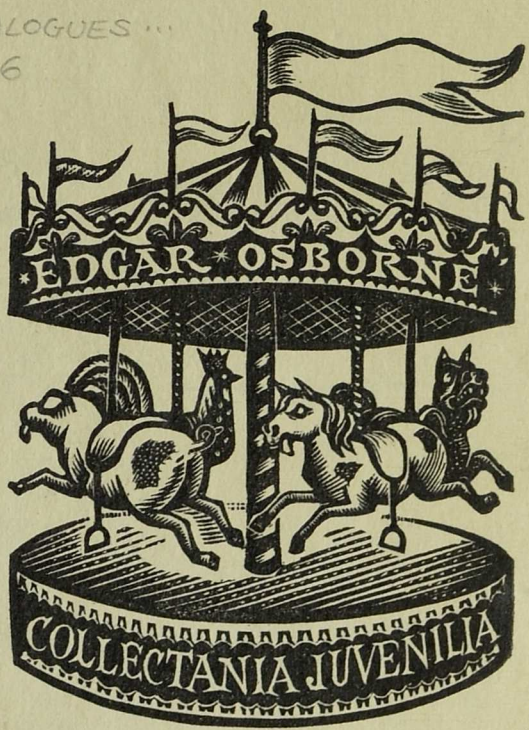


590

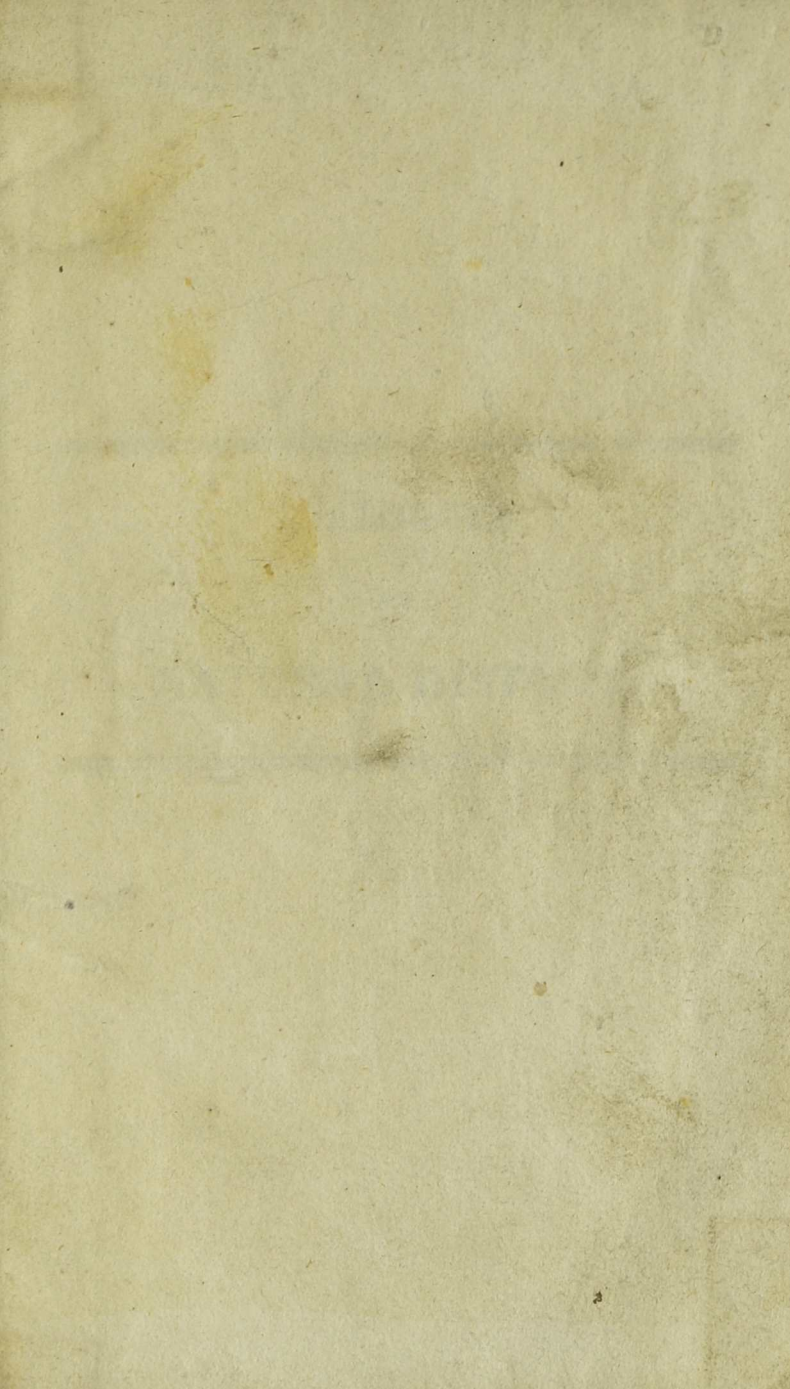
NS
DIALOGUES ...
1816



37131 009 561 747

I, 199

Sold by
MEYLER
& SON,
Churchyard.
BATH.



DIALOGUES
ON
NATURAL HISTORY.

DIALOGUES

OR

NATURAL HISTORY.

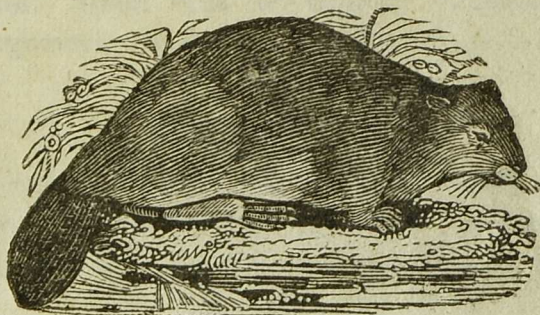
DIALOGUES

ON

Curious Subjects

IN

NATURAL HISTORY.



See page 42.

LONDON:

PRINTED FOR DARTON, HARVEY, AND DARTON,
No. 55, Gracechurch-Street.

1816.

PLANTS

OR

Common Subjects

IN

NATURAL HISTORY.



See page 41.

LONDON:

PRINTED FOR HARTON, HARTY, AND HARTON,
27, St. Dunstons Street.

1810.

CONTENTS.



DIALOGUE I.

	Page.
ON plants and flowers. Their sap-vessels. Roots. Outer skin, or cuticle. Cellular integument. Bark. Lace-bark.....	1

DIALOGUE II.

The Cuckoo. On the seeds of plants. Bladder senna. Sparks from the nasturtium. Silpha vespillo.	6
--	---

DIALOGUE III.

The chameleon. Apparent voluntary motion of plants. Aristolochia clematis. Nepenthes. Sarracenia. Hedysarum movens. Date-tree.	12
---	----

DIALOGUE IV.

The aphis, or leaf-insect. Dragon-fly. The changes which insects undergo. Myrmeleon. Orator mantis.	23
--	----

DIALOGUE V.

	Page.
Gall-nut and gall-insect. Phasma. Animal-cules. Polypus.	29

DIALOGUE VI.

Account of a tame bat. Curious nest of a field-mouse. Water-rat. Care of mice for their young. A tame snake kept by a lady. Tortoise. Owls. Rats of Kamtschatka. Beaver.	35
---	----

DIALOGUE VII.

Migration of swallows and other birds. Solan goose. Rein-deer. Migration of fish. Salmon. Herring. Pilchards. Land-crab. Sea-crab. Soldier-crab.	43
---	----

DIALOGUE VIII.

The camel and dromedary. Elephant.	58
---	----

DIALOGUE IX.

Of bees. The mason-bee. Wood-piercing bee. SpheX sabulosa.	75
---	----

DIALOGUE X.

	Page:
Solitary bee. Anecdote of a wasp. Various habits of bees, wasps, and ants, in different countries. Vegetable wax. Spiders. Water-spider. Stratagems of animals for the preservation of their young. Zebra.	86

DIALOGUE XI.

A bees'-nest made of rose-leaves. The solitary wasp. Water-worm. Earth-worms. Sea-anemone. Ichneumon fly. Instinct. Sea-hedgehog. Pinna. Cancer pinnotheris. Nautilus. Remora, or sucking-fish. Some animals place centinels to give notice of danger. Sagacity of the horse. The Hottentots train oxen to war.	97
--	----

DIALOGUE XII.

Monkeys have centinels to warn them of danger. The ourang-outang. Toads found in stones, &c. Anecdotes of a tame toad. Of muscles. The tellina, or limpet. Spout-fish. Scallop. Sea-urchin. Toad-fish.....	113
--	-----

DIALOGUE XIII.

	Page.
Anecdote of a canary-bird. Of a cat which caught fish. Man-of-war bird. Pelican. Ostrich. Curious sparrows' nests. Stork. Contrivances of birds in India in building their nests. Tailor-bird. Eagle's nest. Formica-leo. Sheep-dog. Anecdotes of the sagacity of dogs.	134

DIALOGUES, &c.

DIALOGUE I.

Marian.

MY dear Charlotte, if you will come and sit with me while I work, I will tell you something I have been reading this morning.

Charlotte. What is it about? Is it a story?

Marian. Not exactly a story; but it is entertaining, and, what is still better, it is improving.

Charlotte. Well, I will come, but first let me call Edward; for as he likes to improve himself, it will give him pleasure to hear it. (*They return together.*)

Marian. Now, Edward and Charlotte, if you will be attentive, I shall be able to amuse you, this wet evening, with a slight history of plants and flowers, which I have collected for your instruction. A plant is an organized body: that is, it possesses parts designed to perform different offices; as, sap-vessels to conduct the nourishment, &c.

Edward. I once heard a gentleman say, that the sap-vessels of a tree answered the same purpose as the blood-vessels of the human body. Look, Charlotte, this is a blood-vessel, or vein, which you see running across my hand. (*He holds his hand to her.*)

Marian. You were right to remember this: the roots of the tree first draw moisture or nourishment from the earth, which is carried through an amazing number of small vessels, even to the very ends of the leaves, which appear to transmit a part of it by means of perspiration, and in some plants this process is very evident. You are well acquainted with the large sun-flowers which grow in the south walk?

Charlotte. Oh yes.

Marian. Well, they are said to perspire seventeen times faster than the human skin.

Edward. How very astonishing! I had no idea that plants perspire. Pray go on, and tell us more about these vessels.

Marian. To begin with greater regularity, I will first mention to you the outer skin, or cuticle, which is colourless and full of pores, either admitting moisture, or suffering it to pass off; though this property varies in different plants. There is one species of the aloe, a leaf of which being cut off, will not dry for several weeks, though exposed to the sun; but the same leaf will readily absorb moisture when immersed in water. This you will think wonderful, when I tell you, that it is a plant produced in hot countries.

Edward. What! do you mean where there is but little rain?

Marian. Yes: and from that circumstance the plant would soon be dried up, if the skin readily parted with the moisture it had obtained.

Edward. That is very curious. I should

like to examine that plant, and see this skin, or———pray what is that other hard name?

Marian. Cuticle. Next to the cuticle is found a substance called the cellular integument; which is the seat of colour, and, in leaves, this is generally green. Under the cellular integument is the bark, containing a great many woody fibres: and in a plant found in Jamaica, these fibres are so fine as to resemble lace, especially when separated from the tree.

Charlotte. How very pretty that must be!

Marian. Before we proceed, pray can you tell me where Jamaica is?

Charlotte. Let me see.—It is one of the West India Islands, where the poor slaves cultivate the sugar-cane; and it is in this island too, that this beautiful lace-bark is produced.

Marian. In the bark, the peculiar virtues or qualities of particular plants chiefly reside, and more especially in the inner part: here we find the resin of the fir, the oil of the cinnamon, &c. Next to the bark is the

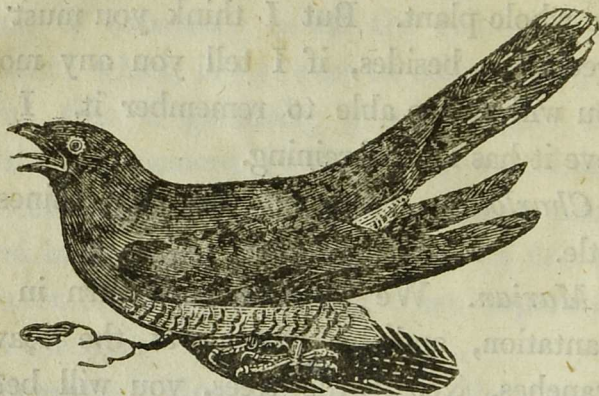
wood, which forms the principal bulk of the tree; and beneath that is the pith, appearing to be that part which gives life and vigour to the whole plant. But I think you must be tired now: besides, if I tell you any more, you will not be able to remember it. I believe it has left off raining.

Charlotte. Yes, and the sun shines a little.

Marian. We will take one turn in the plantation, and by looking at the leaves, branches, &c. of the trees, you will better understand what I have been telling you.

[*They go out.*]

DIALOGUE II.



CUCKOO.

Charlotte.

HOW pleasant it is to hear the cuckoo sing. I fancy the bird has a nest in that grove.

Marian. I differ from you. The cuckoo does not hatch its own egg, but lays it in the nest of a small bird, as the wagtail or hedge-sparrow. Walk onwards, we shall probably hear the nightingale. Go to that row of peas, Edward, and pull one. (*He brings it to her.*) Now, you observe that

the seed has just burst. That part at the lower end will produce the root, whilst the shoot at the top, called the *plumula*, expands into the leaves, &c. of the plant. You have seen seeds before they were put into the ground?

Edward. Yes, I have seen many; but you would not suppose those little things could produce large trees and plants.

Marian. No; but as you advance in gaining knowledge, new wonders will open to you. The number of seeds produced by one plant is very astonishing. A single tobacco plant is said to have yielded three hundred and sixty thousand seeds. You have seen the ferns, which grew on the common going to grand-papa's?

Charlotte. Yes, I remember gathering some; and there were a great many seeds.

Marian. They were numerous, indeed: I believe a million on a leaf. Like the other works of Nature, the formation of seeds displays the great wisdom of their Divine Author. We must not suppose, that this amazing number of seeds was produced

merely for the purpose of being scattered about: they probably become the food of many birds and insects. Some seeds are wrapped up in down, as those of the rose and cotton plant; and we are just coming to the bladder senna. Pick some of the bladders. Now you perceive that these seeds are enclosed in this bladder, the breaking of which seems to have amused you.

Charlotte. May I snap some more? I did not know that these bladders held the seeds.

Marian. We will now look at the dandelion seeds. You see they have little wings, which are designed to waft them from place to place; and there is a very curious plant, which does not grow on the ground, but on the branches of trees. Its seeds are furnished with long threads, which wind round the branches, and hold them fast till they can take root.

Edward. What is that plant called? I should like to meet some of these seeds flying about.

Marian. It is called *tillandsia*. Pray,

Charlotte, have you ever observed the little brown things in apples and pears?

Charlotte. Yes: the pips you mean.

Marian. They are the seeds, which are enclosed in the covering of the pulp, and are thus carefully preserved from injury.

