiftness, but climbs trees with great ease and expedition—it often hangs by the tail, and for hours together, with the head downwards, keeps watching for its prey—by means of its tail, flings itself from one tree to another, hunts insects, and escapes its pursuers—eats vegetables as well as animal substances—is easily tamed, but a disagreeable domestic, from its stupidity, figure, and scent, which, though fragrant in small quantities, is ungrateful when copious—during its gestation, the bag in which the young are concealed may be opened and examined without inconvenience; the young may be counted and handled; they keep fixed to the teat, and cling as firm as if they made a part of the body of the mother, iv. 227 to 231.

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Organs of generation in fishes, vi. 162.

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Osprey, its flesh is admired by many, and, when young, an excellent food according to Belonius, v. 77—it chiefly lives upon fish, 86—its distinctive marks, 89.

Ostiac Tartars, a race that have travelled down from the North, ii. 201.

Ostracion, a fish of the cartilaginous kind, is poisonous, vi. 264.

Ostrich, manner in which the Arabians hunt them, ii. 320, and v. 55—an Arabian horse of the first speed scarcely outruns them, 320—the greatest of birds, makes near approaches to the quadrupede class, v. 37—its flesh proscribed in Scripture as unfit to be eaten—its description—appears as tall as a man on horseback—brought into England above seven feet high—surprising conformation of its internal parts—a native only of the torrid regions of Africa—not known to breed elsewhere than where first produced—places they inhabit—the Arabians say it never drinks—will devour leather, glass, hair, iron, stones, or any thing given.—in native deserts, lead an inoffensive social life—Thevenot affirms the male keeps to the female with connubial fidelity—thought much inclined to venery—some of their eggs weigh fifteen pounds, v. 45 to 52—season for laying depends on the climate where the animal is bred—these birds very prolific, and lay from forty to fifty eggs at one clutch—none has a stronger affection for her young, nor watches her eggs with greater assiduity, sit on them, like other birds, male and female by turns—assiduous in supplying the young with grass, and careful to defend them, encountering every danger boldly;—way of taking them among the ancients—

the plumes used in their helmets—the ladies of the East use them as ornaments in their dress—plumes used in Europe to decorate our hearses and hats—feathers plucked from the animal while alive more valued than those taken when dead—some savage nations of Africa hunt them for their flesh—Heliogabalus had the brains of six hundred dressed in one dish—a single egg sufficient entertainment for eight men—eggs well tasted, and extremely nourishing—Apicius gives a receipt of sauce for the ostrich—of all chaces, that of the ostrich, though most laborious, the most entertaining—use they make of its skin—method of hunting of the Struthophagi—its blood mixed with the fat a great dainty with the Arabians—inhabitants of Dara and Lybia breed flocks of them—tamed with little trouble—prized for more than feathers in this domestic state—often ridden upon and used as horses—Moore assures he saw a man at Joar travelling upon an ostrich; and Adanson asserts he had two young ostriches, the strongest of which ran swifter than the best English racer, with two negroes on his back—of all animals using wings with legs in running, these by far the swiftest—parts of it convertible to medicinal purposes—eggs, worst of all to be eaten according to Galen—the American ostrich, v. 53 to 58.

Otter of roses, a modern perfume, valued for its vegetable fragrance, iii. 365.

Otter, the link between land amphibious animals, resembles terrestrial in make, and aquatic in living—swims faster than it runs—is brown, and like an overgrown weasel—its description—voracious animal, found near lakes—not fond of fishing in running water, and why—when in rivers, always swims against the stream, to meet rather than pursue the fish it preys upon—in lakes, destroys more than it devours, and spoils a pond in a few nights—tears to pieces the nets of the fishers—two different methods of fishing practised by it—infests the edges of lakes with the dead fish it leaves—often distressed for provision

in winter, when lakes are frozen, and then obliged to live upon grass, weeds, and bark of trees—its retreat the hollow of a bank made by the water—there it forms a gallery several yards along the water—how it evades the fowler—time of coupling—description of its habitation—way of training it up to hunt fish, and, at the word of command, drive them up to the corner of a pond, seize the largest, and bring it in its mouth to its master—to take an old otter alive not easy—few dogs dare to encounter it—marks of its residence—bites with great fierceness, and never lets go its hold—brings forth its young under hollow banks upon beds of rushes, flags, or weeds—manner of taking the young alive—how fed when taken—continues long without food—couples about midsummer in Europe, and brings forth at nine weeks end, three or four at a time—some dogs trained up to discover its retreat—otters met with in most parts of the world—in North America and Carolina found white, inclining to yellow—description of the Brasilian otter, iv. 139 to 146.

Ovaria, two glandular bodies near the womb, resembling the cluster of small eggs found in fowls, ii. 15.

Quarine species of monkeys so called by Mr. Buffon, remarkable for the loudness of their voice, and the use to which they apply it, iv. 212.

Oviparous animals, distinguished from the viviparous, the two classes for generation; all other modes held imaginary and erroneous, ii. 20.

Ourang-outang, the wild man of the wood, an animal nearly approaching the human race, is the foremost of the ape-kind—this name given to various animals walking upright; but of different countries, proportions and powers—the troglodyte of Bontius, the drill of Purchas, and the pigmy of Tyson have received this general name—its description in a comparative view with man—gigantic races of it described by travellers truly formidable—many are

taller than man, active, strong, intrepid, cunning, lascivious, and cruel—countries where found—in Borneo the quality course him as we do the stag, and this hunting is a favourite amusement of the king—runs with great celerity—its description—Battel calls him pongo; assures us that in all he resembles man, but is larger to a gigantic state—a native of the tropical climates—he lives upon fruit, and is not carnivorous—goes in companies; and this troop meeting one of the human species without succour, shew him no mercy—they jointly attack the elephant, beat him with clubs, and force him to leave that part of the forest they claim as their own—is so strong, that ten men are not a match for it—none of the kind taken but very young—one of them dying, the rest cover the body with leaves and branches—a negro boy taken by one of these, and carried into the woods, continued there a whole year without any injury—they often attempt the female negroes going into the wood, and keep them against their wills for their company, feeding them plentifully all the time—a traveller assures us, that he knew a woman of Loango that lived among them for three years—they build sheds, and use clubs for their defence—sometimes walk upright, and sometimes upon all fours, when phantastically disposed—though it resembles man in form, and imitates his actions, it is inferior in sagacity even to the elephant or the beaver—two of these creatures brought to Europe discovered an astonishing power of imitation, sat at table like men, ate of every thing without distinction, made use of knife, fork, and spoon, drank wine and other liquors—the male of these two creatures—being sea-sick, was twice bled in the arm; and afterwards, when out of order, he shewed his arm as desirous of relief by bleeding—another was surprisngly well behaved, drank wine moderately, and gladly left it for milk or other sweet liquors—it had a defluxion upon the
breast

- breast, which encreasing caused its death in the space of one year from its arrival, iv. 177 to 191.
- Ounce*, or *onza*, remarkable for being easily tamed, and employed all over the East for the purposes of hunting, iii. 79—distinguished from the panther, the *orca* of Linnaeus, 236—one at present in the Tower of London, with which the keeper plays without the smallest apprehension, 240—does not pursue by the smell like the dog-kind—manner of hunting with it, 242—the hyena attacks it, and seldom fails to conquer, 318.
- Owl*, description of the common horned-owl—the skreech-owl, and its distinctive marks, v. 78—common mark by which all birds of this kind are distinguished from others—general characteristics of birds of the owl-kind—though dazzled by a bright day-light, they do not see best in darkest nights, as imagined—seasons in which they see best—nights of moon-light the times of their successful plunder—seeing in the night, or being dazzled by day, not alike in every species of this kind—instances in the white, or barn-owl, and in the brown horn-owl—description of the great horned-owl—names of several owls without horns—these horns nothing more than two or three feathers that stand up on each side of the head over the ear—times of making their excursions—places where found in the day-time—father Kircher having set the voices of birds to music, has given all the tones of the owl note, which make a most tremendous melody—sometimes bewildered—what they do in that distress—aversion of small birds to the owl—how they injure and torment him in the day-time—an owl appearing by day sets a whole grove into an uproar—small birds sometimes hunt the owl until evening, when recovering sight, he makes the foremost pay dear for their sport, and does not always leave man an unconcerned spectator—sport of bird-catchers, by counterfeiting the cry of the owl—in what manner the great horned-owl is used by falconers to lure

the kite, when wanted for training the falcon—places where the great horned-owl breeds—its nest, and number of eggs—the lesser owl takes by force the nest of some other bird—number of eggs—the other owls build near the place where they chiefly prey—a single owl more serviceable than six cats, in ridding a barn of mice—an army of mice devoured at Hallontide by a number of strange painted owls—are shy of man, extremely untractable, and difficult to tame—the white owl in captivity refuses all nourishment, and dies of hunger—account of Mr. Buffon to this purpose, v. 123 to 134.

Ox, its eyes are brown, ii. 76—on the fertile plains of India it grows to a size four times as large as the same kind bred in the Alps, 219—one in England sixteen hands high; its growth depends on the richness of pasture, iii. 12.

Oxney, an island near Romney marsh, in what manner produced, i. 257.

Oysters, a horse known to be fond of oysters, ii. 301—surprising manner in which monkies manage an oyster, iv. 213—bivalved shell-fish, are self-impregnated—the particulars in which they differ from the muscle—growing even amidst branches of the forest—have no other seeming food than the afflux of sea-water—they are deposited in beds where the tide comes in, at Colchester, and other places of the kingdom—these said to be better tasted—amazing size of oysters along the coast of Coromandel, vii. 44 to 47—the pearl oyster has a large whitish shell, the internal coat of which is the mother-of-pearl, 51.

P.

Paca, improperly called American rabbit, an animal of South America—its cry, and manner of eating—is most like the agouti, yet differs in several particulars—its description—places where generally found—

- found—its flesh considered a delicacy, and eaten, skin and all, like a young pig—is seldom taken alive, defending itself to the last extremity—persecuted not only by man, but by every beast and bird of prey—breeds in such numbers, the diminution is not perceptible, iv. 50 to 52.
- Pachomac* deserts, where the formidable bird condor is chiefly seen, men seldom venture to travel; hissing serpents, and prowling panthers, being the scattered inhabitants, v. 95.
- Pacific sea*, the winds never change in it, i. 317.
- Pacos*, a kind of camel in South America—its wool very valuable, iv. 293.
- Paddock-moan*, the silence of frogs in dry weather, may serve to explain an opinion, that there is a month in the year so called, in which they never croak, vii. 80.
- Pain*, nothing but repeated experience shows how seldom pain can be suffered to the utmost, ii. 192.
- Painters* never fully imitate that bold relief, which both eyes give to the object, ii. 137.
- Paleness* often the effect of anger, and almost ever the attendant of fright and fear, ii. 85.
- Palm-tree*, its juice drank by the rousette, or the great bat of Madagascar, iv. 133—the elephant eats the shoots, leaves, and branches, to the stump, 242.
- Pambamarca*, mountain at Quito in Peru—a very uncommon meteor seen upon it by Ulloa, i. 357.
- Pangolin*, vulgarly the scaly lizard, is a native of the torrid climates of the ancient continent—of all animals, the best protected from external injury—its description—at the approach of an enemy, it rolls itself up like the hedge-hog—the tiger, panther, and hyena make vain attempts to force this animal, when it rolls itself up like the hedge-hog—its flesh is considered by the negroes of Africa as a great delicacy—it has no teeth—lives entirely upon insects—there is not a more harmless, inoffensive creature

than this, unmolested—cunning in hunting for its prey—chiefly keeps in the obscure parts of the forests—its tongue, when extended, is shot out above a quarter of a yard beyond the tip of the nose—countries where found, iv. 111 to 116.

Panther, it naturally hunts the sheep and the goat, ii. 294— the foremost of the mischievous spotted kind, by many naturalists mistaken for the tiger— the panther of Senegal—the large panther—difference between these two—that of America, or jaguar, compared with the two former, iii. 231 to 234—sometimes employed in hunting—the gazelle, or leveret, are its prey—it sometimes attacks its employer, 241—attends to the call of the jackal, 312.

Pappus observes, the most convenient figures in buildings are hexagons, cells of bees are perfect hexagons, viii. 10.

Par, a peasant, lived to a hundred and forty-four, without being abitemious, ii. 186.

Paradise-bird, few have more deceived and puzzled the learned than this—it is an inhabitant of the Mollucca islands—erroneous reports concerning this bird, and what has given rise to them—the native savages of those islands carefully cut off its legs before they bring it to market, and why—two kinds of the bird of Paradise—their distinction from other birds—the description of this bird—found in great numbers in the island of Aro, where the inhabitants call it God's bird—live in large flocks, and at night perch upon the same tree—are called by some the swallows of Ternate, and, like them, have their stated times of return—their king distinguished from the rest by the lustre of his plumage, and the respect and veneration paid to him—killing the king, the best chance of getting the flock—chief mark to know the king, is by the ends of the feathers in the tail, having eyes like those of the peacock—a number of these birds taken, the method is to gut them, cut off their legs, dry the internal

internal moisture with a hot iron, and fill the cavity with salt and spices, then sell them to the Europeans for a mere trifle—how this bird breeds, or what the number of its young, remains for discovery—for beauty, it exceeds all others of the pie kind, v. 227 to 231.

Parakeets, a kind of parrot of a lesser size, v. 240—of that kind in Brasil, Labat assures us, there are the most beautiful in plumage, and the most talkative birds in nature, 248. See *Parrot*.

Parana, a river in South America, wherewith, at eight hundred leagues from its source, the Plata runs to its mouth, i. 201.

Parasua, name given by the Italians to a fishing line, not less than twenty miles long—baited with ten or twelve thousand hooks, and sunk to the bottom along the coast in the Mediterranean, for that fishing called the *piclago*, vi. 233.

Parasite plants, not able to support themselves, grow and fix upon some neighbouring tree, ii. 9.

Parrot, the middle or second size of the kind, described—the ease with which this bird is taught to speak, and the number of words it is capable of speaking, are surprising—a grave writer affirms, that one of these was taught to repeat a whole sonnet from Petrarch—the author has seen one taught to pronounce the ninth commandment articulately—account of a parrot belonging to king Henry VII. which fell into the Thames, crying, *A boat, twenty pound for a boat*—Linnaeus makes its varieties amount to forty-seven; Brisson extends his catalogue to ninety-five; and the author thinks them numberless—assertion, that the natives of Brasil by art change the colour of a parrot's plumage—peculiarities observed in their conformation—common enough in Europe; will not, however, breed here—loses spirits and appetite during the rigour of winter—instances of sagacity and docility, particularly of the great parrot, called *aicurus*—their

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habits—their nests, and the number of eggs—usual method of taking the young—always speak best, when not accustomed to harsh wild notes—what fruit or grain these birds feed upon, their flesh partakes of the flavour and taste—instances of it—seed of the cotton-tree intoxicates them, as wine does man—wine renders them more talkative and amusing—in France very expert, but nothing to those of Brasil, which Clusius says are most sensible and cunning—natives of Brasil shoot them with heavy arrows, headed with cotton, which knock down the bird without killing it—those of the parakeet tribe are delicate eating—of this kind in Brasil, Labat assures there are the most beautiful in plumage, and the most talkative possible—are restless, and ever on the wing—their habits—their outcry when their companions fall—are very destructive on the coast of Guinea—more than a hundred different kinds counted on the coast of Africa—the white sort called lories—countries where found—one, north of the Cape of Good Hope, takes its name from the multitude of parrots in its woods—a hundred kinds now known, not one of which naturally breeds in countries that acknowledged the Roman power—the green parakeet, with a red neck, was the first of the kind brought into Europe, and the only one known to the ancients, from Alexander the Great to Nero—disorders peculiar to the parrot kind—one well kept will live five or six and twenty years, v. 238 to 251.

Parley, pinks, and birch, hares are particularly fond of, iv. 7.

Partridges, in England, a favourite delicacy at the table of the rich, whose desire of keeping them to themselves has been gratified with laws for their preservation, no way harmonizing with the general spirit of English legislation, and why—there are two kinds, the grey and the red; the grey is most prolific, and always keep on the ground; the red less common, and perches upon trees—the partridge

tridge is found in every country and climate—in Greenland, where it is brown in summer, becomes white in winter—those of Barakonda are larger legged, swifter of foot, and reside in the highest rocks—partridges of all sorts agree in one character, being immoderately addicted to venery; often to an unnatural degree—the male pursues the hen to her nest, and breaks her eggs, rather than be disappointed—the young having kept in flocks during the winter, break society in spring, when they begin to pair; and terrible combats ensue—their manners otherwise resemble those of poultry, but their cunning and instincts are superior—means the female uses to draw away any formidable animal that approaches her nest—the covies from ten to fifteen, and, unmolested, they live from fifteen to seventeen years—method of taking them in a net with a setting-dog, the most pleasant, and most secure—they are never so tame as our domestic poultry, v. 183 to 187.

Passions, most of the furious sort characterized from the elevation and depression of the eye-brows, ii. 77—freedom from passions not only adds to the happiness of the mind, but preserves the beauty of the face, 182.

Pastures, those of Great Britain excellently adapted to quadrupedes of the cow kind, iii. 9.

Patas, by some called the red African monkey—its description, iv. 218.

Paul, (St.) in Lower Brittany. See *Sand*, i. 339.

Paunch, name of the first stomach of ruminating animals, iii. 3.

Pazan, name of the eighth variety of gazelles, by Mr. Buffon, iii. 69.

Peacock, a saying among the ancients, as beautiful as is the peacock among birds, so is the tiger among quadrupedes, iii. 215—varieties of this bird—some white, others crested—that of Thibet, the most beautiful of the feathered creation—our first were

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brought from the East Indies; and they are still found in flocks in a wild state in the islands of Java and Ceylon—the common people of Italy say it has the plumage of an angel, the voice of a devil, and the guts of a thief—in the days of Solomon, we find his navies imported from the East apes and peacocks—Ælian relates, they were brought into Greece from some barbarous country; and that a male and female were valued at thirty pounds of our money—it is said also, that when Alexander was in India, he saw them flying wild on the banks of the river Hyarotis, and was so struck with their beauty, that he laid a fine and punishment on all who should kill or disturb them—the Greeks were so much taken with the beauty of this bird, when first brought among them, that it was shewn for money; and many came to Athens from Lacedæmon and Thessaly to see it—once esteemed a delicacy at the tables of the rich and great—Aufidius Hurco stands charged by Pliny with being the first who fattened up the peacock for the feasts of the luxurious—Hortensius the orator was the first who served them up at an entertainment at Rome; and they are talked of as the first of viands—in the times of Francis I. it was a custom to serve up peacocks to the tables of the great, not to be eaten, but seen; in what manner they served them—its flesh is said to keep longer unputrefied than any other—has a predilection for barley; but, as a proud and fickle bird, there is scarce any food it will at all times like—it strips the tops of houses of tiles or thatch, lays waste the labours of the gardener, roots up the choicest feeds, and nips favourite flowers in the bud—is still more salacious than the cock—requires five females at least to attend him; and the number not sufficient, will run upon and tread the sitting hen—the peahen, as much as possible, hides her nest from him, that he may not disturb her sitting—she seldom lays above five or six eggs in this climate—Aristotle describes her laying twelve—in forests where they

they breed naturally, they are very numerous—this bird lives about twenty years; and not till the third year has that beautiful variegated plumage of its tail—in the kingdom of Cambaya, says Taverner, near the city of Baroch, whole flocks of them are in the fields—description of their habits—Lecoy made use of to catch them there, v. 153 to 158.

Peacock, (sea) a name given, and by which has been described, the Balearic crane, from some resemblance in disposition and manners, v. 346.

Peak, a noted mountain in the Molucca islands. seen far off at sea, swallowed by an earthquake, and a lake left where it stood, i. 150.

Peak of Teneriffe, a volcano, i. 92.

Pearl, an animal substance concreted and taking a tincture from the air—found in all bivalved shells, the inside of which resemble that substance called mother-of-pearl—the formation of pearls a disease or an accident in the animal, is not known—common opinion upon this subject—the pearl bred from no disorder in the animal—*pearl-oyster*, from which the mother-of-pearl is taken—several pearl fisheries—the chief of them in the Persian Gulph, and the most valuable of pearls brought from thence—different sizes, figures, and colours—whence their different colours proceed—pearls converted by time and damps into a chalky powder—wretched people destined to fish for pearls—usually die consumptive—in what manner they fish for them, vii. 45 to 55.

Pearls, in flags, are parts rising from the crust of the beam, iii. 105.

Peasants, the meanest of them in Germany, Poland, and Switzerland kills a cow for his own table, salts and hangs up, and preserves it as a delicacy all the year round, iii. 8.

Peccary, or *tajacu*, an animal a native of America, at first view resembling a small hog—its description—

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tion—has upon the back a lump like the navel in other animals—it consists of glands producing a liquor of an offensive smell—when killed, the parts of geueration, and the glands on the back, must be taken instantly away, otherwise in half an hour the flesh becomes unfit to be eaten—though like the hog in many respects, is nevertheless a distinct race, and will not mix nor produce an intermediate race—is easily tamed—goes in herds of two or three hundred, and unites, like hogs, in each other's defence—delights not in marshes or mud, like our hogs—an unceasing enemy to the lizard, the toad, and the serpent kinds—also feeds upon toads and serpents—any plunderer seizing their young, is surrounded, and often killed, iii. 169 to 175.

Pedigree, the Arabians preserve that of their best horses with great care, and for several generations back, ii. 321.

Pegu, a river called the Indian Nile, because of the similar overflowings of its stream, i. 203.

Pelagii, the Latin name for those shells fished up from the deep—those cast on the shore are the littorales, vii. 12.