Edward. But I think the peaches and nectarines are still better guarded, for they have a stone to cover the seed.

Marian. They are indeed well protected; but when put into the ground, we find that this shell decays and opens, to allow the kernel to burst and shoot forth roots and branches. The seed-vessels of plants are very curious. Before the seeds are ripe, they serve as coverings, and when they are ready to be dispersed, they assist the process in different ways. Seeds are often driven to great distances. I have heard of seeds floating on the sea till they came to land, perhaps a long way off, where they have taken root and flourished. Do you see how that convolvulus is shutting up its blossoms! It is the case with many flowers at night, or on the approach of rain.

Edward. Ah! I remember seeing a flower, which the gardener told me was called the old man's weather-glass.

Marian. It is named so from its always closing the petals when rain is approaching; and this is a curious instance of the care necessary to preserve the finer parts of plants from the injuries of the weather. But look there, do you see those little sparks, which seem to come from the nasturtium?

Edward. Yes, I see something bright: what can it be?

Marian. These sparks are sometimes seen proceeding from this flower when twilight approaches: indeed, it is probable that they might be perceived in the day, if it were not for the superior light; but as that declines, and the sun sets, they become apparent.

Charlotte. What is the use of these sparks.

Marian. They are supposed to be a defence to the plant, by preventing insects of different kinds from approaching it. But the evening is closing in. To-morrow, if you

like it, we will take a longer walk, and have some further conversation upon flowers.

Edward. We should like it very much indeed; particularly if you can show us the flowers you are telling us about.

Charlotte. Take care, Edward, you will tread on that black insect.



SILPHA VESPILLO.

Marian. What have you there? Oh, I see! it is the *silpha vespillo*, or Carrion Beetle. A dead mouse or mole is often buried by the industry of four or five *silphæ*, in the space of twenty-four hours. After having deposited their eggs on its body, they scoop out the earth all round and

below the animal, which gradually sinks down; and while the agents are invisible, their effects may be seen by the disappearance of the body. Go into the house now, and amuse yourselves till the hour of rest.



DIALOGUE III.



CHAMELEON.

Edward.

MY father gave me a fable to read this morning, which amused me very much. The subject was the positiveness of three men, respecting the colour of a chameleon which they had seen. Is there really such a creature, that has the power of changing its own colour?

Marian. Yes: some persons have sup-

posed that this change takes place when the animal is irritated; others, that it receives its colour from the object beside which it placed. It lives on trees, and feeds on insects. I have now a very agreeable thing to propose to you, Edward and Charlotte.

Charlotte. Pray what is that?

Marian. A walk to Mr. Symon's greenhouse. I have asked his permission to show you some curious flowers, which he has in bloom at this time.

Edward. Oh! we shall be very much obliged to you; for I like better to see the flowers, because then I understand and remember the wonderful things you tell us.

Marian. As we walk I will explain to you something of the means employed by nature, to protect flowers during sleep. The leaves of the chickweed are situated opposite to each other in pairs: during the night they rise perpendicularly, and, closing round the flower, defend it from injury. The leaves of the nightshade, which you have often seen, are quite straight during the day, but, at night, they rise and cover the flowers.

The Egyptian vetch erects its leaves during the night, in such a manner, that each pair seems to be one leaf only. The leaves of the white lupine, in the state of sleep, hang down, and protect the young buds from being injured by the nocturnal air.

Charlotte. What is the meaning of *nocturnal*?

Marian. That I will leave Edward to explain, as he is a Latin scholar.

Edward. I believe it comes from the word *nocturnus*, and means, of, or belonging to, the night. So this was night-air. Do you understand, Charlotte.

Charlotte. Quite well, thank you, Edward.

Marian. There are many plants which seem to have voluntary motions, that are conducive to their benefit. When trees grow near a ditch, and the roots, by proceeding in a certain direction, would touch the water, they will sink below the level of the ditch, then shoot across, and reach the soil on the opposite side.

Charlotte. That is very curious.

Marian. But what I am going to tell you is still more so. A tree grew on a high wall, but that being a situation which afforded no nourishment to the roots, they struck downwards, a distance of sixteen feet, to the earth, and, after having entered it, spread out into many branches. But before the tree could derive moisture from the earth, no branches shot out from the main one, which continued in a straight line, till it found the means of nourishing the tree. If a vessel of water be placed within six inches of a growing cucumber, in twenty-four hours the cucumber alters its direction, bends its branches either to the right or left, and never stops till it reaches the water.

Edward. I should like to try that experiment, for I can hardly believe all these things.

Marian. That you can easily do, by asking the gardener to let you put a pan of water under the frame. You may also try another, which will show you the very quick growth of the asparagus. Before you go to bed, mark a certain head with a bit of chalk,

and, as there has been rain to-day, I dare say you will find that it has grown an inch by the morning. But we will now go into the green-house.

Charlotte. Oh, dear! how very beautiful! Why I should think there was every kind of flower here.

Marian. Oh no, you are quite mistaken: but we will begin regularly, and I will give you some account of the most curious. This is the *aristolochia clematis*: the stamens and pistil of this flower are enclosed in the bottom part, which is round. Now, in order to bring the seed to perfection, it is necessary that the pollen, or fine dust, which covers the tops of the stamens, called anthers, should be conveyed to the part of the pistil called the stigma; but, as the stigma is *above* the anthers, this would be impossible, were it not for the interference of a little insect, called *tipula pennicornis*, which enters the flower by the tubular part; but, as the inside is covered with hairs, it is prevented from escaping till the corolla fades, and while he

has been pacing about his prison, he has rendered essential benefit, by brushing the pollen into the stigma. Thus, you see, an insect is made the means of fertilizing the flower; for if the dust were not scattered on the stigma, the seeds would not ripen.

Charlotte. I am very much pleased with that. But pray what is this, resembling a little pitcher?

Marian. It is the *nepenthes*. Each leaf terminates in a sort of close shut tube, like a tankard, holding an ounce or two of water, which rises through the footstalk of the leaf, whose spiral, coated vessels are uncommonly large and numerous. The lid of this tube either opens of its own accord, or is easily lifted up by insects and small worms, which are supposed to resort to these leaves in search of a refreshing beverage. Various little worms and insects crawl into the orifice, and die in the tube, except a certain *squilla*, or shrimp, which lives there, and, it is very probable, feeds upon these dead insects.

Edward. Well, that is the most wonderful flower I ever saw!

Marian. But look at this, which is called *sarracenia*. Its leaves form a kind of tube, which is filled with water, and you will see how this tube is employed by an insect called ichneumon. This creature has been seen to draw several large flies, and, with some difficulty, forcing them under the lid or cover of its leaf, to deposit them in the tubular part, which was half filled with water. All the leaves, on being examined, were found crammed with dead or drowning flies. The *sarracenia purpurea* is generally observed to be full of putrified insects, whose scent is perceptible as we pass the plant.

Charlotte. I see two flies in now! but why do not they crawl out before they are quite drowned?

Marian. Do you not perceive that the margins of its leaves are beset with inverted hairs, or those that bend inwards, like the wires of a mouse-trap, which render it very difficult for any unfortunate fly that has fallen into the watery tube, to crawl out again. Probably, the air from these dead flies may be beneficial to vegetation, and, as

far as the plant is concerned, its curious construction may be designed to entrap them, while the water is provided to tempt as well as retain them.

Charlotte. Pray, Marian, what is that plant which is shaking about so?

Marian. It is called *hedysarum movens*, and is a native of the East Indies. The motion you perceive in its leaves is supposed to be caused by the influence of the sun; for, when it shines, the leaves are seen to move briskly about in all directions, but during the night, or when the weather is cloudy, they are quite still.

Charlotte. I think that the leaves of the aspen trees in the grove, shake something like these.

Marian. Yes; the leaves of the aspen, like these, are hung on long foot-stalks, and thus are easily moved.

Edward. May we try to find one of those fly traps?

Marian. There is one at the other end of the green-house. (*They walk to it.*) You perceive that its leaves are jointed, and furnished with two strong rows of bristles.

Their edges also are supplied with little vessels, which contain a sweet liquor; and thus flies are enticed to alight on the leaves, which immediately close, and squeeze the poor animal to death. Take this pin, Charlotte, and touch the leaf.

Charlotte. Dear me, it has closed directly!

Marian. This is the way. These leaves cover the flies, which come to their edges to drink the sweet liquor, and, being thus entrapped, they are destroyed. But we must now go home, for it is getting late. As we walk I will tell you something about the date tree, of which I was reading last night, in Mr Clarke's Travels. It is chiefly found in Africa; and, in those dreary deserts, it presents a supply of salutary food for men and camels. The mere circumstance of its presence, at all seasons of the year, is a never-failing indication of fresh water near its roots, and thus may direct the weary traveller to the means of allaying his thirst, or that of his camels. The stem is full of knots, which are exactly adapted to the reception of the

human feet and hands, which makes the climbing it easy. Its extensive uses are felt in many parts of the world. A considerable portion of the inhabitants of Egypt, Arabia, and Persia, subsist almost entirely on its fruit. They boast, also, of its uses in medicine. Their camels feed upon date stones. From the leaves they make couches, baskets, bags, mats, and brushes. From the branches they make cages for poultry, and fences for gardens: from the fibres of the boughs are manufactured ropes and rigging: from the sap is prepared a spirituous liquor; and the body of the tree furnishes fuel. But I shall not tell you any more of these curious things just now, lest you should not remember them. To-morrow I shall have many anecdotes to relate, respecting some species of animals.

Charlotte. Oh! I shall like that. I am sure we will take care to remember these things, and then you will be so kind as to tell us some more. But Mary is come for me, so good night, my dear sister, and I am very much obliged to you for all this entertainment.


~~~~~

DIALOGUE IV.

~~~~~

Edward.

PRAY, Marian, can you tell me the name of this curious little insect, which I have found on a currant leaf.

Marian. Yes, I believe I can: it is the aphis, or leaf insect, and is very destructive to those plants it infests. Do you not know that the gardener sometimes smokes tobacco in the green-house?

Edward. Yes, I have smelt it very strong there.

Marian. This is to destroy the aphis, which would otherwise be injurious to the tender plants. Can you tell me what is the plural of *aphis*? Remember, that it is a Latin word, increasing in the genitive case?

Edward. Well, then I think it must be *aphides* in the plural nominative.

Marian. Right. I am much pleased to find that you can make your learning of some use; for you perceive, that if you had not learnt the Latin grammar, you could not have found out the proper plural of this word. But to return to some further particulars of the aphides, one of the most curious of which is their rapid increase. It is said, that one insect will produce, in five generations, five hundred and ninety-four million, nine hundred thousand others.

Charlotte. But then the world would be overrun with them.

Marian. Oh no! you are mistaken; they have a great many enemies to contend with. Your favourite, the pretty little lady-bird, lives upon them, and they form the food of small birds.

Charlotte. I never thought of that: but, Marian, since you are talking of insects, will you tell us something about the beautiful dragon-fly we saw yesterday, when we were walking, for you were in a hurry then?

Marian. I think I can tell you something about that, at which you will be very much surprised. You do not know that this insect, which you have seen flying about so swiftly, was once an inhabitant of the water.

Charlotte. No, indeed, I should not have guessed that; nor do I quite know what you mean.

Marian. Almost all insects undergo some changes. The silk-worm, you know, becomes a chrysalis, and afterwards a moth; and this beautiful dragon-fly was once an ugly kind of worm. The finest species generally appear about the end of summer. They are nearly three inches from head to tail, and the wings, when expanded, measure almost four inches. These are the most curious as well as beautiful part of the insect. The fineness of the fibres you remarked with astonishment, and you saw that it could use these wings in the swiftest flight, without injury. There is another curious insect, something like the dragon-fly, called the myrmeleon, which deposits its eggs in dry, sandy situations; and

the young larvæ, when hatched, begin separately to prepare their abode, by turning themselves rapidly round, making a small, conical cavity. The little animal conceals itself, suddenly rushing forth, at intervals, in order to seize any small insect, which, by approaching the edge of the hole, has been so unfortunate as to fall in. After sucking its juices, the creature will make a sudden exertion, and throw it to a considerable distance.

Charlotte. How very curious! But what is the meaning of *larvæ*.

Marian. It is the first state of the insect after it is hatched, and is something like a worm or caterpillar. The word is spelt *larva* in the singular number. This myrmeleon is furnished with a pair of forceps, or claws, which answer the purpose of hands, and with which it shovels out the sand from its dwelling, sometimes to the distance of a foot beyond the brink. When full grown, and ready to change into a chrysalis, the animal envelopes itself in a round ball of sand, stuck together and connected by a very fine silk:



ORATOR MANTIS.

with this silk it also lines the inside of the ball, which, if opened, appears coated by a fine pearl-coloured tissue.

Charlotte. I wish I could find one of these curious nests.

Marian. That I am afraid you are not likely to do, as the myrmeleon is not a native of England, though it is found in France, and other parts of the Continent. In some parts of the European continent, an insect,

called *orator mantis*, is found. It is perpetually resting on its hind legs, and bringing its fore feet together with a quick motion, as if in the act of praying. The country people look upon the insect as almost sacred, and would, on no account, injure it.

Charlotte. Well, if you have finished about that insect, I wish you would give us the history of some others, for I think it is very entertaining. Do not you, Edward?

Edward. Indeed I do; and if Marian will go with me, I can show her, on a young oak in the plantation, a little ball, which, I believe, is made by an insect.

Marian. We will now go to tea; and afterwards I shall have pleasure in telling you what I know about this ball, and the creature which made it.


~~~~~  
 DIALOGUE V.  
 ~~~~~

Marian.

NOW, my dear children, we will examine this curious gall-nut. In that part of the leaf in which the female gall-insect makes a hole, for the purpose of depositing an egg, she discharges a peculiar fluid, which, by preventing the sap from passing in its natural course, causes a gradual enlargement, which becomes the habitation of the future insect, when hatched from the egg deposited there by the mother. In the autumn this caterpillar, or larva, changes into a fly, and gnaws a passage through the ball. These gall-nuts form one of the ingredients of ink, and are also used in medicine.

Edward. Ah! I see that many things are useful which I did not think so; for papa lent me a picture-book the other day, in

which I saw a May-fly, and I thought I should like to know its nature, which induced me to look at the reading, and there I found, that they are so abundant in Carniola, that they are used as manure, and carried in cart-loads by the farmers. Will you have the goodness to tell me where Carniola is?

Marian. It is a province of Germany, adjoining to Hungary. You will not forget to look on the map for it, when we return. You may also find the island of Amboyna, which is one of the Moluccas, in the Eastern Ocean, producing a very curious insect, called *phasma*. Its outside wings are so much like the leaves of trees, as to be taken for them, and provide for the security of the animal, by defendiug it against the attacks of birds: they prove useful, also, by preventing the creatures it lives on from being aware of its attack.

Edward. Pray, Marian, is animalcule the name of an insect? for I heard Mr. Johnson talking about it the other day, and could not quite understand him.