Pelican, a ruminating bird, iii. 5—a native of Africa and America; once known in Europe, particularly in Russia—fabulous accounts propagated of it—the description of it, particularly of its bill, and the great pouch underneath, as wonderful—Tertre affirms the pouch will hide flesh enough to serve sixty hungry men for a meal—this pouch placed at the top of the gullet, considered as the crop in other birds—the description of the bird, from father Labat—indolent habits in preparing for incubation, and defending their young—their gluttony scarcely to be satisfied; their flesh rancid, and tastes worse than it smells—use made by the Americans of their pouches—is not entirely incapable of instruction in a domestic state—instances of it—Aldrovandus
mentions

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mentions one believed to be fifty years old, vi. 46 to 54.

Penguin, union between this bird and the albatross, and regularity in their building together, vi. 57—
 a heavy water-fowl—the wings of this tribe unfit for flight; and their legs still more awkwardly adapted for walking—our sailors call them arse-foot—they dive to the bottom, or swim between two waters—they never visit land, but when coming to breed—their colour—are covered more warmly with feathers than other birds—description of the Magellanic penguin—they unite in them the qualities of men, fowls, and fishes—instances of its gluttonous appetite—their food and flesh—are a bird of society—season of laying, and manner of making their nests—some of this tribe called by our seamen the booby—our men first coming among them, were not distrusted nor avoided; they stood to be shot at in flocks, till every one was destroyed—the females let them take their eggs without any resistance—the penguin lays but one egg—in frequented shores—burrows like a rabbit—three or four take possession of one hole, and hatch—one is placed as a centinel to warn of approaching danger, vi. 81 to 88.

Peninsula of India, on one side the coasts are near half the year harrassed by violent hurricanes and northern tempests, i. 324—the people there employ the elephant chiefly in carrying or drawing burthens, iv. 260.

Penpark-hole, in Gloucestershire, twenty-five fathom perpendicular depth—its description, from captain Sturmev, i. 61.

People, so young as fourteen or fifteen often found to cease growing, ii. 72.

Pepper, the Indians prefer that devoured and voided unconcocted by the toucan, before the pepper fresh gathered from the tree, v. 216.

Perch,

Perch, a prickly-finned thoracic fish—its description, vi. 280.

Perfumes, some physicians think all perfumes unwholesome—our delight in perfumes seems made by habit, ii. 166—many bodies at a distance give an agreeable perfume, and nearer have a most ungrateful odour, 167—no perfume has a stronger or more permanent smell than musk, iii. 82—the scent of the martin a most pleasing perfume, 340—some of the weasel kind have a smell approaching to perfume, 353—that of the musk or the civet, is nothing to the odour of the stinkards, 355—in what manner taken from the pouch—more grateful perfume than musk—that of Amsterdamburg the purest of any—is communicated to all parts of the animal's body; the fur impregnated, and the skin also—a person shut up with one of the skins in a close room, cannot support the scent—this perfume sold in Holland for about fifteen shillings an ounce—it has no analogy with the creature's appetite for generation—a proof of it—has its vicissitudes of fashion, like dress, 363 to 366.

Persopolis, pastures in the plains about that place excellent for the purposes of rearing horses, ii. 332.

Persia, snow falls in abundance upon its mountains, i. 334—the horses of that country the most beautiful and most valuable of all in the East, ii. 332—there are studs of ten thousand white mares together, with the hoof so hard that shoeing is unnecessary, 326—description of the Persian horses by Pietro della Valle, 332—the flesh of the wild asses so much liked that its delicacy is a proverb there, 347—an entertainment of wild asses exhibited by the monarch to Olearius, 346—two kinds of asses there, and some of them worth forty or fifty pounds, 354—a noted country for giving long soft hair to the animals bred in it, iii. 196—lions found to diminish in number in this country, 199—the bird of Persia is the common cock of Aristophanes, v. 144.

- Persian Gulph*, a very dangerous wind prevails, by the natives called the sameyel—it suddenly kills those it involves in its passage, and frequently assumes a visible form, darting in a blueish vapour along the surface of the country—the poets of Persia and Arabia have described it as under the conduct of vengeance, who governs its terrors, and raises or depresses it, as he thinks proper, i. 334 — the chief pearl fishery carried on there, vii. 52 — that gulph choaked up in many places with coralline substances, viii. 121.
- Persian kings*, wore their whiskers matted with gold thread, ii. 88.
- Persians* admire large eye-brows, joining in the middle, ii. 70 — divided into two classes, tyrants and slaves, vii. 54.
- Perspiration*, an experiment from which the learned may infer upon what foundation the doctrine of Sanctorian perspiration is built, ii. 101, 102.
- Peruvians*, father Acosta, and Garcilasso de la Vega, make no doubt but that they understood the art of preserving their dead for a long space of time, ii. 250.
- Peter* the Great, czar of Russia, celebrated a marriage of dwarfs—the preparations for this wedding were grand, yet executed in a style of barbarous ridicule, ii. 231.
- Petroceleum*, an injection of this bituminous oil inwardly, and an application of asphaltum without, suffice to make a mummy, ii. 263.
- Pettichaps*, a bird of the sparrow kind, v. 279.
- Phalanger*, a kind of opossum—its description—has been called the rat of Surinam, iv. 232.
- Pharaoh*, (the cat of) name given to the ichneumon, iii. 348.
- Pharaoh*, (the capon of) thought to be the true ibis—a devourer of serpents, and will follow the earavans to Mecea, to feed upon the offal of animals killed on the journey, v. 343.

Phasis, a river of Colchis, in Asia Minor, from the banks of which the pheasants were brought into Europe, and still retain their name, v. 164.

Phatagin, an animal less than the pangolin—the extent of its tail above twice the length of its body—countries where it is to be found, iv. 116.

Pheasants, at first propagated among us, brought into Europe from the banks of the Phasis, a river of Colchis, in Asia Minor, whence they still retain their name—Cræsus, king of Lydia, seated on his throne, adorned with the barbarous pomp of eastern splendour, asked Solon whether he ever beheld any thing so fine? Solon replied, that having seen the beautiful plumage of the pheasant, no other finery could astonish him—description of this beautiful bird—its flesh the greatest dainty,—animals of the domestic kind, once reclaimed, still continue domestic, and persevere in the habits and appetites of willing slavery; but the pheasant, taken from its native warm retreats, still continues his attachment to native freedom; and wild among us, is an envied ornament of our parks and forests, where he feeds upon acorns and berries—in the woods the hen pheasant lays from eighteen to twenty eggs in a season; but in a domestic state seldom above ten—when wild, she hatches and leads up her brood with patience, vigilance, and courage; but when tame she never sits well; and a common hen becomes her substitute; and for leading her young to their food, she is utterly ignorant where it is found—and the young would starve if left solely to her management—it is better left at large in the woods than reduced to its pristine captivity—its fecundity, when wild, is sufficient to stock the forest, and its flesh acquires a higher flavour from its unlimited freedom—its habits, when tame—no birds are shot more easily—when physicians of old spoke of wholesomeness of viands, the comparison lay with the flesh of the pheasant—these birds taken young into keeping, become as familiar as chickens; and when designed for

for breeding, they are put together in a yard, five hens to a cock—their nest in its natural state—the female refusing to hatch the eggs, a common hen supplies her place, and performs the task with perseverance and success—the young difficult to be reared—with what food the young must be supplied—particularities concerning the rearing of the young ones—the method of Longolius, to encrease the breed and make it more valuable—the pheasant will at last be brought to couple with a common hen—many varieties of pheasants; of all others, the *golden pheasant* of China the most beautiful, v. 164 to 170.

Phegium, highest mountains in Ethiopia, swallowed by an earthquake, i. 150.

Pholades, the file-fish, places where these animals are found—their power of penetrating—the pillars of the temple of Serapis at Puteoli were penetrated by them—they pierce the hardest bodies with their tongue—their motion slow beyond conception—have no other food but the sea-water—are accounted a great delicacy, vii. 60 to 64.

Pichincha, a remarkable mountain, near Quito, in South America, i. 140.

Pic, in the class of the pie kind, few, except the pigeon, are of use to man; yet, to each other, no class of birds so ingenious, active, and well-fitted for society—they live in pairs, and their attachments are confined to each other—they build nests in trees or bushes; the male shares in the labour of building, and relieves his mate in the duties of incubation; and the young once excluded, both are equally active in making them ample provision—general laws prevail, and a republican form of government is established among them—they watch for the general safety of every bird of the grove—they are remarkable for instinct and capacity for instruction—instances of it, fetching and carrying untaught, all this tribe are but too fond of—their passion for shining things, and such toys as some of

us put a value upon—rings found in the nest of a tame magpie—the few general characters in which they all agree, v. 194 to 197.

Pic, (sea) breeds in this country, and resides in its marshy parts, vi. 26.

Pigeons, bred to a feather, means a display of art by those persons who employ themselves in rearing pigeons of different colours, ii. 228—are ruminating birds, iii. 5—those that live in a wild state by no means so fruitful as those in our pigeon-houses nearer home—the tame pigeon, and all its beautiful varieties, owe their origin to one species, the stock-dove—colours of the pigeon in a state of nature—the dove-house pigeon breeds every month—the hatching of its eggs—a full explanation of the method of feeding their young from the crop—various names of tame pigeons—attempts made to render domestic the ring-dove, but hitherto fruitless—the turtle-dove a bird of passage—a pair put in a cage, and one dying, the other does not survive—the pigeon called ocoztimtzan is one of the splendid tenants of the Mexican forests—pigeons of the dove-house not so faithful as the turtle-dove—two males quarrel for the same mistress; and when the female admits the addresses of a new gallant, her old companion bears the contempt with marks of displeasure, abstains from her company, or when he approaches is sure to chastise her—instances of two males displeas'd with their mates, who have made an exchange, and lived in harmony with their new companions—near fifteen thousand pigeons may in four years be produced from a single pair—the stock-dove seldom breeds above twice a year—have a stronger attachment to their young than those who breed so often—the pigeons called carriers used to convey letters, not trained with as much care as formerly, when sent from a besieged city to those coming to relieve it—in an hour and a half, they perform a journey of forty miles—the only use now made

- made of them is to be let off at the place of execution, when the cart is drawn away, v. 252 to 261.
- Pigmy*, existence of a pigmy race of mankind founded in error or in fable, ii. 230.
- Pigtail* is the last of the baboons—Mr. Buffon calls it maimon—its description—is a native of Sumatra, not well enduring the rigours of our climate, iv. 202.
- Pike*, the description of this fish, vi. 285—poets have called it the tyrant of the watery plain—instances of their rapacity, 314, *et seq.*
- Pilchards*, little differing from the herring—make the coast of Cornwall their place of resort—the natives sometimes enclose a bay of several miles extent with nets called faines—how directed, some years ago, to know where to extend the nets—they take twelve or fifteen hundred barrels of pilchards at a draught—serve also for manure—advantages of this fishery—money paid for pilchards exported has annually amounted to near fifty thousand pounds, vi. 302 to 304.
- Pillau*, on the Baltic, the shores near that place divided into districts for the sturgeon fishery, and allotted to companies of fishermen, who rent some of them at three hundred pounds a year, vi. 253.
- Pills*, of calcined shells and tobacco, used by the American Indians undertaking long journies, to palliate hunger, ii. 122.
- Pilori*, one of the three distinctions of the musk-rat—it is a native of the West-India islands, iv. 73.
- Pilot* of the shark, name given the sucking-fish or remora, and why, vi. 222.
- Pinch*, name of a monkey of the sagoin-kind—its description, iv. 222.
- Pinks*, hares are particularly fond of them as of parsley and birch, iv. 7.
- Pintada*, or the Guinea hen, its description—different names given to this bird—its habits—the eggs are speckled, v. 171.

Pintail, a kind of duck has the two middle feathers of the tail three inches longer than the rest, vi. 116.

Pipal, the Surinam toad, an extraordinary and hideous creature—its description—the young bred and hatched on its back, vii. 98, *et seq.*

Pipe of the shepherd, the stag seems delighted with its sound, iii. 97.

Pipe-fish, cartilaginous and not thicker than a swan-quill—its description, vi. 262.

Pipes, conducting water, upon what principle they depend, i. 172—why those in London are extremely apt to burst, 173.

Pife-worms, and other little animals, fix their habitations to the oyster's sides, and live in security, vii. 45.

Pit-falls, a wolf, a friar, and a woman taken in one, all in the same night—the woman lost her senses, the friar his reputation, and the wolf his life, iii. 295.

Pithekos, name given by the ancients to the ape properly so called, iv. 193.

Pivot, the razor shell, its motion and habits—is allured by salt, vii. 48, 49.

Placenta, the burden, or that body by which the animal is supplied with nourishment, ii. 37, 38.

Plague, not well known whence it has beginning—is propagated by infection—some countries, even in the midst of Africa, never infected with it—others generally visited by it once a year, as Egypt—not known in Nigritia—Numidia it molests not once in a hundred years—plague spread over the world in 1346, after two years travelling from the great kingdom of Cathay, north of China, to Europe—the plague desolated the city of London in 1665—its contagious steams produced spots on the walls—for this last age it has abated its violence even in those countries where most common, and why—a plague affected trees and stones, i. 306 to 308.

- Plaisne en Anjou*, a village in France, particular account of a dwarf born there, ii. 234.
- Plaisier* of Paris finely powdered boils and heaves in great waves, like water, i. 168.
- Planets*, some of them exceed the earth a thousand times in magnitude—at first supposed to wander in the heavens without fixed paths—perform their circuits with great exactness and strict regularity, i. 3.—lesser planets attendants upon some of the greater, 4.
- Plantane*, preferred by the ass to every other vegetable, ii. 350.
- Plants* and vegetables, will not grow so fast in distilled as undistilled water, i. 155—smell of some so powerful as hardly to be endured, 204—plants, submarine, corals, and other vegetables, covering the bottom of the sea, 269—do not vegetate in an exhausted receiver, 294—but thus ceasing to vegetate, keep longer sweet than when exposed to external air, 295—their juices rarefied principally by the sun, to give an escape to their imprisoned air, 315—a certain plant in Ireland so strongly affected the person who beat it in a mortar, and the physician present, that their hands and faces swelled to an enormous size, and continued tumid for some time after, 305—compared with animals, similitude—how assimilated in different climates and soils, ii. 3 to 7—the sensitive, that moves at the touch, has as much perception as the fresh-water polypus, possessed of a still slower share of motion, 3—many plants propagated from the deposition of birds, v. 281. See *Caraguata*. See *Parasite*.
- Plate*, or *Plata*, a great river in South America—its source and length, i. 201—receives above fifty rivers, 203.
- Platina*, or white gold, the most obstinate of all substances, i. 69.
- Pluers en Champagne*, a town in France, buried beneath a rocky mountain, i. 147.

- Plum*, in his arrangements different from the present, placed the bats among birds, iv. 126.
- Plumonecles*, the sumide, description of this fish, vi. 284.
- Plover*, the green and grey, are birds of passage—the Norfolk plover—season of courtship, vi. 25 to 28.
- Plumage* of the king-fisher preserves its lustre longer than any other, vi. 132.
- Pochard*, a kind of duck, vi. 116.
- Poetry*, our ancestors excelled us in the poetic arts, as they had the first rising of all the striking images of nature, ii. 244.
- Pointer*, a kind of dog, iii. 264.
- Poison*, the most deadly poisons are often of great use in medicine, ii. 12 — fishes often live and subsist upon such substances as are poisonous to the more perfect classes of animated nature—that numbers of fishes inflict poisonous wounds, in the opinion of many, cannot be doubted, vi. 319—the many speculations and conjectures to which this poisonous quality in some fishes has given rise, 319—some crabs found poisonous, 342—the seat where the poison in venomous serpents, vii. 178—the serpent poison may be taken inwardly, without any sensible effects, or any prejudice to the constitution—an instance of it—if milk be ejected into a vein, it will kill with more certain destruction than even the poison of the viper, vii. 182 to 184. See *Fireflare*. See *New Providence*.
- Polar* regions, description of them, i. 10, 11 — and of the inhabitants round them, ii. 196.
- Pole-cat*, a distinct species from the ermine, iii. 331—resembles the ferret so much, that some have thought them the same animal—there are many distinctions between them—warreners assert the pole-cat will mix with the ferret—Mr. Buffon denies it—description of the pole-cat—very destructive to young game—

the rabbit its favourite prey; and one pole-cat destroys a whole warren by a wound hardly perceptible—generally reside in woods or thick brakes, making holes two yards deep under ground—in winter, they rob the hen-roost and the dairy—particularly destructive among pigeons—and feast upon their brains—fond also of honey—ferrelic brings forth in summer five or six young at a time, and supplies the want of milk with the blood of such animals as she can seize—the fur is in less estimation than of inferior kinds, and why—an inhabitant of temperate climates, being afraid of cold as well as heat—the species confined in Europe to a range from Poland to Italy, iii. 336 to 340—pole-cat of America and Virginia are names for the squash and the skink—distinctions of those animals, 353—seizes the flying squirrel, iv. 35.

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Polynemus, description of this fish, vi. 282.

Polypus, very voracious—its description—uses its arms as a fisherman his net—is not of the vegetable tribe but a real animal—examined with a microscope, several little specks are seen like buds, that pullulate from different parts of the body, and these soon appear to be young polypi, beginning to cast their little arms about for prey; the same food is digested, and serves for nourishment of both—every polypus has a colony sprouting from its body; and these new ones, even while attached to the parent, become parents themselves, with a smaller colony also budding

budding from them—though cut into thousands of parts, each still retains its vivacious quality, and shortly becomes a distinct and complete polypus, fit to reproduce upon cutting in pieces—it hunts for its food, and possesses a power of chusing it or retreating from danger, ii. 21 to 23—dimensions of the sea-polypus, and of that which grows in fresh-waters—the power of dissection first tried upon these animals to multiply their numbers—Mr. Trembley has the honour of the first discovery of the amazing properties and powers of this animal—this class of animals divided into four different kinds—method of conceiving a just idea of their figure—manner of lengthening or contracting itself—progressive motion—an appearance of an organ of sight found over the whole body—inclined to turn towards the light—their way of living—arms serve them as limetwigs do a fowler—how it seizes upon its prey—testifies its hunger by opening its mouth—having seized the prey, opens its mouth in proportion to the size of what it would swallow, whether fish, flesh, or insects—when two mouths are joined upon one common prey, the largest swallows his antagonist; but after laying in the conqueror's body for about an hour, it issues unhurt, and often in possession of the prey of contention—the cold approaching to congelation, they feel the general torpor of nature, and their faculties are for two or three months suspended—such as are best supplied soonest acquire their largest size, but they diminish also in their growth with the same facility, if their food be lessened—some propagated from eggs; some produced by buds issuing from the body as plants by inoculation; while all may be multiplied by cuttings to an amazing degree of minuteness—of those produced by buds issuing from the parent stem, should the parent swallow a red worm, it gives a tincture to all its fluids, and the young partakes of the parental colour; but if the latter should seize upon the same prey, the parent is no way benefitted by the capture, all the advantage thus remains with the young—

several

several young of different sizes are growing from its body; some just budding forth, others acquiring perfect form, and others ready to drop from the original stem; those young, still attached to the parent, bud and propagate also, each holding dependence upon its parent—artificial method of propagating these animals by cuttings—Mr. Hughes describes a species of this animal, but mistakes its nature, and calls it a sensitive flowering plant, viii. 109 to 120.

Polypus-coral, the work of an infinite number of reptiles of that kind, viii. 123—in every coralline substance are a number of polypi, 125.

Pomerania, a large part of it covered by the sea, i. 260.

Pongo, name given by Battel to the ouran-outang, iv. 188.

Poppies affect with drowsiness those who walk through fields of them, or are occupied in preparing the flowers for opium, i. 305.

Porcelain, an artificial composition of earth and water, united by heat, i. 154.

Porcupine, as to quills, might be classed among the birds, ii. 287—an enlarged hedge-hog—its description—of all those brought into Europe, not one ever seen to launch its quills, though sufficiently provoked—their manner of defence—directs its quills pointing to the enemy—Kolben relates, the lion then will not venture an attack—feeds on serpents and other reptiles—the porcupine and serpent are said never to meet without a mortal engagement—how it destroys and devours them—of Canada subsists on vegetables—those brought to this country for shew, usually fed on bread, milk, and fruits; do not refuse meat when offered—is extremely hurtful to gardens—the Americans, who hunt it, believe it lives from twelve to fifteen years—during the time of coupling, in the month of September, the males become fierce and dangerous, and often destroy each

other with their teeth—time of gestation—the female brings forth one at a time; she suckles it about a month, and accustoms it to live like herself, upon vegetables and the bark of trees—the female very fierce in the defence of her young; at other seasons, fearful, timid, and harmless—never attempts to bite or any way injure its pursuers—manner of escaping, when hunted by a dog or a wolf—the Indians pursue it to make embroidery with its quills, and eat its flesh—circumstances concerning it remaining to be known—little known with precision, except what offers in a state of captivity—description of one kept in an iron cage—the porcupine of America differs much from that of the ancient continent—two kinds, the couando and the urson—description of both, iv. 101 to 108.

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Porpus, or *porpesse*, a fish less than a grampus, with the snout of a hog—its description and habits—a fishery for them along the western isles of Scotland, in the summer season, when they abound on that shore—live to a considerable age, though some say not above twenty-five or thirty years—sleep with the snout above water—possess, proportionably to their bulk, the manners of whales—places where they seek for prey—destroy the nets of fishermen on the coasts of Cornwall—manner of killing them in the Thames—yield a large quantity of oil—the lean, of some not old, said to be as well tasted as veal—caviar prepared from the eggs of this fish, vi. 200 to 206.

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capable of holding near seven quarts of water, v. 175—of the pelican, hides as many fish as will serve sixty hungry men for a meal, vi. 48—its description, 46, 47.