Marian. Animalcules, my dear, are gene-

rally very minute creatures, inhabiting different liquids. After you left the room, he gave me a curious account of one called the sloth; and, if you like it, I will try to remember what he said.

Edward. Oh, I should like it very much indeed.

Marian. The person who discovered it, had procured some water thickened with sand, which contained another animalcule, called the wheel-animal. In this water, by the help of a good microscope, he observed a yellowish animal, with six legs; its tail was furnished with four hooked filaments, which served to attach it to any particular place; the limbs were provided with small shining claws: but the most curious particular relating to this animal is, that its life may be restored after it is apparently dead. If all the water be taken off, the creature will become quite dry, but, on again immersing it, it will recover life, and, beginning to move, in a short time, be as active as ever.

Edward. How very extraordinary!

Marian. It is, indeed, wonderful; and

this may be repeated several times, though the animal appears to lose some portion of its activity every time it is dried. Mr. Johnson also told me about another animalcule, which is a little worm, or eel. The head and adjoining part of the body are very transparent, and of a shining silver colour. The tail is the same, but the intermediate part is dark, and marked with lines, like rings, round it. This creature also dries and seems quite dead when out of water, but revives when wetted. It will even submit to this drying and wetting nine times, but, after that, it will not revive. Do you remember, Edward, that we heard Mr Johnson, one day, talking about an animal called the polype?

Edward. Yes: it is an inhabitant of the water, and is a wonderful creature.

Marian. It has no inside, but may be turned out like a glove, without injury. It multiplies by splitting lengthwise. In twenty-four hours, these divisions, which adhere to a common stalk, separate again, and form four distinct animals. These four split



POLYPUS.

again in an equal time, and thus they proceed, doubling their numbers daily. The young afterwards separate from the parent stock, attach themselves to the roots or leaves of aquatic plants, and each individual gives rise to a new colony. There is a species of animalcule, with a beak, or horn, on the fore part of its body, which was found in an infusion of hemp-seed, which also multiplied by division. When going to divide, it attaches itself to the bottom of the infusion, contracts its body, which is naturally oblong, into a round form, so that the beak entirely disappears. It then begins to move briskly round, sometimes from right to left,

sometimes from left to right, but still the centre remains fixed. After a time, the motion becomes quicker, and, instead of a uniform circle, two cross-like divisions begin to appear. Soon after, the creature is greatly agitated, and splits into four animalcules, perfectly similar, though smaller than that from which they were produced. These four increase to the usual size, and, in their turn, subdivide again. Many animalcules will continue to grow after they have been divided. Thus, if one be cut into two parts, those two parts will form into perfect creatures. The common earth-worm will survive this mutilation.

Edward. But how very cruel!

Marian. Yes; I should be sorry that you should try the experiment. Many cruel things have been done by philosophers, who have been anxious to make discoveries; but you can gain all the results from their books, without being obliged to torture any poor creatures, which would give me great concern.

DIALOGUE VI.

Marian.

AS you have been attentive this morning, I shall amuse you with some very pretty anecdotes, which I read after you went to bed last night, and which I endeavoured to remember, for your pleasure and improvement.

Edward. Pray do, for I like your anecdotes very much, particularly if they are about animals.

Marian. The first is an account of a tame bat, which would take flies out of a person's hand. If any thing was given it to eat, it would bring its wings round before the mouth, hovering, and hiding its head, in the manner of birds of prey when they are feeding. It would not eat the flies' wings, but always cut them off, and threw them away.

Bats drink on the wing; that is, when flying over water, dip down to it, in the same manner as you may have observed swallows do.

Edward. Yes, I have seen many swallows fly over the pond; but I thought they went to find more insects.

Marian. So they do: but, at the same time, they often dip close to the water, for the purpose of drinking.

Charlotte. Well, please to go on with your anecdotes.

Marian. You are in too great a hurry: you will hardly let us understand the first. The next thing I met with, was an account of a curious nest, made by a little field-mouse. It was found hanging to the head of a thistle, and was made of blades of wheat, platted most curiously. It was perfectly round, and about the size of a cricket-ball; and the opening so ingeniously closed, that there was no discovering in what part it had been placed. So compact and well fitted was it, that it would roll across the table without being discomposed, though it con-

tained eight little mice that were naked and blind.

Charlotte. But, pray, how did the mother feed them?

Marian. That seems rather difficult to answer. We can only suppose, that she made an opening, and closed it again when their hunger was satisfied.

Edward. I never heard of any thing so ingenious!

Marian. These mice often build in corn-ricks. They are the smallest quadrupeds known in this island. A gentleman measured one, and found it to be two inches and a quarter from nose to tail, and the tail itself two inches. Two of these very little mice, in a scale, weighed down one old copper halfpenny, which is equal to the third part of an ounce.

Edward. How very small they must be! I wish I could find a nest!

Marian. But if you did find one, I should not approve of your taking it; though I grant that a wish to see one is a laudable curiosity. There was another nest, the

habitation of a water-rat, which was discovered by a ploughman. It was formed of grass and leaves; and at one end was more than a gallon of potatoes, regularly stowed, on which it was to have supported itself during the winter. It was no less curious, that this amphibious rat should choose a spot at a considerable distance from any water: perhaps it might be influenced by meeting with potatoes to form its winter store. Pray, Charlotte, do you know the meaning of the word *amphibious*?

Charlotte. I think I do. Does it not mean an animal which can live either in the water or on land?

Marian. That is quite right. The great injury done to vegetation by rats, arises from their making burrows beneath the soil, and feeding on the roots of a great many vegetables. Some newly planted apple-trees were taken out of the ground, with the whole of the smaller roots eaten, and the larger ones peeled, by these creatures. They will also destroy young ducks, rabbits, &c. Field-mice are equally mischievous: they

form little granaries of corn, some of which have been found to contain nearly a hatful of grain. Water-rats display great ingenuity in the construction of their nests, which have two openings, one above the water, and the other beneath. If they cannot conceal the upper one amongst the weeds or grass, they will forsake the situation. The care that mice take of their young, is very surprising. A gardener, who was removing a hot-bed in order to put fresh manure, was surprised to see a little animal leap out of the side with great agility. He thought it an unknown creature, from its grotesque appearance, but, on catching it, (which he did with difficulty,) found it to be a mouse, with four little ones clinging to her, which she was endeavouring to preserve, by making her immediate escape.

Charlotte. How I should have loved that little mouse! I wish I could have one, they must be so entertaining.

Marian. Yes, I think with you, that tame animals, in general, are very entertaining; but I knew a lady who used to keep a

tame snake, and, though by no means an agreeable animal, it was harmless and quiet when unmolested; but if a stranger or dog came into the room, it would hiss very much, and filled the room with such a nauseous smell, that rendered it almost insupportable.

Edward. How very disagreeable!

Charlotte. But I think I should like to have Mr. Smith's tame tortoise.

Marian. It is a curious animal. You know, I suppose, that it lies torpid during the winter, making itself a hole in the ground, where it remains till the sunny days of summer draw it forth; when, though a stupid-looking animal, it shows some sagacity, for as soon as the lady comes in sight, who has fed it for thirty years, it hobbles towards its benefactress with awkward alacrity, but remains inattentive to strangers. In the same book I read an account of a hollow ash-tree, which had been the dwelling of some owls for many years. At the bottom was discovered a mass of bones of mice, birds, and bats, which had been collecting together for a long time. Perhaps you did not know that

owls, like other birds of prey, cast up the bones, fur, and feathers, of what they devour; and this was their receptacle, containing several bushels of the same substances.

Edward. Pray, Marian, do you believe that story of the rats coming into my uncle's bed-room in such numbers, to gnaw the rush-light?

Marian. Yes, I believe it, because I know that your uncle always speaks the truth; besides which, I know that it is the nature of rats to travel from one place to another. There are some which are known to leave Kamtschatka for several years, which greatly alarms the inhabitants, who consider it as a presage of a bad season for hunting. They always take their departure in spring, when they assemble in prodigious numbers, and traverse rivers, lakes, and even arms of the sea. They generally return in October, and are sometimes met in such vast multitudes, that travellers are obliged to stop for hours, till the whole troop is gone. The tract of ground they pass in a single

summer, is not less wonderful than the regularity they observe in their march, and that instinctive impulse which enables them to foresee, with certainty, the changes of times and seasons. These rats make spacious nests underground, which are lined with turf, and divided into separate apartments, in which are deposited stores for support during the winter. It is remarkable, that they never touch these provisions till every other supply is exhausted; they are then obliged to have recourse to a store so prudently laid up. The beaver is a more pleasing object of curiosity. It is found in the northern parts of Europe and Asia, but chiefly in the less frequented regions of America. In the spring, these animals assemble near some river or lake. They fell trees, cut stakes, form palisades, mix stones and clay together, build dams, and make their own separate apartments, which have two doors, one to the water, the other to the land. They keep their magazines under water, and store them with leaves and the bark of trees. Farewell: I must leave you for the present.

DIALOGUE VII.



SWALLOW.

Edward.

PRAY, Marian, what is the meaning of migration?

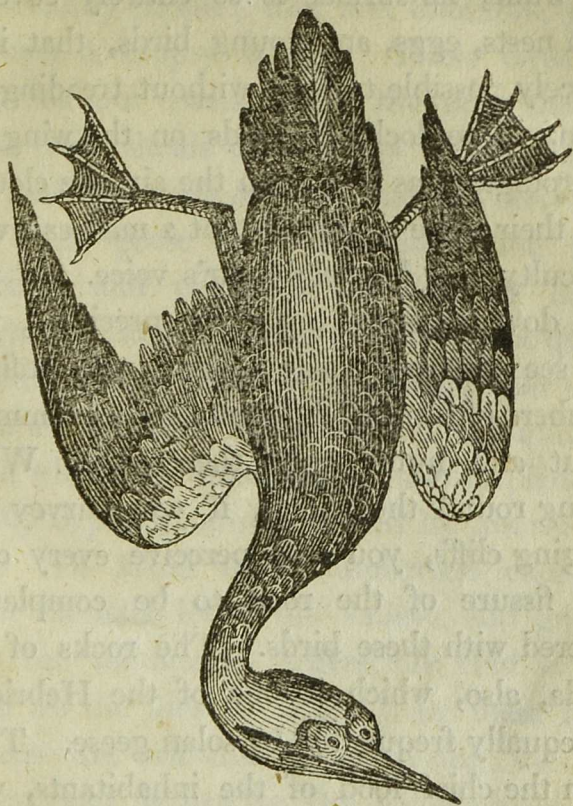
Marian. There are some creatures, more especially birds, whose instincts teach them to remove from one country to another, either for the sake of convenience in procuring food, or for the sake of changing the climate. Those who have attentively watched swal-

lows, have found that they assemble in flocks on the approach of our winter, and appearing to make a kind of plan for their journey, they leave this country.

Charlotte. But where do they go? and how can they fly across the sea without being tired?

Marian. Some have been seen on the northern shores of Africa, and in the Cape de Verd Islands, which are near that continent. It is, indeed, astonishing, that such little creatures should be able to perform such long flights; but it has often happened, that they have alighted on vessels for the sake of rest, and are then so exhausted that they are easily taken by the sailors. Wild geese, brent ducks, and many others, visit our coasts in the winter; but, as their nature teaches them to prefer colder regions, they retire into Lapland and Greenland as our summer advances. Solan geese, or gannets, are also birds of passage. There is a small island in the Frith of Forth——

Charlotte. Let me see—I think that is between Scotland and England.



SOLAN GOOSE.

Marian. You are right; and I am much pleased that you pay attention to the geography of the places I mention. This is called Bass Island, and does not exceed a mile in circumference. During the months of May

and June, its surface is so entirely covered with nests, eggs, and young birds, that it is scarcely possible to walk without treading on them. The flocks of birds on the wing are so prodigious as to darken the air like clouds, and their noise so great, that a man can with difficulty hear his neighbour's voice. If you look down from the top of the precipice, you will see it on every side covered with infinite numbers of birds of different kinds, swimming about and hunting for their prey. When sailing round the island, if you survey the hanging cliffs, you will perceive every crag and fissure of the rock to be completely covered with these birds. The rocks of St. Kilda, also, which is one of the Hebrides, are equally frequented by solan geese. They form the chief food of the inhabitants, who are said to consume not less than twenty-two thousand six hundred young birds of this species, annually, besides a great many of their eggs.

Charlotte. Dear me, I should think they would be tired of this food constantly.

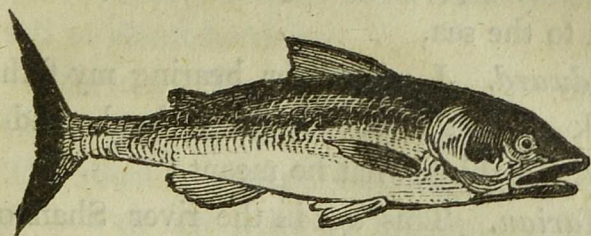
Marian. We cannot suppose that they

are wealthy people; they are, therefore, glad of such a supply as this. These birds remain on our coasts, about the same time as those vast shoals of herrings which inhabit our seas at certain seasons, and the arrival of the solan geese is a sure indication that herrings and pilchards are near at hand. Migration is not confined to birds: some quadrupeds, fishes, and insects, change their situation according to the season. The rein-deer, upon which the existence of the Laplanders chiefly depends, are tormented by swarms of flies. To avoid their numberless enemies, these animals leave the valleys, and go up into the mountains, where the cold is too great for the flies to follow. In these high regions the rein-deer feed during the hot season, and return to the valleys after the cold has destroyed the myriads of insects. This migration has two good effects: it both preserves the health of the rein-deer, and allows the vegetables in the valleys time to increase; for, otherwise, they would have been prematurely exhausted. Some species of rats, too, are migratory animals, as I have

before observed. When they are going to leave their accustomed abode, they assemble together in great numbers. In the course of their journey, they make tracks on the earth, of two inches in depth, and these tracks sometimes occupy a breadth of several fathoms. During their march, these rats uniformly pursue a straight line, unless they are forced to turn aside by some insurmountable obstacle. If they meet with a rock, they first try to pierce it, and, after discovering the attempt to be impracticable, they go round it, and then resume the straight line. Even a lake will not interrupt their progress, for they either traverse it in a straight line, or perish in the attempt. If they meet with a vessel, they will not alter the direction, but climb up one side, and go down on the other.

Edward. I did not know that rats could swim.

Marian. Those I have been mentioning are the large Norway rats. I do not know that those of this country do migrate in this extraordinary manner. Many fish, also, migrate. Salmon, which generally inhabit the



SALMON.

sea, always ascend rivers for the purpose of depositing their spawn. This generally happens in the month of September; and so strong is the instinct which impels them to this change, that they press up the rivers with amazing keenness, and scarcely any obstacle is sufficient to interrupt their progress. They spring with great agility over cataracts of several feet in height. When they find a place which they think proper for the reception of their eggs, the male and female unite their labours in forming a convenient receptacle for the spawn, in the sand, which is generally about eighteen inches deep.

After the eggs are deposited, they hasten back to the sea.

Edward. I remember hearing my father speak of a salmon-leap in Ireland, and I could not think what he meant.

Marian. This was in the river Shannon, where the fish are seen to leap an amazing height. The rapid increase in the growth of salmon is astonishing. One was caught at Warrington, in Lancashire, on the seventh of February, which then weighed seven pounds and three quarters. It was marked on the back, fin, and tail, with scissors, and then turned into the river. It was retaken on the seventeenth of the following March, and then it weighed seventeen pounds and a half. So that it had increased nearly ten pounds in a very short time.

Charlotte. Was not that kind of pink-orange fish, we had for dinner the other day, a salmon?

Edward. Yes: do you not remember that Marian told us it was, and promised to give us some account of it, which you see she has

done. But you said, also, that you would tell us about herrings.

Marian. They appear on the coasts of Great Britain about the month of June. The shoal is generally divided into columns of five or six miles in length, and three or four in breadth. The motion of these vast numbers creates a kind of rippling, or little wave, in the water. They sometimes sink and disappear for ten or fifteen minutes, and then rise again towards the surface. When the sun shines, a variety of splendid and beautiful colours are reflected from their bodies. The chief object of herrings migrating southward, is to deposit their spawn, or eggs, in more shallow seas than those of the Frigid Zone.

Charlotte. What is meant by seas of the Frigid Zone?

Marian. The North Seas. There is another species of herring, called the pilchard, which appears in vast shoals off the coast of Cornwall, where the fishery employs great numbers of people. Men are engaged at sea in catching them, whilst men, women, and

even children, are occupied on land, in washing, cleaning, salting, and pressing them, as well as in making ropes, nets, &c. The poor feed upon them, and the refuse is used as manure by the farmer. It is said, that twenty-two thousand, seven hundred and ninety-five hogsheads, are annually exported from this coast.

Charlotte. That is an amazing number, indeed; because, I suppose, that each hogshead contains a great many fish.

Marian. No doubt: but, if you remember that they come to our coast in such numbers as to darken the sea, you will not be surprised at the supply. The migration of the land-crab is attended with many curious circumstances. It lives in the warmer countries of Europe, but is more frequently found in Africa. It frequents the mountainous parts of the country, which are most remote from the sea. In the months of April and May they leave their retreats in the mountains, and march in thousands to the seashore. At this period, the whole ground is covered with them. The object of their

migration is to deposit their spawn on the sea-shore; and, in their progress, like the northern rats, these crabs move in a straight line. Even when a house intervenes, instead of deviating to the right or to the left, they attempt to scale the walls. But, when they meet with a river, they are obliged to wind along the course of the stream. They observe the greatest regularity, and commonly divide into three battalions, or bodies. The first consists of the strongest and boldest males, who, like pioneers, march forward to clear the route, and face the greatest dangers. The females, who form the main body, descend from the mountain in regular columns, which are fifty paces broad, three miles long, and so close that they almost entirely cover the ground. Three or four days afterwards, the rear-guard follows, which consists of a straggling, undisciplined troop of both sexes. They travel, chiefly, during the night, but, if it rains, proceed in the day, as moisture facilitates their motion. When the sun shines, and the surface of the ground is dry, they

make a universal halt till the evening, and then renew their march. When alarmed by an appearance of danger, they run back in a disorderly manner, and hold up their nippers in a threatening posture.

Charlotte. Ah! I think such a little army of these nippers must look rather formidable.

Marian. This has the effect of intimidating their enemies. They are, however, cruel to one another; for, if an individual, by any accident, is so maimed that he cannot proceed, they immediately devour him, and then pursue their course.

Edward. Well, that is cruel! It is not often that we hear of creatures devouring their own species.

Marian. It is, indeed, a rare instance; though I am sorry to observe, that many creatures seem to take pleasure in destruction; nor is that confined to the brute creation. But there is another remarkable circumstance attached to the history of the land-crab, which I must relate. Many kinds of fishes, which live upon the spawn of these crabs, approach the shore at the time of their

arrival, watching for their accustomed supply of food. The eggs are hatched under the sand, soon after which, numbers of young crabs are seen leaving the shore, and migrating slowly towards the mountains. Most of the old ones, however, remain in the flat parts of the country till they regain their strength. They dig holes in the earth, the mouths of which they cover with mud. Here they throw off their old shells, and remain quite naked and without motion for six days. When they become fat, and the shell is hardened, the animals, by an instinctive impulse, march back to the mountains. The crab-fish, like many other creatures with shells, which are called testaceous animals, annually changes its shell. It is in this condition that it conceals itself in holes in the sand, or under weeds. At this place of retreat, a hard-shelled crab always stands sentinel, to prevent the sea-insects from injuring the other in its defenceless state; and the fishermen, from his appearance, are aware that he is guarding the retreat of a disabled companion. When they thus meet with crabs

which have no shell, they take them to use as baits in catching other fish. The hard-shelled crab generally shews great timidity, will make his escape quickly, and, if often interrupted, will pretend death, like a spider, and take an opportunity to sink himself into the sand, keeping only his eyes above ground; but, when employed in the protection of another, he advances boldly to meet the foe, and will with difficulty quit the field. There is another fish used as a bait by fishermen, called the old soldier: his size and form are somewhat like the craw-fish, with this difference, that his tail is covered with a tough membrane instead of a shell, and, to obviate this defect, he seeks out the uninhabited shell of some dead fish, that is large enough to receive his tail, and carries it about with him, as part of his clothing or armour.

Edward. That is, indeed, a curious account! Who told it you, Marian?

Marian. No one, my dear: I read it.

Charlotte. May we read the book in which you find all these nice things?

Marian. All parts of this book are not

proper for you to read; but, if you are very attentive to your lessons to-morrow morning, I will try and remember some other anecdotes to tell you.

Edward. Thank you, my dear Marian. You need have no fears of our being inattentive, when you promise us such a reward.

~~~~~

DIALOGUE VIII.

~~~~~

Marian.

DO you know where Arabia is, Edward?

Edward. Yes: it is not far from Persia, and near the Red Sea.

Marian. Well, suppose you were to say, that it was bounded on the west by the Red Sea, on the north and east by Persia, and on the south by the Indian Ocean.

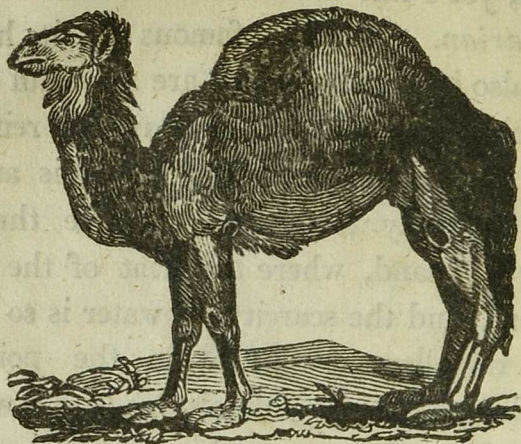
Charlotte. Well, that is nothing about animals.

Marian. No; but I wanted to make you understand the situation of the countries, before I spoke of the animals which inhabit them.

Charlotte. Oh! thank you: I was afraid you were going to give us a lesson in geogra-

phy; and though I like that very well sometimes, yet I like the anecdotes better.

Marian. Arabia is famous for its horses, and also its camels, which are as useful to the inhabitants of that country, as the rein-deer is to the Laplander. The camel is an animal naturally formed to traverse the vast deserts of sand, where the heat of the sun is intense, and the scarcity of water is so great, that travellers are often on the point of perishing. Many animals, as the cow and horse, have four stomachs; but the camel is supplied with a fifth, which is a bag to hold water. When he meets with a drinking-place, he can fill this bag, which serves as a store-house, from whence he can draw supplies at pleasure. When he chews his food, by a contraction of certain muscles he can make some of this water ascend into his stomach, or even as high as the throat. This singular construction enables him to travel six, eight, or even twelve days, in the sandy deserts, without drinking, and to take at once a prodigious quantity of water, which remains in the reservoir clear and pure, because



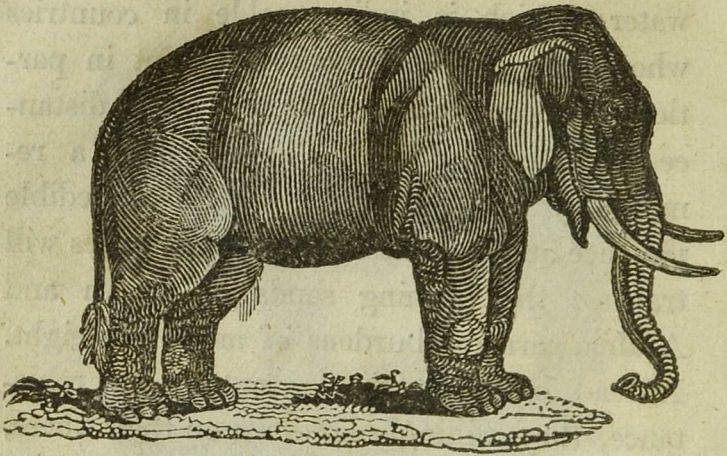
DROMEDARY.

neither the humours of the body, nor the juices that promote digestion, can have access to this bag. Besides this extraordinary formation, the camel has two large, fleshy bunches on his back, and the dromedary one; while the feet of both are covered with a very tough but flexible substance. These peculiarities enable them to travel with heavy loads, through the deserts of the east, where the horse or the ass would inevitably perish, because they are not provided

with reservoirs for holding or preserving water; which is indispensable in countries where none can be procured, except in particular places, that are often at great distances from each other. The camel is a remarkably docile creature. With incredible patience and submission, these creatures will traverse the burning sands of Africa and Arabia, carrying burdens of amazing weight. Instead of discovering symptoms of reluctance, they willingly lie down on their knees, till their masters bind on the unmerciful loads. The Arabians consider the camel as a gift sent from heaven—a sacred animal, without whose assistance they could neither subsist nor carry on traffic. Its milk is their common food; they eat its flesh, and of its hair they make clothes. In one day they can perform a journey of fifty leagues into the desert, which puts them out of the reach of an enemy.

Charlotte. Pray, how much is a league?

Edward. Do you not know that? It is three miles.



ELEPHANT.

Marian. Now, Edward, can you tell how many miles fifty leagues make?

Edward. Yes: three times fifty are a hundred and fifty; so this would be a journey of a hundred and fifty miles. A horse cannot go nearly so far.

Marian. Certainly not; but the swiftness of the camel is remarkable. The Arabs often put it to a bad use; for it enables them to commit great depredations, with the certainty of eluding all pursuit.

Charlotte. Do not elephants live in Arabia too?

Marian. The elephant is found in most parts of Asia and Africa, is a very intelligent creature, and, when tamed, remarkably docile.

Edward. But how do they contrive to catch such immense animals?

Marian. By means of tame elephants, which they employ to entice the wild ones into enclosures, where they soon secure them. The tame elephants are taught to walk on a narrow path between the pit-falls, which are covered with turf, and then to go into the woods, and to seduce the wild elephants to come that way, who fall into these wells, whilst the tame ones pass safely between them; and it has been observed, that those wild elephants which escape the snare, pursue the one which has deceived their companions, with the utmost vehemence, and, if they can overtake it, which is sometimes the case, they always beat it to death.

Edward. Well, that is a wonderful spirit of revenge in a brute.

Marian. You will perceive, when you hear more, that these creatures are endowed with more sagacity than is commonly seen in animals inferior to man. When tamed and instructed, the elephant is rendered the mildest and most obedient of all domestic animals. He loves his keeper, caresses him, and anticipates his commands. He learns to comprehend signs, and even to understand the expression of sounds. He distinguishes the tones of command, of anger, and of approbation, and regulates his actions by his perceptions. The voice of his master he never mistakes. His orders are executed with alacrity, but without precipitation. His movements are always measured and sedate, and his character seems to correspond with the gravity of his appearance. To accommodate those who mount him, he readily learns to bend his knees. With his trunk he salutes his friends, uses it for raising burdens, and assists in loading himself. He loves to be clothed, and seems to be proud of gaudy trappings. At Goa, which is an island in the East Indies, elephants are constantly

employed by the ship-builders. Several beams are tied together, and the rope given to the elephant, who carries it to his mouth, and, after twisting it round his trunk, draws it, without any conductor, to the place where the ships are building, though it had only once been pointed out to him. One of these creatures has been known to draw a beam larger than twenty men could have been able to move. But what is still more extraordinary, when other beams were in the way, he raised the ends of his own, that they might run easily over those that obstructed his passage.

Charlotte. Well, now I think that was very sensible and very wise of the elephant.

Marian. It is, indeed, a sagacious creature. When drawing any carriage, the elephant proceeds equally, and seldom wants more than encouraging words to make him continue his labour. The attachment and affection of the elephant are sometimes so strong and durable, that he has been known to die of grief, when, in an unguarded

paroxysm of rage, he had killed his guide. Before the invention of gunpowder, elephants were employed in war by the African and Asiatic nations. Naked sabres were tied to their trunks, and on their backs were fixed small wooden castles, which contained several men, armed with javelins and other weapons. The Greeks and Romans, however, soon became acquainted with the nature of these monstrous warriors: they learnt to open their ranks, and let the elephants pass without injuring them. In the East, the nobles are always attended by elephants at the time of public entertainments. The tusks are ornamented with rings of gold and silver, their ears and cheeks are painted with various colours, they are crowned with garlands, and a number of small bells are fixed to different parts of their bodies. A domestic elephant performs more labour than could be accomplished by six horses; but he requires much care, and a great deal of food. He is subject to be over-heated, and must be led to the water twice or three times a day. He easily learns to bathe himself. With his trunk he

sucks up large quantities of water, carries it to his mouth, drinks part, and throws the rest over his body. You will have some idea of the labour he performs, and the docility of his disposition, when I tell you, that all the bales, sacks, and tuns, transported from one place to another, are carried by elephants. They support burdens on their bodies, their necks, their tusks, and even in their mouths, by giving them the end of a rope, which they hold fast with their teeth; thus uniting sagacity with strength. They never break or injure any thing committed to their charge.

Charlotte. I do not quite understand what you mean by *sagacity*.

Marian. It means intelligence, and sense: and though it is often applied to men, when we wish to give an idea of their wisdom, yet still it may apply to the degree of sense which the elephant possesses.

Charlotte. Thank you, *Marian*. Can you tell us any thing more about the elephant? I wish we had one, for they are both useful and agreeable animals.

Marian. From the margins of rivers,

they will put weights and bundles into boats without wetting them, lay them down gently, and arrange them where they ought to be placed. When the goods are disposed as their masters direct, they will examine with their trunks, whether the articles be properly stowed, and if a cask or tun rolls, they will look for stones, or some other thing, to prop and render it firm. In the elephant the sense of smelling is acute; and he is passionately fond of odoriferous flowers, which he collects, one by one, and, after smelling them, carries the nosegay to his mouth. Though the weight of the elephant is so great, he is an excellent swimmer, and, of course, is of great use in the passage of rivers. When employed on occasions of this kind, he is often laden with two pieces of cannon, which admit three or four pound balls, besides a great deal of baggage, and two or three men clinging to his ears and tail.