Poultry, general characteristics of the poultry kind—they live together; and each, conscious of his strength, seldom tries a second combat, where he has been once worsted—kept in the same district, or fed in the same yard, they learn the arts of subordination—the young of the kind, not fed with meat put into their mouths, peck their food—the female intent on providing food for her young clutch, and scarce takes any nourishment at all—among the habits of this class of birds, is the peculiarity of dusting themselves—nearly all domestic birds of this kind, maintained in our yards, are of foreign extraction—the courtship of this kind is short, and the congress fortuitous—the male takes no heed of his offspring—though timorous with birds of prey, he is incredibly bold among his own kind; the fight of a male of his own species produces a combat—the female takes all the labour of hatching and bringing up her young, chusing a place remote from the cock, v. 137 to 142.

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- Prickley-finned fishes*, their description, vi. 277 to 282.
- Primas*, appellation of a first rate animal—Linnaeus bestows it upon the female of the bat, iv. 129.
- Propagation* of gnats, one of the strangest discoveries in natural history, viii. 89—a new kind lately discovered in a most numerous tribe of animals, propagated by cuttings, 94—different manners of that operation in the polypi, to the astonishment of the learned of Europe, 117.
- Propolis*, a resinous gum, with which the bees plaister the inside of their hives, viii. 11.
- Proportion* of the human figure, little known with precision in regard to it, ii. 97—different opinions upon the subject, 98.
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- Psalmodi*, in France, an island in 815, now more than six miles from the shore, i. 258.
- Ptarmigan*, sort of grouse, chiefly found in heathy mountains, and piny forests, at a distance from mankind—size and colour, v. 177.
- Pthiriasis*, the lousy disease, frequent among the ancients—principal people who died of this disorder—plants and animals are infested with diseases of this kind—a vegetable louse from America over-run all the physic-garden at Leyden—the leaf-louse described—the males have four wings, the females never have any—when they perceive the ant behind them, they kick back with their hind feet—three principal and constant enemies to these insects, vii. 250 to 255.
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Rabbits (tame) in a warren, continue exposed to weather, without burrowing—in two or three generations, they find the necessity and convenience of an asylum—various colours of rabbits—the mouse-colour kinds originally from an island in the river Humber—still continuing their general colour, after a number of successive generations—account of their production

production—surprising obedience and submission of descendants to their common parent—the descendants quarrelling, his appearance restores peace and order—sometimes he punishes them, as an example to the rest—other instances of superiority of the common parent—the rabbit generally fatter, and lives longer than the hare—its flesh less delicate—native of the warmer climates—it has been imported into England from Spain—in some of the islands of the Mediterranean, they multiplied in such numbers, that military aid was demanded to destroy them—love a warm climate—English counties most noted for them—delight in a sandy soil—the tame larger than the wild—indulged in too great plenty of moist food, as the feeders express it, are apt to grow rotten—their hair employed in England for several purposes—the skin of the male preferred, iv. 18 to 22.

Rabbit (Syrian) remarkable for the length, gloss, and softness of its hair, iii. 196 and iv. 22—in some places curled at the end like wool, and shed once a year in large masses; and some part dragging on the ground, appears like another leg, or a longer tail—no rabbits natural in America—those carried from Europe multiply in the West-India islands abundantly—on the continent there are animals resembling the European rabbits, iv. 22.

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- Rain-fowl*, the name given in some parts of the country to the wood-pecker, and why, v. 220.
- Rains of blood*, the excrements of an insect at that time raised into the air, i. 364.
- Rams*, it is no uncommon thing in the counties of Lincoln and Warwick, to give fifty guineas for a ram, iii. 41.
- Ranguer*, the name of the ninth variety of gazelles, made by Mr. Buffon, iii. 72.
- Rarefaction of air*, produced by the heat of the sun-beams in countries under the line, being flat and sandy, low and extensive, as the deserts of Africa, i. 321.
- Rats, musk rat*, three distinctions of that species—the *ondatra*, *desman*, and *pilori*—the *ondatra* differs from all others, having the tail flattened, and carried edge-ways—in what they resemble each other—female of the *ondatra* has two apertures, one for urine, the other for propagation—they can creep into a hole, where others, seemingly much less, cannot follow, and why—they resemble the beaver in nature and disposition—manner of life—their houses during winter are covered under a depth of eight or ten feet of snow—the savages of Canada think the musk rat intolerably foetid, but deem its flesh good eating, iv. 73 to 76—*great rat*, called also *rat of Norway*, though unknown in all northern countries—originally from the Levant, and a new comer into this country—first arrival upon the coasts of Ireland, with ships trading in provisions to Gibraltar

Gibraltar—a single pair enough for the numerous progeny now infesting the British empire—called by Mr. Buffon the *surmalot*—its description—the Norway rat has destroyed the *black rat*, or *common rat*, as once called; and, being of an amphibious nature, has also destroyed the frogs in Ireland—great mischief done by the Norway rat—it swims with ease, dives with celerity, and soon thins the fish-pond—the feebler animals do not escape the rapacity of the Norway rat, except the mouse—they eat and destroy each other—the large male keeps in a hole by itself, and dreaded by its own species, as a most formidable enemy—produce from fifteen to thirty at a time; and bring forth three times a year—quadrupedes which have antipathies against the rat—the *black rat* has propagated in America in great numbers, introduced from Europe, and are become the most noxious animal there—its description—*black water rat*, not web-footed, as supposed by Ray—its description—its food—is eat, in some countries, on fasting days—the nux vomica, ground and mixed with meal, the most certain poison, and the least dangerous to kill rats, iv. 61 to 67—the *German rat*. See *Cricetus*.

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to speak like a parrot; and to sing like a man, with distinctness, truth, and humour—amusing qualities, vices, and defects—food in the wild state—places for building nests—number of eggs—will not permit their young to keep in the same district, but drive them off when sufficiently able to shift for themselves—three of the Western Islands occupied by a pair of ravens each, that drive off all other birds with great cries and impetuosity—pick out the eyes of sheep and lambs when sick and helpless—the Romans thought it ominous, and from fear paid it profound veneration—Pliny's account of one kept in the temple of Castor, and flew down into the shop of a taylor—some have lived near a hundred years—in clear weather they fly in pairs to a great height, making a deep loud noise, different from their usual croaking, v. 197 to 203—
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land pound for his conveyance and food—how it was fed—of a gentle disposition, permitted itself to be touched and handled by all visitors, attempting no mischief but when abused, or hungry; no method of appeasing its fury then but by giving it something to eat—when angry, it jumped against the walls of the room with great violence—its age—its food—places where found—in some parts of Asia, these animals are tamed, and led into the field to strike terror into the enemy, but are as dangerous to the employers—method of taking them—some found in Africa with a double horn, one above the other—many medicinal virtues ascribed to this horn when taken in powder, without any foundation, iv. 266 to 271.

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Roe-buck, the smallest of the deer kind in our climate—its description—differs from the fallow-deer, from the stag, and from all the goat-kind—faces the stag, and often comes off victorious—these bucks live in separate families; the sire, dam, and young associate, and admit no stranger into their community—never leaves its mate—rutting season continues but fifteen days, from the end of October to the middle of November—female goes with young five months and a half—produces two at a time, and three rarely—her tenderness in protecting them very extraordinary—names given by hunters to the different kinds

kinds and ages of it—time of shedding its horns—its life seldom longer than twelve or fifteen years; and time not above six or seven—is of a delicate constitution—easily subdued, but never thoroughly tamed—its cry neither so loud nor so frequent as the stag's—hunters easily imitate the call of the young to the dam, and thus allure her to destruction—this animal contented to slake its thirst with the dew on the grass and leaves of trees—prefers tender branches and buds of trees to corn and other vegetables—we have but two known varieties—the flesh of those between one and two years old the greatest delicacy known—more common in America than in Europe—inhabitants of Louisiana live upon its flesh, which tastes like mutton when well fatted—the breed extremely numerous, and the varieties in proportion—found also in Brasil, where called *cuguacuapara*; and in China—its describers there confound it with the musk-goat, though of a different nature, iii. 121 to 129.

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- fects of its sting upon a dog, in an experiment made by M. Maupertuis—experiments made upon other dogs—instances of its irascible nature and malignity—when driven to extremity, destroys itself—instance of it—the male smaller than the female—their chief food—how the common scorpion produces its young—captivity makes it destroy its young—a scorpion of America produced from the egg, vii. 265 to 273.
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cats, to pursue prey, or warn of danger—feeling natural desires, they fight desperately, and the victorious male keeps all to himself—two never fall upon one, each has its antagonist—neither length of time in pregnancy, nor duration of these animals lives yet known—two taken young, after ten years had the marks of age—expert at catching fish—destroy herrings by thousands—swift in deep waters, and dive with rapidity—attacked with stones, they bite at what is thrown, and to the last gasp annoy the enemy—time to surprise them—how the Europeans and Greenlanders destroy them—in our climate they are wary, and suffer no approach—never sleep without moving, and seldom more than a minute—taken for their skin and oil—uses of the skin when dressed—the flesh formerly at the tables of the great—an instance of it—the sea-lion, in Anson's Voyage, the largest of the seal family, iv. 164. to 169.

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- Silks*, brought to Jamaica, and there exposed to the air, rot while they preserve their colour, but kept from air retain their strength and gloss, i. 293—anciently so scarce in Rome as to be sold for their weight in gold; considered such a luxurious refinement in dress, that infamy was attached to wearing stuffs in which it made but half the composition, vii. 378.
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- Slatberg*, in Iceland, there stood a declivity, and the earth of it was found sliding down the hill upon the subjacent plain, i. 148.
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- Sorel*, the hunters name for the buck the third year, iii. 118.
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Squirrels are in heat early in the spring, very diverting to see the female then feigning an escape from the pursuit of two or three males—nature particular in the formation of these animals for propagation—time of gestation—keeps in the midst of tallest trees, and shuns the habitation of men—the tree but touched at bottom, they quit the nest, and fly to another tree; thus travelling with ease along the tops
of

of the forest, until quite out of danger—in Lapland, vast numbers remove from one part to another—method of crossing broad rivers, or extensive lakes—they have a sharp piercing note, and another, more like the purring of the cat when pleased—the Laplanders eat their flesh—description of the *common furt*, and of the *grey Virginian kind*—the *Barbary*; *Siberian white*; *Carolina black*; *Brazilian*; *little ground Carolina*, and *New Spain squirrel*—*flying squirrel* more common in America than in Europe—its food, and mansion, iv. 30 to 35.