Edward. Poor creature! what an immense burden that must be to bear.

Marian. I think I have told you, that elephants are employed in carrying luggage,

accompanied by a cornack, and perhaps his family. Whilst the man and his wife go into the woods, to procure leaves and young branches for his food, they fix him to one spot by a chain, which only allows him to move over a certain space. They frequently leave a little child under his protection. The intelligent animal not only defends it, but if it should wander to the extremity of its chain, so that it would soon be out of reach, he will wrap his trunk gently round its body, and bring it again into the centre of the circle. The elephant is very fond of wine and ardent spirits. By showing him a vessel filled with any of these liquors, and promising to give it him as a reward of his labours, he is induced to exert the greatest efforts, and to perform the most painful tasks. He seems to understand what the cornack says to him.

Edward. What is a *cornack*?

Marian. The keeper of the elephant is so called; and, by gentle means, these cornacks obtain great influence over creatures so superior in strength to themselves. When the

conductor wants him to perform any painful labour, he explains the nature of the operation, and gives the reasons which should induce him to obey. If the elephant shows a reluctance to the task, the cornack promises, by signs, to give him wine, arrack, which is a spirituous liquor, or any other article of which he is fond; and, upon this, the animal will use his utmost efforts. But to break any promise made to him, is extremely dangerous. Many cornacks have fallen victims to indiscretions of this kind.

Charlotte. What! do the elephants understand the meaning of a promise? I know you found it very difficult to explain it to little Theodore, the other day.

Marian. I did; but Theodore is young, and he must gain more experience before he will be properly aware of the nature of a promise, which is a very serious thing, even if it relates only to a trifling subject.

Charlotte. I think it is serious; and you, my dear Marian, have always taught me to be very careful, both about making and keeping promises. But can you not tell us

some more anecdotes about the elephant. I like anecdotes very much.

Marian. An elephant at Dekan, from revenge, killed his cornack. The man's wife, who beheld the dreadful scene, took her two children and threw them at the feet of the enraged animal.

Edward. How very cruel! to expose the poor little things to his fury.

Marian. But hear what happened. When she threw them down, she said: "Since you have slain my husband, take my life also, as well as that of my children." The elephant stopped, relented, and, as if stung with remorse, took the eldest boy into his trunk, placed him on his neck, adopted him for his cornack, and would never allow any other person to mount him.

Edward. That was an extraordinary instance of sense, but it could not make amends to the poor woman for the loss of her husband.

Marian. There was an elephant kept at Versailles, in France, which seemed to know when it was mocked, and remembered the

affront till it had an opportunity of revenge. A man deceived it by pretending to throw some food into its mouth. The animal gave him such a blow with its trunk, as knocked him down and broke two of his ribs. A painter wanted to draw the animal in an unusual posture, with his trunk raised, and mouth open. The painter's servant, to make it remain in that position, threw fruit into its mouth, but often only pretended to do so. This conduct enraged the elephant, and, as if it knew that the painter was the cause of this teasing impertinence, instead of attacking the servant, it eyed the master, and squirted at him, from its trunk, such a quantity of water, as spoiled the paper on which he was drawing. This elephant effected more by his address than by his strength. It could undo, with ease, the buckle of a large double leathern strap, with which its leg was fixed; and as the servants had wrapped the buckle round with a small cord, and tied many knots in it, the creature, with much deliberation, loosed the whole, without breaking the strap or cord. Elephants are proud and

ambitious; and they are so grateful for good usage, that, as a mark of respect, they bow their heads in passing the houses where they have been hospitably treated. When a wild elephant is taken, the hunters tie his feet. One of them accosts and salutes him, makes apologies for binding him, protests that no injury is intended, tells him, that, in his former condition, he frequently wanted food, but that henceforward he should be well treated, and that every promise should be performed to him. Though we cannot suppose that the animal understands the meaning of the words, yet the soothing tones are often followed by great docility. The powers of the elephant are sometimes abused; for if his master should wish to affront another person, he commands the elephant to collect water and mud with his trunk, and to squirt it upon the object pointed out to him, which he does immediately. The Mogul keeps some elephants, which serve as executioners of the law, to criminals condemned to death.

Charlotte. Who is the Mogul? and how are the elephants made executioners?

Marian. The emperors of India used to bear the title of Mogul, but now they have only the shadow of royalty. When the conductor orders the animal to dispatch the poor sufferers quickly, he tears them to pieces in a moment; but if desired to torment them slowly, he breaks their bones one after the other, and makes them suffer a lingering death. But I think you must be almost tired. Go and take a run in the garden, and to-morrow I shall have found something more to relate.

~~~~~  
 DIALOGUE IX.  
 ~~~~~

Edward.

WELL, Marian, what have you got to tell us to day? I am quite impatient to hear some more wonderful stories.

Marian. I am glad your curiosity is excited, and I hope I shall be able to amuse you, for I have been reading an account of the mason-bee.

Charlotte. The mason-bee! Pray what does that mean?

Marian. You are well acquainted with the common bee, kept in our own hives; but there are several other species of bees, and one called the mason, on account of the curious habitation it builds.

Charlotte. I suppose, then, it is made of

stone, as masons are people who work in stone.

Marian. The mason-bee, unlike some other species, is a solitary animal. Its habitation is composed of sand and mortar, and, when finished, has the appearance of a piece of dirt thrown accidentally against a wall. Though the outside does not attract attention, when the external covering is removed the structure is found to be truly admirable. After choosing a part of a wall in which she is resolved to fix an habitation for her future progeny, the bee goes in quest of proper materials. The nest to be constructed must consist of a species of mortar, of which sand is the principal ingredient. She knows, like human builders, that every kind of sand is not equally proper for making good mortar: she goes, therefore, to a bed of sand, and selects, grain by grain, the kind which is best suited to answer her purpose. With her teeth, which are as large and as strong as those of the honey-bee, she examines and brings together several grains. But sand alone will not make mortar: recourse must

be had to a cement similar to the slacked lime employed by masons.

Charlotte. Where can she possibly find that? I think she is very ingenious, but here she must be puzzled.

Marian. Nature has provided her with a kind of liquor in her own body, with which she moistens the first grain she has chosen. To this grain she cements a second, and so on till she has formed a mass as big as a shot. This she carries off in her teeth, to the place she has chosen for her nest, and makes it the foundation of the first cell. In this manner she labours incessantly, till all the cells are completed; a work which is generally accomplished in five or six days. The cells are exactly alike, and nearly equal in dimensions. Before they are covered, their figure resembles that of a thimble, each one being about an inch high, and nearly half an inch across. But the labour of building is not the only one this bee has to perform. When a cell has been raised to one half, or two-thirds of its height, another

occupation commences. She seems to know the quantity of food that will be necessary for the support of the young worm, after it is hatched from the egg which she is going to deposit in the cell. When this store is collected, and the egg placed in the cell, she carefully plasters up the mouth of it. As soon as the first cell is completed, she lays the foundation of another. In the same nest she often constructs seven or eight cells. This industrious little animal, after all her cells are finished, filled with provisions, and sealed, covers the whole with a coat of mortar, which, when dry, is as hard as a stone.

Charlotte. How I do wish we could find a nest!

Marian. I am afraid you will not, as I do not think they are very common. The nest is usually of an oblong figure, and the external cover is composed of a coarser sand than the cells. As these nests are almost as durable as walls, they are often repaired in the following year by a stranger bee.

Edward. But I am thinking how the young bee gets out of that prison.

Marian. That is a very natural enquiry. As soon as it is hatched, it gnaws a passage through the wall that enclosed the cell, and afterwards pierces the still stronger and more compact cover which invests the whole nest. At last it escapes into the open air, and, if a female, in a short time constructs one similar to that its mother had made. It sometimes happens, that an intruder takes possession of the nest, whilst the owner is out in search of food. When they meet, a battle ensues. They sometimes fly with such rapidity against one another, that both fall to the ground; but in general, like birds of prey, the one endeavours to rise above the other, and to give a downward blow. To avoid the stroke, the undermost, instead of flying forward or on one side, often goes backward. There is another curious species, called the wood-piercing bee. It is larger than the common honey-bee. In the spring it frequents gardens, in search of dead wood, in order to make a habitation for its young. When a female has selected a piece of wood or decayed tree, she commences her labour by

making a hole in it, which is often as big as the top of a man's finger, and from twelve to fifteen inches long. If the thickness of the wood permits, she makes two or three of these holes. This labour, for a single bee, is prodigious; but in executing it she often consumes weeks, and even months.

Charlotte. I do not wonder at her being a long time, and am only surprised to think how such a little creature can ever make such a long hole.

Marian. Around the foot of the post, or piece of wood, where one of these bees is working, little heaps of timber-dust are always found. These heaps daily increase in size, and the particles of dust are as big as those made by a hand-saw. This animal is provided with two teeth, the only instruments with which she makes such considerable openings. These teeth are wonderfully adapted to their office: they consist of a solid piece of shell, in shape resembling an auger or gimlet. They are convex above, concave below, and terminate in a sharp but strong point.

Edward. That is very wonderful! Why, they are almost as handy as a carpenter's tool.

Marian. Indeed they are, and perhaps better adapted to their office, than any tool made by the art of man would be; and will serve to prove, that the Almighty Being who has created this world, has extended his power, in considering the necessities of the most humble of his creatures, as well as in providing for man, who, from his superior powers, has been the more immediate object of divine intelligence. But after the holes are finished, her labour is by no means at an end. The eggs must not be mixed, or piled one above another. Every separate worm must have a distinct apartment, without any communication with the others. Each long hole, or tube, accordingly, is only the outer wall of a house, which is to consist of many chambers, ranged one above another. A hole of about twelve inches in length, she divides into ten or twelve apartments. The roof of the lowest room is the floor of the second, and so on to the uppermost. Each floor is about the thickness of a French

crown. The divisions are composed of particles of wood, cemented together by a glutinous substance, proceeding from the animal's mouth. She takes a curious method of forming a floor.

Charlotte. How does she manage it? I never heard of any thing more ingenious than these bees.

Marian. She begins by gluing a rim of wood-dust round the inside of the hole, at the proper distance from the bottom: to this she attaches a second ring, to the second a third, and so on till she completes the divisions. Like the mason-bee, she supplies each cell with food for the future progeny, which is made of the farina of flowers. When she has filled all the cells, deposited her eggs, and closed them up, the labour for her young ceases. With astonishing industry she has supplied them, not only with a safe and convenient dwelling, but with food enough to last till they are changed into the fly state.

Edward. I suppose the young flies gnaw their passage out, as those of the mason-bee.

Marian. Yes: but listen to the extraor-

dinary provision made for their escape. Those which are placed in the lower cells are older than those in the upper ones, because, after the bee has filled with paste and enclosed the first cells, a considerable time is necessary to collect provisions for all the others: the lower ones, therefore, must be changed into flies first. These circumstances are apparently foreseen by the mother; for if the undermost worm, which is soonest transformed, were to force its way upward, it would not only disturb, but would destroy all those lodged in the superior cells. The wonderful goodness of God is displayed in this seemingly trifling circumstance. The head of the creature is invariably placed downwards, and, therefore, it is first led to move in that direction.

Edward. Well, that is very astonishing! Indeed, Marian, you tell me such extraordinary things, that I could not believe them, if I were not certain that you always take care to tell the truth.

Marian. You may depend upon it, my dear, I never mention any thing of which I



SPHEX SABULOSA.

am not certain; as I am particularly careful to name those circumstances only which are attested by wise and clever men, who have examined these wonders. That the young flies may escape from their cells, the mother digs a hole at the bottom of the long tube, which makes a communication with the undermost cell and the open air. Sometimes a similar passage is made near the middle of the tube. By this contrivance, as all the flies proceed downwards, they find an easy passage; for they have only to pierce the floor of their cells, which they readily perform with their teeth. The *sphex sabulosa* is another remarkable fly. The naturalist, Ray, mentions having seen it dragging a caterpillar

three times larger than itself, which it deposited near the entrance of a hole it had previously dug in the earth. Next, removing a little ball of earth from the entrance, it drew in the caterpillar, filling up the hole with earth and dust, scraping with its feet. In this caterpillar eggs had been laid, and it was to serve as food for the young in their larva state. But as I have finished the account of the *sphex sabulosa*, I think you had better go to play, and to-morrow I shall tell you about another species of solitary bee.


~~~~~

## DIALOGUE X.

~~~~~

Edward.

YOU promised to tell us about the solitary bee, Marian, and we have been working very hard, and making great haste with our lessons, that we might come and hear it.

Marian. Since you have been industrious, I am ready to perform my promise; but, Margaret, fetch your work, as I think you can do some whilst I am reading or talking to you. (*She returns with her work-bag.*)

Marian. The solitary bee makes holes in the earth, to form an habitation for her young. The nest is composed of cylindrical cells, fixed to one another, and each of them in figure resembles a thimble. The bottom of the second is fixed into the opening of the

first, and the mouth of the second receives the bottom of the third. The cylinder is composed of alternate bands, of two different colours. Those at the narrow end are white, and those at the broadest are of a brownish colour.

Charlotte. That is curious: but what are these little striped thimbles made of?

Marian. They consist of a number of fine membranes, formed of a glutinous substance issuing from the animal's mouth.

Edward. Do these cells contain an egg, like those of the wood-piercing bee?

Marian. Yes; and also a store of paste, for the food of the young one.

Edward. Your talking about bees, made me more anxious to watch our own hives than I have been before, and this morning, when I was standing near the hive, the gardener told me he had seen a very wonderful thing there a few days ago. I begged him to tell me what it was, and now I will relate it to you, Marian, for Charlotte heard it from the gardener.

Marian. Pray do, I am always glad when you have any thing new to tell me.

Edward. Well, the bees do not like to let any other creature go into their hives. When an intruder arrives, they sting him to death; but, the other day, the gardener observed a snail going in. He wondered what they would do with this great slimy creature, so he watched them;—and how do you think they contrived? First of all, they stung the poor thing till it died; but they could not manage to get his body out of the hive, so they covered it with glue. But I want to know what this glue is. Can you be so kind as to tell me, *Marian*?

Marian. It is called propolis, and is collected from different trees, by the bees, who employ it in sticking many parts of their habitations together. The story you have just related, shows that the bees had a great deal of contrivance, and seemed to be aware that the bad smell of so large a body would be injurious to them. As bees are more useful to us, we are apt to regard them with more interest than wasps. The following anecdote,

however, will prove them to be equal in contrivance. Dr. Darwin once saw a wasp on a gravel walk, which had caught a fly nearly as large as itself. He knelt on the ground, and observed her separate the tail and the head from the body, to which the wings were attached. The wasp then took the body part in his paws, and rose about two feet from the the ground with it; but a gentle breeze wafting the wings of the fly, turned him round in the air, and he settled again with his prey upon the gravel. He was then distinctly seen to cut off, with his teeth, first one of the wings, and then the other, after which he flew away with it, unaffected by the wind.

Edward. That was a very ingenious contrivance! I think a man could not have thought of a better.

Marian. It was, indeed, like reason. The wasp of this country fixes his habitation underground, that he may not be affected by the various changes of climate; but in Jamaica, where the seasons are less severe, he hangs it on the bough of a tree. He weaves

a very curious paper of vegetable fibres, to cover his nest, which is constructed on the same principle with that of the bee, but with a different material. The bees that were carried to Barbadoes and other Western Islands, ceased to lay up honey after the first year; for they did not find it necessary, as they supplied its place by visiting the sugar-houses, and are become very troublesome to the inhabitants; but those in Jamaica continue to make honey, as the cold north winds and rainy seasons of that island confine them at home for several weeks together. The same accommodation to the difference in the climate, is observed in the ants of Siam. That part of the country lies open to great inundations, and there all the ants make their settlements on trees, and no ants' nests are to be seen on the ground, as in other countries.

Edward. Can you tell me what those little white things are, which I have often observed in the ants' nests?

Marian. They are the eggs; and so careful are they of these eggs, that when a nest is

disturbed, their first care is to remove them to a place of safety. And they will change the situation of their eggs many times in a day, nearer to the surface of their habitation, or further from it, as the heat of the weather varies; and in colder days they will lie upon them, as a hen sits on her eggs, to keep them warm. If their mansion is too dry, they carry them to places where there is moisture; and you may distinctly see the little worms move and suck up the water. When too much moisture approaches their nest, they convey the eggs deeper into the earth, or to some other place of safety.

Edward. The subject of bees puts me in mind of something I read yesterday. Papa lent me a volume of the *Annual Register*, and there I found an account of wax, but not made from the bees. How do you think it was, Charlotte?

Charlotte. I am sure I cannot guess—but yet I should like to know.

Marian. Suppose you tell us, Edward, what it was.

Edward. I will try to remember, but it

was a long account; and then there was a great deal which I did not understand.

Marian. Do your best to amuse us, and I shall then be satisfied with your good-nature, if I am not with your memory.

Edward. It was called vegetable wax, because it is produced on a tree in Louisiana, and that, Charlotte, is in America. The tree is about the size of a cherry-tree, and bears ash-coloured berries, which contain a small, hard, round kernel, covered with glossy wax, which is separated by boiling the berries in water. The natives use it for making candles and soap; the latter washes linen very white. Some plants of this kind have been brought to Orleans, in France, and it is thought that they may establish a useful manufacture of the wax.

Marian. Thank you, Edward, you have remembered the principal facts very well; and, in return, I will try to recollect something about spiders, which I have been reading. The spiders of this country make webs of various forms, adapted to different situations, to catch flies, which form their food;

and some of them have a kind of house, or lodging, in the middle of the net, well contrived for warmth, security, or concealment. There is a large spider in South America, which constructs a nest of so strong a texture as to entangle small birds, particularly the humming-bird.

Edward. But that must be much stronger than the webs of the spider here.

Marian. It is probably a larger species: but the most curious creature of which I have ever heard, or, at least, the creature which forms the most curious nest, is a spider of Jamaica, which digs a hole in the earth, in a slanting position, about three inches in length, and one inch across. This it lines with a tough web, which, when taken out, resembles a leathern purse; but what is most extraordinary is, that this house has a door, with hinges, which opens like some shells, and the spider opens and shuts this door whenever it passes or repasses.

Edward. Well, that spider is an ingenious little manufacturer of a purse!

Marian. Some spiders enclose their eggs



WATER-SPIDER.

in a silken bag, spun and wove by themselves. This bag they fix to their backs, and carry along with them wherever they go. They are extremely nimble, but when a bag is forced from a spider of this kind, her natural agility forsakes her, and she falls into a languid state. If the bag be again presented, she instantly seizes it, and carries it off with rapidity. The young spiders no sooner escape from the egg, than they dexterously arrange themselves on the back of the mother, who continues for some time to carry them about with her, and to supply all their wants. They will rather die than part with the bag of eggs. In the same way, deer, partridges, and several other creatures will present themselves to their pursuers, to

divert their attention from their young. The partridge will pretend to be lame, and draw the dogs in pursuit of her away from the nest. Thus you see that animals are as careful of their young as the superior orders in creation, which are blest with reason, and, consequently, with acute perceptions and warm affections. The water-spider is common in our fresh waters. When immersed, the tail-part seems covered with a varnish, which is only a bubble of air, attached to it by the oily matter that issues from the body. The spider fixes several silken threads to the stalks of water-plants, and by the aid of these bubbles of air, which she can form and retain under the water, by means of the threads, she constructs an apartment under water. Dinner is nearly ready, therefore, Charlotte, put away your work and prepare.

Edward. Tell me, first, if the zebra is like the elephant.

Marian. The zebra, in figure, resembles the mule. It is a most beautiful animal. It inhabits the southern parts of Africa, lives in troops, is exceedingly swift, but wild and un-



ZEBRA.

tractable; consequently, seldom rendered sufficiently docile for any useful purpose. I know not of any remarkable habits peculiar to the animal. Now follow Charlotte, and remove these books.

DIALOGUE XI.

Marian.

UPON looking to my book, I find that I quite forgot to tell you about a bee which builds her nest with rose-leaves.

Edward. Well, I am glad you found out the mistake, however.

Marian. She first digs a cylindrical hole in the earth. When this operation is finished, she goes in quest of rose-bushes, and after selecting leaves proper for the purpose, she cuts oblong, curved, and even round pieces, exactly suited to form the different parts of the cylinder.

Charlotte. That must be most curious patch-work.

Marian. The solitary-wasp, also, digs holes in the sand. In each hole she deposits an egg, and supplies it with food suited to nourish the worm which is to proceed from it. Though she does not feed on flesh herself, she collects ten or twelve small green worms, which she piles one above another, rolls them up in a circular form, and fixes them in the hole in such a manner that they cannot move. When the wasp-worm is hatched, it is amply supplied with the food which nature destines for its support. The green worms are devoured in succession; and it is no less extraordinary, that their number is exactly sufficient to supply the worm till its changing into a fly, when it issues from the hole, and is capable of procuring its own nourishment.

Edward. That is more wonderful than any thing I have heard. Really, *Marian*, I must study natural history; for I am sure that must be a most delightful pursuit.

Marian. It is, indeed, a source of much pleasure, and one calculated to excite the purest feelings of admiration and love for

that Great Being who has created all these wonders, and planned all these contrivances, which provide for even the meanest of his creatures. If we see his mercy thus displayed to the brute creation, how much more should it strike us with regard to ourselves, whom he has blest with reason, and with capacity to understand and admire his works. I am pleased, my dear children, to observe that you are sensible to the beauties of nature, and I trust that you will continue to feel pleasure in the study, as I am certain you will always find it agreeable and improving. We will now turn our attention to quite a new creature.

Charlotte. What is that, pray?

Marian. The water-worm, which is an animal meriting your attention. The general colour is a greenish brown. The body consists of eleven rings, and the skin is rather like parchment. Though these animals, before their transformation into flies, live in the water, still air is necessary to support their principle of life, and very curiously are they enabled to procure the requisite supply.

The last ring, or termination of the body of this creature, is open, and serves as a conductor of air. From this ring proceed a number of hairs, which, when examined by the microscope, are found to be real feathers. In particular situations, they bend the last ring in such a manner as to reach the surface of the water, or mud, in which they are placed. These feathers prevent the water from entering into the tube through which they breathe; and when the animal raises this end of its body to the surface, in order to receive air, it erects and spreads the feathers, and, by this means, exposes the end of the tube to the atmosphere, and thus air is admitted to the body, which is beneath the surface. The common earth-worm retreats underground during cold weather, and stops up its hole with leaves or straw, to prevent the frost from injuring it. The habits of peace, or the stratagems of war, of these subterranean nations, are concealed from our view; but a gentleman once compelled a distressed worm to enter the hole of another worm, on a bowling-green, and he presently

returned, much wounded about the head. There is a creature called a centipes, which is the worm's great enemy. A worm was observed to rise out of the earth with one hanging to its tail: it afterwards seized the worm about its middle, cut it in half with its forceps, and preyed upon one part, whilst the other escaped.

Charlotte. Dear me! how could it escape when it was cut in half?

Marian. Many creatures of inferior classes have the power of doing so. The sea-anemone, when divided, still lives, and sometimes both parts produce a perfect animal. I have myself seen a wasp cut in half, which moved for a considerable time afterwards, but it did not grow, as the sea-anemone does. There is a species of ichneumon fly, which provides for its young much in the same manner as that wasp of which I was telling you, which lays up a store of green worms. The general habit of the ichneumon-fly is to lay its eggs in the bodies of other creatures, upon which the young feed as soon as they are hatched;

but there is one which digs a hole in the earth, and carries into it two or three caterpillars, which serve as provision for the young when come to maturity. A gentleman put about fifty large caterpillars, collected from cabbages, on some bran, and a few leaves in a box, covered with gauze, to prevent their escape. In a few days, he saw eight or ten little caterpillars of the ichneumon-fly come out of their backs, and spin each a small ball of silk, and soon after, the large caterpillars died. This small fly lays its eggs in the back of the cabbage-caterpillar, which, when hatched, preys upon the material that is produced there, for the purpose of making silk; being deprived of which, the creature wanders about till it dies: and thus our gardens are preserved, by the cruel ingenuity of this fly.

Edward. It is a wonderful thing, what teaches the ichneumon-fly to deposit her egg in a body which will be fit nourishment for her young.

Marian. This is called instinct; and by it are all animals enabled to provide their

food, their habitations, and to take care of their young. Though we see some instances in which they vary from the common dictates of instinct, and employ what may certainly be termed an inferior reason;—an instance of which I will give you. On the northern coast of Ireland, above a hundred crows were observed preying upon muscles. Each crow took a muscle up into the air, perhaps twenty or thirty yards high, and then let it fall upon the stones, which, by breaking the shell, enabled it to devour the fish.

Edward. Well! that is like reason, indeed!

Marian. There is a story told of a philosopher, (Anaxagoras,) who was walking by the sea-shore to gather shells. A bird, mistaking his bald head for a stone, dropped a shell-fish upon it, and killed at once the philosopher and the oyster.

Charlotte. Oh, Marian! do you think that is true?

Marian. I cannot tell; but I will now relate a circumstance that I am sure is true. There is a creature called the echinus, or sea-

hedgehog, which is covered with spines, forming a kind of armour. It is said, that this animal foresees tempestuous weather, and, sinking to the bottom of the sea, adheres firmly to sea-plants, or other bodies, by means of a substance which resembles the horns of snails. Above twelve hundred of these fillets have been counted, by which this animal fixes itself; and when afloat it can draw them in, so as not to be any interruption to its course. There is another sea-animal, called the pinna——

Edward. Oh! I remember seeing the shell at my uncle's. Well, what about it? I shall like that, because I have seen the shell.

Marian. The shell consists of two valves, or pieces, weighing sometimes fifteen pounds. This fish emits a thread of fine, long, glossy, silk fibres, by which it is suspended to rocks twenty or thirty feet beneath the surface of the sea. On the coasts of Italy and Provence, it is called the silk-worm of the sea. The stockings and gloves manufactured from it are of exquisite fineness, and extremely warm. When these fibres are broken by

violence, the animal has the power of reproducing them, as the common spider can draw threads from her mouth, for the repairing of her web. But what is very curious, this pinna admits a companion into its shell. This is the cancer pinnotheris; which is a small, naked crab, furnished with good eyes. When they want food, the pinna opens its shell, and sends its faithful ally to forage. The great enemy of the pinna is the eight-footed polypus; and when the cancer sees this creature approaching, it returns immediately to the blind pinna, which, by closing its shell, avoids the attack of the polypus. If this is not the case, the crab returns to the opening of the shell, with what he has caught, where they share the booty.

Edward. Well, that is a great instance of friendship amongst shell-fish.

Marian. Dr. Darwin says:—

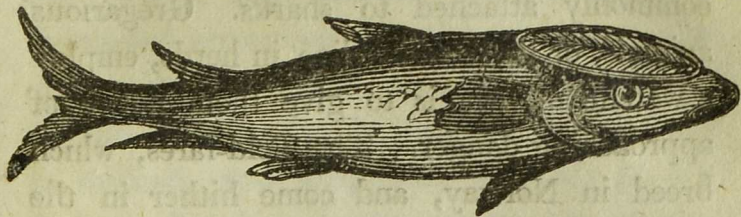
“ You round echinus see his arrowy mail ;
 Give the keel'd nautilus his oar and sail ;
 Firm to his rock, with silver cords suspend
 The anchor'd pinna and his cancer friend.”

Edward. But what is that about the nautilus?

Marian. I thought you would most likely enquire, and, therefore, would not tell you before. When out of the water, the shell seems no thicker nor stronger than a piece of paper.

Charlotte. But those lines say something about a sail and oar.

Marian. When this fish wishes to sail, it extends two of its arms on high, and between these supports a membrane, which it throws out on this occasion: this answers the purpose of a sail; and the two others, which it hangs out of the shell, serve as oars, or as a steering: but the last office is more frequently performed by the tail. When the sea is calm, it is pleasing to see numbers of these creatures diverting themselves with sailing about in this manner; but as soon as a storm arises, they dare not trust their little bark: they draw in their hind legs, and take in as much water as will make them heavier than the sea-water, and thus sink to the bottom.



SUCKING-FISH.

Edward. How I wish we could see these curious little vessels! it must be so very entertaining.

Marian. It is, indeed, an additional pleasure, when we can behold examples of things of which we are reading; but still we may be very glad that we can meet with so much curious information, without travelling further than to our own book-shelves. We find that many animals assist one another, though, perhaps, not exactly in the way that the cancer waits on the pinna. Another fish, called the *remora*, or sucking-fish, can attach itself to bodies by a kind of suction. The ancients believed that this creature was capable of

stopping a vessel in full sail. It is most commonly attached to sharks. Gregarious animals, or those which live in herds, employ a watchman, who is to give them notice of approaching danger. The field-fares, which breed in Norway, and come hither in the cold season for winter berries, have evident marks of keeping a kind of watch. On approaching a tree that is covered with them, they continue fearless, till one, at the extremity of the bush, raising his wings, gives a loud and peculiar note of alarm; when they all immediately fly away, except one, who continues till you approach still nearer, as if to ascertain more fully the reality of the danger, and then he also flies off, repeating the note of alarm. In the woods about Senegal, in Africa, there is a bird called uett-uett by the negroes, and squaller by the French, which, as soon as they see a man, set up a loud scream, and keep flying round him, as if their intent were to warn other birds, which, upon hearing the cry, immediately take wing. The lapwing, when her young are unfledged, not only gives the note

of alarm at the approach of men or dogs, that her young may conceal themselves, but, flying and screaming near the adversary, she appears more solicitous and impatient as he recedes from her family, and thus endeavours to mislead, and frequently succeeds in her design. In this country horses are so domesticated, that we cannot be acquainted with many of their natural habits; but in the deserts of Tartary and Siberia, they form a kind of community, set watches to prevent being surprised, and have commanders, who direct their movements. The horse fights by striking with his hinder feet: he turns his heels to the enemy, and bends back his ears, that he may listen to the movements of his adversary, and thus aim his blow so as to do mischief. There are some parts of a horse which he cannot conveniently rub; as about the shoulder, which he can neither bite with his teeth, nor scratch with his hind feet. When this part itches, he goes to another horse, and gently bites him in the part that he wishes to be bitten, which is immediately

done by his intelligent friend. A foal was once observed to bite its mother in this way, but she did not choose to drop the grass she had in her mouth, and, instead of biting, rubbed her nose against the foal, evidently showing that she was aware of its wish.