Stag, first in rank among quadrupedes; its elegant form described—no obvious difference between the internal structure of the stag and the bull, but to a nice observer—ruminates not so easily as the cow or sheep; reason why—manner of knowing its age—differs in size and horns from a fallow-deer—increase in beauty and stature in proportion to goodness of pasture, enjoyed in security—seldom drinks in winter, and less in spring—different colours of stags—how watchfully he examines an enemy's approach—delighted with the sound of the shepherd's pipe—of animals natives of this climate, none have such a beautiful eye as the stag—beauty and size of horns mark strength and vigour—time and manner of shedding them—severe cold retards the shedding—horns increase in thickness and height from the second year of age to the eighth—shedding his horns, hides himself in solitudes and thickets, and ventures out to pasture only by night—grow differently in stags from sheep or cows—horns found to partake of the nature of the soil—a mistake that horns take colour of the sap of the tree against which they are rubbed—stag castrated when its horns are off, they never grow again; the same operation performed when they are on, they never fall off—one testicle only tied up, he loses the horn of the opposite side—Mr. Buffon thinks the growth of the horns retarded by retrenching the food—horns resembled to a vegetable substance, grafted upon the head of the stag—
time

time of feeling impressions of the rut, or desire of copulation—effects the rut causes—stag lives about forty years—voice in the time of rut terrible; and then keeps dogs off intrepidly—a stag and tiger enclosed in the same area, the stag's defence so bold, the tiger was obliged to fly—the stag in rut, ventures out to sea from one island to another, and swims best when fattest, iii. 86 to 98—the hind, or female, uses all her arts to conceal her young from him, the most dangerous of her pursuers—men of every age and nation made the stag chase a favourite pursuit—stags remaining wild in England, called red-deer, found on the moors bordering Cornwall and Devonshire—manner of hunting stag and buck in England—different names given them, according to their ages—terms used by hunters pursuing the stag—the manner of knowing the track of a stag; and that of a hind—he changes his manner of feeding every month; in what manner—swims against the stream—the antient manner of pursuing him—that of hunting him—and in China—stag of Corfica—a kind called by the antients *tragelaphus*—Germans call it *bran-deer*, or *brown-deer*—a beautiful stag, thought a native of Sardinia, though perhaps of Africa, or the East-Indies—its description—*stag royal*, in Mexico—*of Canada*, brought into the state of domestic tameness, as our sheep, goats, and black cattle, iii. 99 to 114.

Staggard, name of the stag the fourth year, iii. 104.

Stallions, law prohibiting exportation of stallions and mares; and another similar, obtained as early as the times of Athelstan, ii. 339.

Stanislaus, the exiled king of Poland, had a dwarf at his court in Luneville—described, ii. 234.

Stare, bird classed with the thrush; distinction from the rest of its tribe—its residence—its eggs—it is easily taught to speak—its food, v. 287.

Star-fish, general description of the tribe—substance of their bodies almost as soft as water—no way injured by

- by swallowing shells almost of a stony hardness—float upon the surface of the sea, and in the dark send forth a shining light, resembling that of phosphorus—called *sea-nettles*—the passage for devouring food, serves to eject excrements—taken and put into spirits of wine, continue many years entire; but left to influence of air, in four-and-twenty hours melted down into a limpid offensive water—cut in pieces, every part survives the operation, becoming a perfect animal, endued with its natural rapacity, viii. 105 to 107.
- Starling*, time of migration, v. 29—often lays eggs in holes deserted by the wood-pecker, 223—slender-billed bird of the sparrow kind, living upon insects, 279.
- Stars*, fixed, supposed by philosophers suns resembling that which enlivens our system, i. 6.
- Stars*, falling, meteors, or unctuous vapours raised from the earth, kindled and supported in the air, until they fall back extinguished, i. 363.
- Statues of antiquity*, first copied after human form, now become models of it, ii. 97.
- Stature*, middle in men, from five feet five to five feet eight inches, ii. 99—cause of different statures, 218—ordinary of men, Mr. Derham observes, probably the same now as at the beginning—many corroborating proofs of this, 243.
- Stellaris*, name given by the Latins to the bittern, vi. 5.
- Steno*, his opinion about the formation of the incipient animal, ii. 15.
- Stickleback*, the gasterosteus of the prickly-finned thoracic sort; description of this fish, vi. 281—this fish appears in quantities every seventh or eighth year in the river Welland, near Spalding; a man, employed by a farmer to take them, for manuring his grounds, got, for a considerable time, four shillings a day, selling them at a halfpenny a bushel, 304.
- Stigmata*, holes through which caterpillars breathe—
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- famous experiment of Malpighi to verify this, vii. 347, 348.
- Stilicon*, his two daughters betrothed, one after the other, to the emperor Honorius, buried with much finery, found eleven hundred years after, in good preservation, excepting the pearls, vii. 53.
- Stinkards*, name given by our sailors to one or two animals of the weasel kind, chiefly found in America, iii. 352—and by the savages of Canada to the musk-rat, iv. 75.
- Stint*, smaller and shorter billed water bird of the crane kind, vi. 21.
- Stoat*, the ermine, its description, iii. 327.
- Stomach*, nature has contracted the stomachs of animals of the forest, suitable to their precarious way of living, ii. 114—proportioned to the quality of the animal's food, or the ease of obtaining it—those who chew the cud have four stomachs, ii. 291, and iii. 2—yet several of those have but two in Africa, ii. 291—names of the four stomachs—stomach of carnivorous animals small—those of ruminating, strong and muscular—of insects, composed of muscular fibres, iii. 2 to 6—the camel has a fifth stomach, as a reservoir of water for occasional use, iv. 284—birds have, properly, but one stomach, yet this is different in different kinds, v. 14—that of the cuckoo enormous, reaches from the breast-bone to the vent, 234. See *Animals*.
- Stone-chatter*, slender-billed bird of the sparrow-kind, v. 279—migrates, 282.
- Stone of Shammoy*, generally about the size of a walnut, and blackish—formerly in request for the same virtues with oriental bezoar, iii. 64.
- Stones*, shower of stones and other matters raised by storms in one country, carried to another, fall suddenly as showers of rain, i. 364.
- Stork*, a ruminating bird, iii. 5—true difference between it and the crane—are birds of passage—returning

turning into Europe in March—places for their nests—number of eggs—are a month in hatching; and their young excluded, they are particularly solicitous for their safety—their food in a great measure frogs and serpents—the Dutch attentive to the preservation of the stork, in their republic the bird protected by the laws, and the prejudices of the people—countries where found—ancient Egyptians regard for this bird carried to adoration—the ancient ibis supposed the same which at present bears the same name; a bird of the stork kind, about the size of a curlew, v. 340 to 343.

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Stove, its warmth expeditious for hatching, and efficacious in bringing the animal in the egg to perfection, ii. 25.

Strabism, an inequality of sight, and particular cast of the eye; whence it proceeds, ii. 144.

Stream of rivers, more rapid in proportion as its channel is diminished, and why, i. 191—the surface swifter than the bottom, and why—lands, turnings, and other obstacles retard the course but inconsiderably, and why, 192.

Strength, a just way of estimating human strength, by perseverance and agility of motions—not hereditary—prodigies of it in Milo, and also in Athanatus—estimation of strength in Maximin, the emperor, described—instance of it in animals by the bulk of their muscles very fallacious; thin and raw-boned men being generally stronger and more powerful than those seemingly more muscular—women much inferior in strength to men—of man less valuable since the invention of gun-powder, of

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Struthophagi, some nations so called from their fondness for the flesh of the ostrich, v. 55—their method of taking it, 56.

Stuffs made of hair of animals about Angora, iii 54—half composed of silk forbid to be worn at home, as a luxurious refinement, vii. 378.

Stunts, name given to whales at the age of two years, vi. 181.

Sturgeon, a cartilaginous fish, of a considerable size, yet flies terrified from the smallest fishes—its description—three kinds of it—countries of Europe this fish visits at different seasons—annually ascends the largest rivers to spawn, and propagates in vast numbers, enjoying the vicissitude of fresh and salt water, then grows to an enormous size, almost to rival the whale—the largest caught in Great Britain taken in the Elbe, where frequently found weighing four hundred and fifty pounds—places where caught in numbers—never by a bait, always in nets—their food—whence the German proverb, *He is as moderate as a sturgeon*—live in society among themselves; and Gesner has seen them shoal together at the notes of a trumpet—usual time of coming up rivers to spawn—at Pillau the shores formed into districts, and allotted to companies of fishermen, and rented some for three hundred pounds a year—nets in which caught—in the water it is one of the strongest fishes, and often breaks the nets that enclose it, but its head once raised above water, its activity ceases—has broke fishermen's legs with a blow of its tail—two methods of preparing it—that from America not so good as from

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- from the north of Europe—caviar made with the roe of all kinds of sturgeon—manner of making it, vi. 249 to 255.
- Sturmeſy*, the captain who deſcended into Penpark-hole, where remaining five hours, coſt him his life, i. 61.
- Sucking-fiſh*, the remora, ſticks to the ſhark—alſo called the ſhark's pilot, and why, vi. 222.
- Sucking-fiſh*, the echeneis, a ſoft-finned thoracic fiſh, its deſcription, vi. 284.
- Suction*, from whence that amazing power in the lam-prey ariſes, vi. 245.
- Sugar*, the white ſort in the tropical climates ſome-times full of maggots, i. 293.
- Sulphur*, with iron filings, kneaded together into a paſte, with water, when heating, produces a flame, i. 71.
- Sun*, mock-ſuns and other meteors ſeen in the Alps, i. 134—in the polar regions, 352—reflected upon oppoſite clouds, appear like three or four real ſuns in the firmament—real ſun always readily known by ſuperior brightneſs—the rainbow alſo different in thoſe countries, 361, 362—its warmth efficacious in bringing the animal in the egg to perfection, ii. 25—not eaſy to conceive how it whitens wax and linen, and darkens the human complexion, ii. 217.
- Sun fiſh*, an anomalous cartilaginous fiſh, like a bulky head, its deſcription, vi. 258.
- Surf of the ſea*, name the mariners give the riſing waves breaking againſt the ſhore, i. 255.
- Surinam rat*, the phalanger, a ſmall monkey, deſcribed, iv. 232.
- Surinam toad*, the pipal, a hideous toad, its deſcription, vii. 99.
- Surmalot*, with Mr. Buffon, the great-rat, a hateful rapacious creature, deſcribed, iv. 61.

Surmulet, the mullus, a spinous fish, its description, vi. 280.

Swallows, time of their migrations—departure of some, and retreat of others into old walls, from the inclemencies of winter, wrap the migrations of birds in great obscurity, v. 34—experiment of Mr. Buffon to this purpose, 35—with us birds of passage; breed in Upper Egypt and the island of Java, and never disappear, 283—*house-swallow*—characteristics of the swallow-tribe—their food—have the greatest swiftness and agility—at the end of September they depart; some feeble wretched families, compelled to stay, perish the first cold weather—those migrating first seen in Africa in the beginning of October, having performed their journey in seven days—sometimes seen, interrupted by contrary winds, wavering in their course at sea, and lighting upon the ships in their passage—a doubt whether all swallows thus migrate, or some other of this species externally alike, and internally different, be differently affected by the approach of winter—observations made to this purpose by Reaumur, Frisch, and Klein—indicate approaching change of weather—their nests, and those they build on the coasts of China and Coromandel—Chinese pluck them from rocks, and send great numbers into the East Indies for sale—gluttons esteem them great delicacies dissolved in chicken or mutton broth—the number of their eggs, 308 to 315.