Edward. That is very convenient, indeed: and these signs, then, answer the same purpose as speaking.

Marian. Many of our shrubs, which would otherwise afford an agreeable food to horses, are armed with thorns or prickles, which secure them from those animals; as the holly, hawthorn, and gorse. In the extensive moorlands of Staffordshire, the horses have learnt to stamp upon a gorse-bush with one of their fore-feet, for a minute together, and when the points are broken, they eat it without injury; which is an art other horses, in the fertile parts of the country, do not possess, and prick their mouths till they bleed, if they are induced, by hunger or caprice, to attempt eating this shrub. By domestication, horses are rendered perfectly harmless, and even are capable of being

taught many curious movements. A gentleman named Ray, saw a horse dance to music, and, at the command of his master, he affected to be lame: he even would feign death, and, with his limbs extended, allowed himself to be dragged about till new orders were issued, when he would immediately spring upon his feet. Indeed, there are few animals which cannot, in some degree, be regulated by the will of man. The Hottentots train their oxen to war. In all their armies there are considerable troops of these oxen, which are easily governed by their chief. They strike with their horns, kick, overturn, and trample under their feet every thing that opposes their progress. They run furiously into the ranks, which they soon put into the utmost disorder. These oxen are instructed to guard the flocks, which they conduct with dexterity, and defend them from the attacks of strangers and rapacious animals. They are taught to distinguish friends from enemies, to understand signals, and to obey the commands of their masters. When pasturing at a small distance from the

keeper, they bring back and collect the wandering animals. These oxen are called *brackeleys*. They are acquainted with all the inhabitants of a kraal, or village, and any of them may approach these cattle with security; but if a stranger, particularly an European, should use the same freedom, without being accompanied by a Hottentot, his life would be in danger.

Edward. I had not the least idea that oxen were ever used in war.

Marian. I dare say not: but, my dear boy, you will daily find that you have a great deal to learn, and that the number of things of which you have no idea, is astonishing. Let me advise you to redouble your efforts, and assure you, that the more you know, the more you will feel the desire of improvement. Sincerely wishing that this may be the case, I must now wish you good night, as it is time for you both to retire, or else you will not be able to rise at your usual hour in the morning.

Edward and Charlotte. Good night, my dear Marian; we are much obliged to you for this entertaining conversation.


~~~~~

DIALOGUE XII.

~~~~~

Charlotte.

WE have been working in our gardens, Marian, till we are quite tired; so, if you will tell us a few nice little anecdotes, we shall be very glad.

Marian. I shall with pleasure reward your industry. Pray, what have you been doing in your garden?

Edward. I have been digging a bed for potatoes; and that is very hard work, I can assure you.

Marian. I did not quite finish the subject we were mentioning, about those animals who employ centinels and watchmen. The monkeys in Brazil, which is in South Ame-

rica, while they are sleeping on the trees, have, uniformly, a centinel to warn them of the approach of the tiger or other rapacious animals; and if ever he is found sleeping, his companions instantly tear him in pieces for his neglect of duty. For the same purpose, when a troop of monkeys is committing depredations on the fruits of a garden, a centinel is placed on an eminence, who, when any person appears, makes a certain chattering noise, which the rest understand to be a signal for retreat, and immediately make their escape.

Charlotte. I am very fond of watching monkeys. Do not you remember the one we saw at Exeter 'Change, which used to crack nuts with a stone, because it had lost its teeth?

Marian. Yes, I remember. It was an instance of great sagacity, for, as the natural organs failed, it supplied the deficiency by using a tool. The most extraordinary of the monkey tribe is the ourang-outang, or wild man of the woods. Buffon says, speaking of an ape of this kind: "I have seen it sit at



OURANG-OUTANG.

table, use a fork and spoon, and pour out drink into a glass. When invited, it took a cup and saucer, put in sugar, poured out tea, and left it to cool before drinking.

Charlotte. I think he must have been taught some of these actions.

Marian. Many of these habits were, no doubt, the effect of education. In his natural state, the ourang-outang feeds on vegetables, sleeps in trees, in thick woods, and lives mostly alone.

Edward. What did Mr. Johnson say about toads, just when we came into the room yesterday? I did not like to ask, but thought you would tell us if it were proper.

Marian. He was talking about a toad that was discovered near Nantz, in France, in the heart of an old oak, without any visible entrance to the habitation. From the size of the tree, it was concluded that the animal must have been confined in that situation at least eighty or a hundred years. In the numerous examples of toads found in solid rocks, exact impressions of the animal bodies, corresponding to their respective sizes, were uniformly left in the stones or trees from which they were dislodged; and to this day, it is said, that there is a marble chimney-piece, at Chatsworth, with the print of a toad in it; and many other instances might be given, of toads having been concealed in this manner.

Charlotte. Can you not tell us these instances?

Marian. I do not think I can remember any more; but I will read you part of a

letter from a gentleman, who gives an account of a tame toad.

Charlotte. A tame toad! Well, I do not think I should choose such an ugly animal for my companion. But be so kind as to read us the letter.

Marian, (reads.) “It would give me the greatest pleasure,” says Mr. Ascott, “to be able to inform you of any particulars worthy of notice, concerning the toad which lived so many years with us, and was so great a favourite. It had frequented some steps before the hall-door, some years before my acquaintance commenced with it; and had been admired by my father for its size, (which was the largest I ever met with,) who constantly paid it a visit every morning. I knew it myself above thirty years, and, by constantly feeding it, brought it to be so tame, that it always came to the candle and looked, as if expecting to be taken up and brought upon table, where I fed it with insects of all sorts. You may imagine that a toad, generally detested, although one of the most inoffensive animals, so much taken notice of

and befriended, excited the curiosity of our visitors, who desired to feed it: and even ladies so far conquered their horror of a toad, as to wish to see it. I cannot say how long my father had been acquainted with the toad before I knew it: he used to mention it as 'the old toad, which I have known so many years.' I can myself answer for thirty-six years. In respect to its end, had it not been for a tame raven, I make no doubt it would have been now living; but this raven, seeing it one day at the mouth of its hole, pulled it out, and though I was in time to accomplish its rescue, he had pulled out an eye, and hurt it so much, that, notwithstanding its living a twelvemonth, it never enjoyed itself, and had difficulty in taking its food, missing the mark for want of its eye. Before that accident, it had the appearance of perfect health."

Edward. Does that gentleman know much about natural history?

Marian. Yes, my dear, he is a great naturalist; and I have asked him to be so kind as to write me an account of any thing he



MUSCLE.

meets with worthy notice, that I may have the pleasure of reading it to you, as you both take so much interest in the subject. Has either of you seen a muscle?

Charlotte. Oh, yes; we saw some when we were at the sea-side last year.

Marian. From their appearance, you would suppose that they were almost devoid of motion, but this is not the case. When inclined to change its situation, the river-mussel opens its shell, thrusts out its tentacula, or feet, and while lying on its side in an horizontal position, digs a small furrow in the sand. Into this furrow, by the help of its tentacula, the animal contrives to

make the shell fall, and thus brings it into an upright position. We have now got our muscle on end, but how is he to proceed? He again stretches forward his tentacula, by which he throws back the sand, lengthens the furrow, and thus advances in his journey. Marine or sea-muscles, perform their movements in the same manner, and by the same instruments. When not in motion, they are all firmly attached to rocks, or small stones, by many threads, of about two inches in length, which serve the double purposes of an anchor and cable. Without this provision of nature, these animals must become the sport of the waves. But how does the creature spin these threads? There is a tube running entirely through the tentacula, and in this groove is a glutinous substance, which the animal, by the operation of certain muscles, has the power of forcing out, and of attaching it, in the form of long threads, to stones or other solid bodies. More than a hundred and fifty of these cables are often employed in mooring a single muscle. Other bivalved shell-fish——

Charlotte. Oh! pray what is the meaning of *bivalved*?

Marian. Those fish whose shells consist of two pieces.—Other bivalved shell-fish, the species of which are very numerous, perform a progressive, or retrograde motion, by an instrument something like a leg or foot. But the animals can, at pleasure, make this leg assume almost every kind of form, according as their wants require. By this leg they are not only enabled to creep, to sink in the mud, or disengage themselves from it, but to perform a motion of which you could not suppose shell-fishes were capable. When the *tellina*, or limpet, wishes to make a spring, it puts the shell on the point, or top; it then stretches out the leg as far as possible, makes it take hold of the shell, and, by a sudden movement, similar to that of a spring let loose, strikes the earth with its leg, and actually leaps to a considerable distance.

Edward. I never should have thought of creatures leaping, that were shut up in a case, as these shell-fish are.

Marian. There is another, also, called the spout-fish, whose habits are no less extraordinary. It has a shell, consisting of two pieces, resembling the handle of a razor. This animal is not able to move on a flat surface, but it digs a hole, or cell, in the sand, sometimes two feet in depth, in which it can ascend or descend with pleasure. The leg, which enables it to perform these movements, is situated in the centre. This leg is fleshy, and pretty long. When necessary, the animal can make the termination of the leg assume the form of a ball. When the spout-fish wishes to sink into the sand, it extends its leg from the lower end of its shell, and makes the extremity of it take the form of a shovel, sharp on each side, and terminating in a point. With this instrument the animal cuts a hole in the sand. After the hole is made, it advances the leg still further into the sand, makes it assume the form of a hook, and then easily forces the whole shell to the bottom.

Charlotte. But then, how does it get out again?

Marian. When it chooses to regain the surface, it changes the end of the leg into a ball, and then tries to sink the leg lower down; but the ball prevents any further descent, and the muscular effort necessarily pushes the shell upward, till it reaches the surface, or top of the hole. It is amazing with what dexterity and quickness these seemingly awkward motions are performed. The scallop, also, has a curious way of moving. When it happens to be deserted by the tide, it opens its shell to the full extent, then shuts it with a sudden jerk, by which it often rises five or six inches from the ground. In this manner it tumbles forward till it reaches the water. When the sea is calm, troops or little fleets of scallops are often observed swimming on the surface. They raise one valve of their shell above the surface, which becomes a kind of sail, whilst the other remains under the water, and answers the purpose of an anchor, by steadying the animal, and preventing its being overset. When an enemy approaches, they instantly

shut their shells, plunge to the bottom, and the whole fleet disappears.

Edward. Pray, Marian, what was the name of that prickly kind of shell we saw in a shop-window the other day?

Marian. I am glad you reminded me of that, for I intended to have told you that it was called the sea-urchin, or sea hedge-hog. The surface of the shell is divided into triangular compartments, and covered with numberless prickles, from whence it takes its name. These triangles are separated by regular belts, and perforated by a great number of holes. From these holes proceed horns, like those of the snail, and susceptible of the same motions. Like the snail, the sea-urchin uses its horns when it wishes to move; but their principal use is to fix the animal to rocks and stones. The toad-fish, also, lies concealed behind rocks, and among fuci, or sea-weeds; and by means of certain tendrils that rise from its head, it entices the floating worms and fishes within its reach. The mouth of this creature is sometimes a yard in width. But now, my dear children,



TOAD-FISH.

I must leave off talking to you, as I have some letters to write.

Edward. Thank you, Marian, for what you have told us. We are going to learn our lessons for to-morrow.

~~~~~  
DIALOGUE XIII.  
~~~~~

Marian.

NOW, my dear children, I think I have a great treat for you. I have got a letter from Mr. Parmer, mentioning several interesting circumstances.

Charlotte. Oh, thank you! pray begin. I have got my work ready, so there will be no interruptions.

Marian. Mr. Parmer says: "I was dining out the other day, where I was told that they had a canary-bird which always fainted when its cage was cleaned. I desired to see the experiment. The cage being taken from the ceiling, and its bottom drawn out, the bird began to tremble, and turned white about the root of the bill. He then opened

his mouth, as if for breath, and breathed quickly; stood straight upon his perch, and hung his wings; spread his tail, closed his eyes, and appeared quite stiff for half an hour. At length, with much difficulty and deep respirations, he gradually came to himself again.

Charlotte. Poor little thing! What could be the reason of this?

Marian. I should think it arose from fear.

Edward. Is that all the letter?

Marian. No, I will go on:—"I had a cat, which often used to catch trout by darting upon them in a deep, clear water, near a mill; and I have often seen her catch fish in the same manner, when the mill-pool was drawn so low that the fish could be seen. I have heard of other cats catching fish in shallow water, as they stood on the bank. This seems a natural art of taking prey in cats, which their domestication has, in general, prevented them from employing, though their fondness for fish continues in its original

strength. There is a kind of pelican, whose food is fish, which it takes from other birds, because it is not formed to catch them itself. Hence, it is called by the English, a man-of-war bird. Pelicans are furnished with bags under their bills, which they fill with water. The bill of one of these birds measured a foot and a half, and the bag held twenty-two pints of water."

Edward. Dear me! that is eleven quarts. Why, what a quantity for a bird to carry! But what can be the use of this water?

Marian. I was just going to tell you. The pelican makes choice of dry and desert places to lay her eggs. When her young are hatched, she brings them water from great distances in this bag. This water she pours into the nest, to cool her young and to teach them to swim. Lions, tigers, and other rapacious animals, resort to these nests, drink the water, and are said not to injure the young. Another bird dwelling in deserts, is the ostrich—the largest of known birds. The eggs are equal in size to a child's head. The



OSTRICH.

Arabs use the skin as leather; and the beauty of its plumage has unfortunately marked the bird for destruction.

Edward. Are there any other instances, which prove that animals depend upon one another for assistance, besides that you mentioned just now about the pelican and the lions?

Marian. We have innumerable instances of that kind, and we have others which show that some animals possess a faculty resembling the reason with which man is endowed; an example of which I can give, by continuing Mr. Parmer's letter:—"In the trees before the house of a friend of mine, there are, annually, nests built by sparrows—birds which generally build under the tiles of houses, or the thatch of barns. Not readily finding such a situation, they made covered nests, bigger than a man's head, with an opening like a mouth at the side. These nests resembled those of magpies, except that they were built with straw and hay, and lined with feathers, and so nicely managed as to defend them from wind and rain."

Edward. I think I have heard that sparrows are very useful in destroying caterpillars.