Swallows of Ternate, or *God's birds*, the bird of paradise, described, v. 230.

Swammerdam, lent attention to testaceous animals, almost exceeding credibility; has excelled the insects he dissected, in patience, industry, and perseverance, vii. 16.

Swan, a stately web-footed water-fowl; though an indifferent figure upon land, is beautiful in the water—doubt whether the tame kind be in a state of nature—none found in Europe—the wild swan, though strongly resembling it in colour and form, yet another

ther bird—differences between wild and tame swans—considered a high delicacy among the ancients—the tame most silent, the wild has a loud and disagreeable note—from thence called the hooper—accounts sufficient to suspend an opinion of its musical abilities—their food, nest, and number of eggs—a blow with the pinion breaks a man's leg or arm—two months hatching, and a year growing to proper size—longest in the shell of any bird—said to live three hundred years—by an act of Edward IV. the son of the king was allowed to keep a swan, and no others, unless possessed of five marks a year—punishment for taking their eggs, was imprisonment for a year and a day, and fine at the king's will—places which abound with them, vi. 101 to 108.

Swarms of a bee-hive, several swarms in the year, the first always the best and most numerous, viii. 25.

Sweden, affies a sort of rarity in Sweden, ii. 353.

Sweetmeats, in tropical climates, exposed by day in the sun, to prevent their putrifying by the night air, i. 293.

Swift, a bird of the swallow kind; peculiar position of the toes, v. 308.

Swiftness of savages, many surprising stories about it, ii. 105—of the zebra, a proverb among the Spaniards and Portuguese, 362.

Switzerland, the peasants kill a cow for their own table, salt and hang it up, to preserve as a delicacy the year round, iii. 8.

Sword-fish, the xiphias, its description, vi. 277—its terrible encounters with the whale described, 183, *et seq.*

Syagub, called by Mr. Buffon the caracal of the lynx-kind, a native of the East Indies, resembles the ounce in size, iii. 239—met with only in warm tropical climates—used, in the same manner as the ounce, for hunting—called also the lion's provider; and said when it calls him to pursue prey, its voice resembles that of a man calling another—one sent

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Synagushes, carnivorous animals, like the jackall and wolf; hunt in packs, and encourage each other by their cries, ii. 296—its description, iii. 239.

Symmetry, and proportion of the human body, ii. 72.

Sympathetic, affection of yawning, ii. 83.

Synovia, a lubricating liquor in the joints, so called by anatomists, ii. 100.

Syria and *Palestine*, most of their cities destroyed in 1182 by an earthquake, i. 103.

System, in what manner the harmony of our planetary system is preserved, i. 4—very useful in natural history—books containing them, useful to be consulted, but unnecessary to be read—that of Linnæus deserves the preference—faults of systematic writers in natural history, ii, 266 to 269—what has given birth to the variety of systems in natural history, 275. See *Gouan*.

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Tabbies, streaked cats, to which the civet's colour is compared, iii. 362.

Tajacu, the peccary, an animal of the hog kind, peculiar for a lump upon its back, with glands discharging a musky substance, iii. 169.

Tail, use made of it by the whale—is about twenty-four feet broad, vi. 176.

Tails of sheep a foot broad, and weighing from twenty to thirty pounds, sometimes supported by a board upon wheels, iii. 44.

Talapoin, eighth division of monkeys of the ancient continent—its description, iv. 220.

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- Talons*, in what manner produced in animals, ii. 93.
- Tamaim*, a monkey of the second sort of the sagoim kind—description, iv. 222.
- Tamandua*, an ant-bear, larger and smaller, live upon ants—their description, iv. 310, *et seq.*
- Tamis-bird*, one of the names of the Guinea hen, described, v. 172.
- Tanis*, the Don, a principal river of Europe, parting it from Asia, i. 195—affords great numbers of sturgeon, vi. 251.
- Tanrec*, of the hedge-hog kind, different enough to constitute another species—covered with prickles, though mixed with hair—does not defend itself by rolling up in a ball—only found in the East Indies—sleeps several months, and loves to be near water—in the torpid state, its hair falls off—Indians consider its flesh a delicacy, iv. 99 to 101.
- Tapeti*. See *Rabbit* (Brazilian), iv. 51.
- Tapir*, the largest animal of America, no way comparable in size to the elephant of Africa, ii. 305—considered as the hippopotamos of the new continent—its description—resides in the water—its food—its flesh thought a delicacy, iv. 305, 306.
- Tar*, used by the Laplanders for all disorders of the rein-deer, iii. 157.
- Tarantula*, the bite of this animal, and its cure by music, all a deception—instance of it, ii. 157—native of Apulia in Italy—description—its bite not attended with dangerous symptoms—fables of its virulence, vii. 241, 242.
- Tarcel*, name falconers give the male bird of prey; and why, v. 76.
- Tariguagua*, ruggedness of road from it up to the Andes, not easily described, i. 138.
- Tarnassar*, great bird in the East Indies, no other than the condor, v. 95.
- Tarrier*, first division of dogs of the generous kind, used for hunting, iii. 265.

- Tarsier*, a monkey, last of the class of the oppossum kinds—its description—why so called, iv. 233.
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- Tartary*, in general, comprehends great part of Asia—description of natives and manners, ii. 202.
- Taste*, in all substances, on mountain tops, and valley bottoms, i. 313—to determine somewhat upon the nature of tastes, bodies to be tasted must be moistened, or dissolved by saliva, to produce a sensation; the tongue and body to be tasted, being dry, no taste ensues—tastes rendered agreeable by habit—relish of tastes stronger in children than in persons advanced in life—highest epicure has the most depraved taste, ii. 168, 169.
- Tatou*, or armadilla, a quadrupede of the new continent, covered with shells, iv. 116. See *Armadilla*.
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- Teal*, smallest bird of the duck-kind, distinguished, vi. 116.
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- Tijaguacu*, tockay, and cordyle, all of the lizard kind, gradually less, fill up the chasm between the crocodile and the African iguana, vii. 136.
- Tempests*, loudest formed by united contributions of minerals, vegetables, and animals, encreasing the streams of air fleeting round the globe, i. 315—frequent under the tropics, and a space beyond them—tempests of sandy deserts raised in one country, and deposited on another, 332—in Arabia and Africa described, 338.
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- Teneriffe*, (the peak of) computed a mile and a half perpendicular from the surface of the sea, i. 142.
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- Ternate*, a Molucca island, its swallow taken for the bird of Paradise, v. 230.
- Testaceous* substances in variety on the tops of mountains, and in the heart of marble, i. 17.
- Thales* the philosopher, held all things made of water, i. 154.
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Whip-snake, a very venomous serpent of the East, is five feet long, and its bite kills in six hours time, vii. 197.

Whirlpool, manner in which it is formed, i. 247—those of the ocean particularly dangerous, 249—the central point always lowest, and why, 191.

Whirlwind, the most rapid formed by united contributions of minerals, vegetables, and animals, increasing the current of air, i. 315.

Whiskers, a man without them formerly considered as unfit for company in Spain; nature denying, art supplied the deficiency—a Spanish general borrowing money from the Venetians, pawned his whiskers, and took care to release them—part of the religion of the Tartars consists in the management of their whiskers; and they waged war with the Persians as infidels, whose whiskers had not the orthodox cut—the kings of Persia wore them matted with gold thread; and the kings of France, of the first races, had them knotted and buttoned with gold, ii. 88.

Whiston, his reasoning concerning the theory of the earth—finds water enough in the tail of a comet for the universal deluge, i. 26 to 30.

- White*, the natural colour of men, all other tints proceed from greater or lesser heat of climates, ii. 214—among white races of people, our own country bids fairest for pre-eminence, 216.
- White-bait*, shoals appear near Greenwich in July, and seem the young of some animal not come to perfect form, vi. 307.
- White-nese*, the *moustop*, monkey of the ancient continent, a beautiful little animal—its description—a native of the Gold Coast, iv. 220.
- White-throat*, a slender-billed bird of the sparrow kind, living upon insects, v. 279.
- Widgeon*, a variety of the European duck, described, but best known by its whistling sound, vi. 116.
- Wild man of the woods*, the *ouran-outang*, foremost of the ape-kind—this name given to various animals walking upright, but from different countries, and of different proportions and powers—the *troglydite* of Bontius, the *drill* of Purchas, *pygmy* of Tylon, and *pongo* of Battel, have all this general name, iv. 177.
- Wind*, a current of air—artificial—causes assigned for the variety, activity, continual change, and uncertain duration of it—in what manner to foretel the certainty of a wind, as the return of an eclipse—to account for variations of wind upon land, not at present expected—recourse to be had to the ocean, and why—in many parts of the world the winds pay stated visits—in some places they blow one way by day, and another by night; in others, for one half year they go in a direction contrary to their former course; in some places the winds never change—the wind which never varies is the great universal wind, blowing from the east to the west, in all extensive oceans, where the land does not break the general current—the other winds are deviations of its current—many theories to explain the motion of the winds—that of Dr. Lyster—theory of Cartesius—Dr. Halley's more plausible, i. 314 to 319, *et seq.*

Winds (trade) blow from the poles toward the equator—were the surface of the globe sea, the winds would be constant, and blow in one direction—various circumstances break its current, and drive it back against its general course, forcing it upon coasts that face the west—want of a true system of trade-winds, supplied by an imperfect history of them—north wind prevails during October, November, December, and January, in the Atlantic, under the temperate zone—north wind reigns during the winter of Nova Zembla, and other arctic countries—south wind prevails during July in the Cape de Verde islands—north-west wind blows during September at the Cape of Good Hope—regular winds produced by various causes upon land—ancient Greeks first observed them—in general, wherever a strong current of water, there is a wind to attend it—regular wind produced by the flux and reflux of the sea—winds called *monsoons*—some peculiar to certain coasts—south wind constant upon those of Chili and Peru—other winds particular to various coasts, i. 320 to 326.

Winds at land puff by intervals, and why—not so at sea—east wind more constant than any other, and generally most powerful—wind blowing one way, and clouds moving another, forerunners of thunder—cause of this surprising appearance remains a secret—from sea, generally moister than those over tracts of land—more boisterous in spring and autumn than at other seasons—their force does not depend upon velocity alone, but also upon density—reflected from sides of mountains and towers, often more powerful than in direct progression—raise sandy deserts in one country, to deposit them upon some other—south winds in summer, so hot in Egypt as almost to stop respiration, and produce epidemic disorders, continuing for any length of time—leadly along the coasts of the Persian Gulph, and of India—assume a visible form, i. 328 to 335.

Wind-pipe,

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Wind-pipe, in men has a lump not seen in women, ii. 93—makes convolutions within a bird, and is called the labyrinth—this difference obtains in birds seemingly of the same species, v. 13—strange in the throat of the crane, 336—of the bittern, vi. 2—of the wild and tame swan, 102.

Wings of birds, answer fore-legs of quadrupedes—their description—bastard wing, v. 7—flap of a swan's wing breaks a man's leg; a similar blow from an eagle lays a man dead instantly, 8—of butterflies, distinguish them from flies of other kinds—their number and beautiful colours, vii. 364.

Winter, beginning round the poles, the misty appearance of heat in southern climates is there produced by cold, i. 352, 360.

Wistiti, a monkey of the sagoin kind, remarkable for the tufts of hair upon its face, and its annulated tail, iv. 222.

Wolf, a fierce, strong, cunning, carnivorous quadrupede, externally and internally so nearly resembling the dog, they seem modelled alike, yet have a perfect antipathy to each other, iii. 282—principal distinction from the dog is the eye, which opens slantingly upwards in the same direction with the nose, 284—also the tail is long, bushy, hanging lank—the wolf lives about twenty years—is not much with those of his kind, yet hunts in packs with them—quarrelling, they devour each other, 287—is watchful and easily waked—supplied with water, lives four or five days without food, 291—carries off a sheep without touching the ground, and runs with it swifter than the shepherds his pursuers, 292—smells a carcase at a great distance—leaving the wood, goes out against the wind—particularly fond of human flesh—follow armies, and arrive in numbers upon a field of battle, 293—two or three wolves keep a province for a time in continual alarm—distinguished by hunters into young, old, and great wolf—manner of hunting them, 294—
young dogs shudder at their sight,

fight, 286—the wolf killed, no dogs shew an appetite to enjoy their victory, 295—the flesh so very indifferent, no creature eats it but the kind itself—breathe a most foetid vapour from their jaws, 299—often die of hunger, after running mad by furious agitations, 286—season for coupling lasts but fifteen days—no strong attachment appears between male and female; seek each other only once a year—couple in winter, several males then follow one female, dispute cruelly, growl, and tear each other, and sometimes kill that preferred by the female—she flies from all with the chosen when the rest are asleep—cubs pass from one female to the other—time of pregnancy about three months and an half, 288—couple like the dog, and the separation hindered by the same cause—bring forth five or six, to nine at a litter—the cubs brought forth with eyes closed—young wolves play with hares or birds brought by their dams, and end by killing them, 289—able to engender when two years old, 290—wild dogs partake of the disposition of the wolf, 255—the wolf taken young is gentle only while a cub; as it grows older, discovers its natural appetite of rapine and cruelty, 256—experiments prove neither wolf nor fox of the same nature with the dog, but each a distinct species, 276 *et seq.*—France, Spain, and Italy, much infested with them; England, Ireland, and Scotland, happily free—king Edgar first attempted to rid this kingdom, and in what manner, 295—Edward I. issued a mandate to Peter Corbet for the destruction of them—some quite black, some white all over—found in Asia, Africa, and America, 296—in the East trained up for shew, taught to dance and play tricks; one thus educated sells for four or five hundred crowns—in Lapland, the wolf never attacks a rein-deer when haltered—wolves of North America used in hunting, 297—caught in pit-falls; a wolf, a friar, and a woman, taken in one in the same night, 295.

Wolf, (golden) the Latin name for the jackall, iii.
310.

Wolf-fish, the anarbias, its description, vi. 283.

Volga, its length:—abounds with water in May and June; at other times very shallow—the English disappointed in a trade into Persia through it, i. 194—receives thirty-three lesser rivers in its course, 202—has seventy openings into the Caspian sea, 122.

Woman, the body arrives at perfection sooner than in men, ii. 72—the persons of women as complete at twenty as those of men at thirty, 73—the bones, cartilages, muscles, and other parts of the body, softer than in men—a woman of sixty has a better chance than a man of that age to live to eighty—women longer in growing old than men, 183—the shoulders narrower, and the neck proportionably longer than in men, 99—after a catalogue of deformities, Linnaeus puts down the slender waists of the women of Europe, by strait lacing, destroying their health, through a mistaken notion of improving their beauty, 223—less apt to become bald than men; Mr. Buffon thinks they never become bald; there are too many instances of the contrary, 79—in the polar regions as deformed as the men, 197—women of India described—marry and consummate at eight, nine, and ten years old, and have children at that age—cease bearing before the age of thirty—those of savage nations, in a great measure exempt from painful labours, 206—some continue pregnant a month beyond the usual time—those of Africa deliver themselves, and are well a few hours after, 43—remarkable instance of the power of imagination upon the foetus, 225—lower eye-lids drawn downwards when with child—the corners of the mouth also—then likewise high-shouldered—circumstances under which the midwives call them all mouth and eyes, 96—in barbarous countries, the laborious duties of life thrown upon the women, 64,

111—the chief and only aim of an Asiatic is possession of many women, 65—instance, in our country, of a fine woman married to an eunuch, 67—a principal employment of those of Thibet, is reddening the teeth with herbs, and making their hair white, 70—first impulse of savage nature confirms women's slavery; the next, of half barbarous nations, appropriates their beauty; and that of the perfectly polite engages their affections, 112.

Womb, history of the child in the womb, ii. 36—of the hare divided into two, as a double organ, one side of which may be filled, while the other remains empty, iv. 6—description of the false womb of the opossum, 228.

Woodchat, a rapacious bird, third kind of the butcher-bird, v. 122.

Woodcock, bird of the crane kind, its dimensions, vi. 21—food, 23—is a bird of passage—places where it is to be found, 25.

Wood-cock, or *cock of the wood*, of the grouse kind, places which this bird inhabits—how distinguished from other birds of the poultry kind—the delicacy of its flesh—its food and habitation—amorous desires first felt in spring—keeps to the place where he first courts, and continues till the trees have their leaves, and the forest is in bloom.—its cry, clapping of wings, and ridiculous postures in this season—during which the females, attending his call, are impregnated; sportsmen use this time to fire at them, and take many while thus tame, though at others it is most timorous and watchful—the female much less than her mate, and so unlike him in plumage, she might be mistaken for another species—number and size of the eggs—she hatches them without the cock; and when obliged to leave them, in quest of food, so covers them with moss or leaves, it is difficult to find them—she is then extremely tame and quiet—keeps her nest, though attempted to be driven away—the young being hatched, they

run with agility after the mother, though scarcely disengaged from the shell—their food ant's eggs and wild mountain berries—older, they feed upon tops of hether, and cones of pine-trees—are hardy—the clutching time over, the young males forsake the mother; keep together till spring, when the first genial access sets them at variance for ever—fight each other like game-cocks, and easily fall a prey to the fowler, v. 177 to 182.

Wood-louse, its description—has three varieties—where found—how bred—are of use in medicine, vii. 260.

Wood-pecker, of this bird are many kinds, and varieties in each—general characteristics—description of the *green wood-pecker*, or *wood-spite*, called the *rain-fowl* in some parts—feeds upon insects, particularly those in hollow or rotting trees—description of its tongue, the instrument for killing and procuring food—want that intestine, which anatomists call the cæcum—stratagem used by them to catch ants—in what manner they make nests, and how delicate in the choice—number of eggs—nests in warmer regions of Guinea and Brasil—*little wood-pecker*, called by the natives of Brasil *guiratemga*, v. 219 to 227.

Woods, in Britain, cut down by the Romans, and for what reason, i. 267.

Woodward, his essay towards a natural history of the earth, detail of it, i. 24—quoted, 38.

Wool, the Spanish finer than ours; but in weight not comparable to that of Lincoln or Warwickshire—some Spanish wool required to work up with it, iii. 41—of the pacos, most valuable, and formed into stuffs, not inferior to silk; this manufacture a considerable branch of commerce in South America, iv. 293.

Worms, within the body of the caterpillar, devour its entrails, without destroying its life, vii. 377—of different kinds infest each species of fish, vi. 316.

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—*sea-worms* make the shells of fishes their food, vii. 15.

Blind worm, of the serpent kind, its description—lies torpid all winter, vii. 203.

Froth-worm, an insect in that sort of substance on the surface of plants—description of it, vii. 325.

Worm-kind, general description of the *earth-worm*—entirely without brain, but with the heart near the head—in what manner taken—its eggs—nourishment—keeps life in separated parts, viii. 97 to 101.

Wrasse, the labrus of the prickly-finned thoracic kind—description of this fish, vi. 279.

Wren, and *golden-crowned wren*, slender-billed birds of the sparrow kind, v. 279—*willow-wren*, a wandering bird of the sparrow kind, 282—the singing bird admired for the loudness of its note, compared to the smallness of its body, 298.

Wrinkles, whence those of the body and face proceed, ii. 182.

Wry-neck, or *cuckoo's attendant*, a little bird, active in the chase of the young cuckoo, v. 235.

X.

Xiphias, or the *sword-fish*, of the prickly-finned apodal-kind, its description, vi. 277.

Y.

Young people sometimes cease growing at fourteen or fifteen, ii. 72.

Z.

Zealand, inundations there, in which many villages were and remain overflowed, i. 260.

Zebra,

Zebra, the most beautiful, but wildest animal—a native of the southern parts of Africa—nothing exceeds the delicate regularity of its colour—description—watchful and swift—its speed a proverb among Spaniards and Portuguese—stands better upon its legs than a horse—in what countries found—the Portuguese pretend to have tamed, and sent four from Africa to Lisbon, to draw the king's coach—some sent to Brasil, could not be tamed—Merolla asserts, when tamed, they are still as estimable for swiftness as beauty—their noise resembles the confused barking of a mastiff dog—in two, the author saw the skin below the jaw upon the neck hung loose in a kind of dewlap—they are easily fed; some in England eat bread, meat, and tobacco—the emperor of Japan made a present of sixty thousand crowns value, for one received from a governor of Batavia—the Great Mogul gave two thousand ducats for another—African ambassadors to the court of Constantinople, bring some with them, as presents for the Grand Seignor, ii. 357 to 364.

Zebu, the *Barbary cow*, and the *grunting* or *Siberian cow*, are but different races of the *bison*, iii. 22, 30.

Zeiran, name of the fourth variety of gazelles by Mr. Buffon, iii. 68.

Zembla, Nova, north wind reigns there during winter, i. 323—a description of its inhabitants, ii. 196, *et seq.*

Zeus, the *doree*, of the prickly-finned thoracic kind, description of that fish, vi. 281.

Zibet, one of the two species of the civet, according to Mr. Buffon—distinction between them, iii. 361.

Zone, (temperate) properly speaking the theatre of natural history, i. 14.

Zone, (torrid) in the centre the heat very tolerable, in other places the cold painful—temperature and advantages of perpetual spring under it, i. 139—lightening there not fatal or dangerous, 353—has

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the largest quadrupedes—all fond of the water, iii. 26.

Zoophytes, name of vegetable nature endued with animal life, viii. 93—first class of zoöphytes, 97—all the tribe continue to live in separate parts; one animal, by cuttings, divided into two distinct existences, sometimes into a thousand, 102—second class, 105—a new order, a numerous tribe lately discovered, vii. 223.

Zorille, a stinkard, of the weasel kind—resembles the skink—is smaller and more beautifully coloured, iii. 353, 354.

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