Marian. They are, indeed. Without these little ravagers, our gardens would be overrun. A pair of sparrows, during the time that their young are to be fed, destroy, every week, three thousand three hundred



STORK.

and sixty caterpillars. It was discovered that the two parents carried to their nests forty caterpillars in an hour. The utility of these birds is not confined to this circumstance; for they likewise feed their young with butterflies and other winged insects, each of which, if not destroyed in this manner, would be the parent of several hundreds of caterpillars.

Charlotte. I think they must keep always on the wing, to be able to carry so many in an hour.

Marian. The stork is well known in

Holland, for its usefulness in destroying frogs and other amphibia. It is considered a crime to injure it. In autumn, storks migrate in numerous flocks, to the marshes of Egypt and Barbary. They are remarkable for the care they take of their parents when infirm or disabled. In India the birds exert more contrivance in building their nests, on account of the monkeys and snakes, which would attack their young, were they so situated that they could easily get at them. Some form hanging nests, in the shape of a purse, deep, and open at top; others, with a hole in the side; and some, still more cautious, with an entrance at the very bottom, forming their lodge near the top. But the tailor-bird will not even trust its nest to the extremity of a twig, but makes one more advance to safety, by fixing it to the leaf itself. It picks up a dead leaf, and sews it to the side of a living one, its slender bill being its needle, and its thread some fine fibres. The lining consists of feathers, gossamer, (which is the web of a spider,) and down. Its eggs are white; the colour of the bird is light yellow; its length,

three inches; its weight, three sixteenths of an ounce: so that the materials of the nest are not likely to draw down an habitation so slightly suspended.

Edward. Well, that is the most wonderful thing Mr. Parmer, or any body else, could tell us. - How I should like to have one of these nests!

Marian. There is one preserved in the British Museum, and I hope, some time or other, you will go to London and see it there.

Charlotte. I do not think there is any thing I want to see so much as this nest. Do not you, Edward?

Edward. Yes, indeed I do: but I do not know whether I wish to see it more than any thing else. Indeed, there are so many wonderful, curious, and extraordinary things, that I do not know what I wish to see most. Do you think there is any such thing as a rattle-snake in England, Marian?

Marian. There may, perhaps, be a few brought over as curiosities; but they are not natives of this country.

Edward. Can you tell me any thing about it? for I was reading something the other day, in some travels, but there was not half enough.

Marian. The rattle-snake possesses the most deadly poison, which is situated at the roots of two of its teeth. A person bit by a rattle-snake, dies in less than half an hour. But Providence has wisely ordained that this animal (which otherwise would be so very destructive) should present in itself a warning, by which people may be prevented from going too near to it. This is the rattle at the end of the tail, which gives certain notice of its approach. Some years ago, three gentlemen were travelling in America, who saw a dispute between a dog and a rattle-snake, about a squirrel, the head and shoulders of which the latter had got in his mouth, but which, being rather too large, it took some time to moisten the fur, so as to let it pass down his throat. The dog, taking advantage of this, seized the hinder part of the squirrel, and pulled with all his strength. The snake would not let go for a long time, till at last

he was obliged to give way. The dog eat the squirrel, and felt no injury, which was astonishing, as it had been in the snake's mouth. You may suppose the violent effect of the poison, from the following circumstance. A person who was out in the woods of America, in which country they are chiefly found, caught a rattle-snake. He cut off his head, with about three inches of his body. Then, with a green stick, a foot and half long, the bark being newly peeled off, he contrived to reach the poison. On this he observed small green streaks rise up the stick towards his hand.

Edward. Oh! I should have been afraid of the poison touching me.

Marian. So he was, and threw down the stick; and in a quarter of an hour it split into several pieces, and fell assunder from end to end.

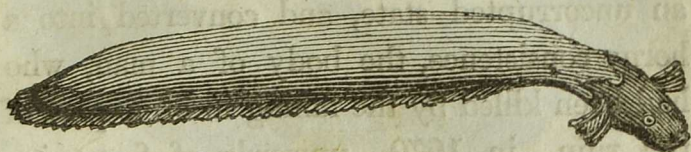
Edward. What terrible creatures these snakes must be!

Marian. The *boa constrictor*, also, is a serpent, found in India and the warm parts of America. It is of vast strength and size,



BOA CONSTRICTOR.

measuring, sometimes, twelve yards in length. By turning itself round the bodies of deer, leopards, and other quadrupeds, it breaks the bones, and after covering them over with slimy mucus, gradually swallows them. This snake is not venomous.



ELECTRICAL EEL.

Edward. Is not the eel a kind of snake?

Marian. The eel ranks among fishes. In the fresh-water rivers of America, the electrical-eel was discovered. It is much dreaded by persons swimming. They are in danger of being drowned when struck by it. When the fish gives a shock, the person is immediately affected in the same manner as if he had received an electrical shock. A very powerful sensation is communicated, even when it is touched with a walking-stick. The book which lies on my work-table contains many other curious anecdotes. Bring it to me, and I will read one respecting a man who was buried in a copper-mine. "In

December, 1719, there was found, in one of the copper-mines at Fahlun in Sweden, in an uncorrupted state, and converted into a horny consistence, the body of a man, who had been killed by the falling in of a part of the ruin, in 1670, upwards of forty-nine years before. Both his legs, with his right arm and head, were fractured; but his face, and the rest of his body, were unhurt. When the body was exposed to view, (for the features still remain^d perfect,) it was recognized by several of the miners. His name was Matthew Israel; and it was well remembered, that he had gone down into the mine at the time before mentioned, and had been missing ever since."

Edward. But why was not the body decayed? I always understood that putrefaction takes place in a few weeks after death.

Marian. The preservation of the body, as well as the hardness which it had acquired, were attributed to the vitriol in the water of the mine, for the body was found in this vitriolic water.



SPHINX ATROPOS.

Edward. Is there not any thing else in that book, which you can read to us?

Marian. I believe there are several things. The first is about the nymph, or chrysalis, of water-moths. Before they change into moths, they are inhabitants of the water, and, by means of a kind of gluten, they cover themselves with pieces of wood, straw, small shells, or gravel. It is necessary that they should always be in equilibrium with the water in which they live. To accomplish this purpose, when their habitations are too heavy, they add a piece of wood; when too light, a bit of gravel.

Charlotte. How much sense that little creature must have, to regulate its weight so exactly!

Edward. Many moths fly about in the evening: do you know any of them?

Marian. I once saw the *sphinx atropos*: it is the largest of the sphinx genus found in England. When taken, it emits a sound almost like the squeaking of a mouse. The caterpillar feeds on the plants of hemp and potatoe. I will give you one more instance of sagacity, noticed in the same work. A gentleman had a cat, which used to frequent a closet, the door of which was fastened by a common iron latch. A window was situated near the door: when the door was shut, the cat gave herself no uneasiness, but when she grew tired of staying in the closet, she used to mount on the ledge of the window, and, with her paw, dexterously lift up the latch, and thus come out when she pleased. This she was in the habit of doing for many years.

Edward. Oh, Marian! there is another thing I wanted to talk to you about. Yes-

terday I saw a duck swallowing stones, and I want to know what that could be for?

Marian. Many birds eat stones to digest their food. I knew a lady, who had a brooch made of a large Scotch pebble, which was found in the gizzard of a grouse that had been shot in Scotland. Turkeys have remarkable digestive powers. Experiments have been tried by some philosophers, which appear very cruel; but as they are curious, I will tell you something about them. It appears, that hardly any thing will injure the stomach of the turkey. All animals are furnished with what is called the gastric juice, which answers the purpose of digesting the food; and in turkeys this is much stronger than in most other creatures. Twelve strong tin needles were firmly fixed into a ball of lead; the points projecting about a quarter of an inch from the surface. Thus armed, it was covered in a case of paper, and forced down the throat of the turkey.

Charlotte. Oh, how very cruel!

Marian. The bird retained it for a day and a half, without showing the least symptom

of uneasiness. Why the stomach should have received no injury from such a terrible trial, I cannot explain. The points of the needles were broken off close to the surface of the ball; but as they could not be found, we may conclude that they were digested with the other food. The same person tried another experiment, which appears still more cruel. Instead of needles, he put small lancets; and in eight hours after the turkey had swallowed the ball, he opened the stomach, but the lancets were broken in pieces: three of them remained in the intestines, but the other nine could not be found.

Edward. That is very wonderful, indeed! I should have thought that the poor thing must have died.

Marian. But I have something still more wonderful to tell you, about a man who eat stones.

Charlotte. A man eat stones! But surely they killed him.

Marian. No: he was a German, and used to gain his livelihood by eating stones, for the amusement of the people. He began

this strange practice at seven years old, and continued it for twenty years. He would swallow six or eight stones at a time; some of them as large as a pigeon's egg. Indeed, this man seemed to have the power of eating almost any thing without injury. He swallowed some leeches, which were digested like other food

Edward. It was most astonishing, that eating all these odd things did not destroy him.

Marian. We must suppose, that it was owing to some peculiar formation in the organs of his stomach, and that another person attempting to swallow such substances, would suffer the greatest pain, and most probably death. But I must now leave off talking of the stone-eater, or upon any other subject; for I have an engagement at two o'clock, and it is very nearly that hour.

~~~~~

DIALOGUE XIV.

~~~~~

Edward.

I THOUGHT I saw a letter from Mr. Parmer to-day, and so I hope you have something very entertaining to read to us. Have you not, my dear Marian?

Marian. Yes; he is very kind, in copying from his Book of Extracts any thing which he thinks will be amusing to us. The first is about the alpine marmot, which is nearly sixteen inches in length, and has a short tail. These animals lie torpid during the winter, and their retreats are formed with much art and precaution. With no other tool than their feet and claws, which are admirably adapted to the purpose, they dig the earth with amazing quickness, and throw it

behind them. The habitation is not a simple hole, but a kind of gallery, in the form of a Y, each branch of which has an aperture, and both terminate in a capacious apartment, where several of the animals lodge together. One branch is below, and the other above this apartment: the latter is the principal entrance. These dwellings are lined with moss or hay. They work in company, and one of them stands sentinel on the rock, whilst the others are employed in cutting the grass, in order to make hay. If the sentinel perceives a man, an eagle, or a dog, he alarms his companions by a loud whistle, and is himself the last that enters the hole. When they feel the approach of the sleeping season, they shut up both passages to their habitations, and this operation they perform so completely, that it is more easy to dig the earth any where else than in such parts as they have thus fortified. At this time they are very fat, but before awaking from their long sleep, are quite emaciated. Mr. Parmer was travelling last year in Derbyshire, and



GOLDEN EAGLE.

saw an eagle's nest, which was built on a mountain called the Peak. "This structure was so considerable, and composed of such solid materials, that it may last many years. Its form resembled that of a floor. The bottom consists of sticks about five or six feet in length, which were supported at each end. These were covered with several layers of rushes and heath. There was one young one in the nest, with a lamb, a hare, and three



ANT-LION.

heath-pouts. The nest was about two yards square, and perfectly flat." The next article is an account of the *formica leo*, or ant-lion. "This animal forms a funnel-shaped hole in the sand, where he lays in ambush, waiting for his prey. It always walks backwards, and therefore cannot pursue any insect. To supply this defect, it lays a snare for them, and especially for the ant. In digging a funnel, the *formica leo* begins with tracing a circular furrow in the sand. After the first furrow is made, it traces a second, which ends,

in the same place as the first. It throws out the sand as with a shovel, from the successive furrows, or circles, by means of its square, flat head, and one of its fore-legs. It proceeds in this manner till it has completed its funnel, which it does with surprising quickness and address. At the bottom of this artful snare it lies concealed and immovable. When an ant happens to make too near an approach to the opening of the funnel, the sides of which are very steep, the fine sand gives way, and the unwary animal tumbles to the bottom. The *formica leo* immediately kills the ant, buries it under the sand, and sucks out its vitals: it afterwards pushes out the empty skin, repairs the disorder introduced into its trap, and again lies in ambush for fresh prey."

Edward. That is a curious kind of snare, indeed.

Marian. Many are the arts employed by different creatures, to entrap their prey, and great is the intelligence which they sometimes display. I was reading, the other day, of a dog which belonged to a blind beggar. This



SHEPHERD'S DOG.

dog, besides leading his master in such a manner as to protect him from all danger, learned to distinguish, not only the streets, but the houses where his master was accustomed to receive alms twice or three times a week. Whenever the animal came to any of those streets with which he was well acquainted, he would not leave it till a call had been made at every house where his master was usually successful in his petitions. When the beggar began to ask alms, the dog, being wearied, lay down to rest; but the master was no sooner relieved or refused assistance, than the dog rose immediately, and, without either order or sign, proceeded to the houses where the beggar generally received some gratuity. When a halfpenny was thrown

from a window, such was the sagacity and attention of this dog, that he went about in search of it, lifted it from the ground with his mouth, and put it into his master's hat. Even when bread was thrown down, the animal would not taste it, unless he received a portion from the hand of his master. Dogs can be taught to repair to a known butcher, and carry home the meat in safety. Without any other instruction than imitation, a mastiff, when accidentally shut out from a house which his master frequented, uniformly rang the bell for admittance.

Charlotte. I am very fond of dogs, and these stories make me like them still better, because it shows me that they are even wiser than I thought them.

Marian. Some little time since, there was a dog, belonging to a grocer in Edinburgh, who amused and astonished the people in the neighbourhood. A man, who went through the streets ringing a bell, and selling penny pies, happened to treat the dog with one. The next time he heard the pieman's bell, he ran to him with impetuosity, seized him

by the coat, and would not suffer him to pass. The pieman, who understood what the animal wanted, showed him a penny, and pointed to his master, who stood at the street door and saw what was going on. The dog immediately supplicated his master by many humble gestures and looks. The master put a penny into the dog's mouth, which he instantly delivered to the pieman, and received his pie. This traffic between the pieman and the dog was daily practised for some time.

Edward. Well, that is the most extraordinary thing you have told us yet!

Marian. Do you think so? I am glad you are entertained by it—and, fearing that I can find nothing more quite so amusing, I shall now wish you good night, as it is time for you to retire.

Edward. Good night, my dear Marian: I think we shall dream of the dog and the pieman.

be the case and would not suffer his losses
 The passage was understood what the rain
 and water, and I like a young and painted
 to be needed who stood at the street door
 and saw what was going on. The dog in-
 stantly anticipated his master by many
 simple gestures and looks. The master put
 a penny into the dog's mouth, which he in-
 stantly delivered to the passage, and returned
 the pie. This traffic between the passage
 and the dog was daily practiced for a year

Likewise, Well, that is the most common
 thing that you have told us of
 likewise. Do you think so? I am afraid
 you are mistaken by it—and I am afraid
 I had had nothing more quite so common. I
 shall now wish you good night, so it is time
 for you to retire.
 Likewise, Good night, my dear Sir,
 I think we shall be glad of the dog and the

BOOKS FOR YOUTH,

PUBLISHED BY

DARTON, HARVEY, & DARTON,

55, GRACECHURCH-STREET,

London.



DOMESTIC PLEASURES; or, the **HAPPY FIRE-SIDE.** Illustrated by interesting Conversations. By *F. B. Vaux.* Price 4s. 6d.

UTILITY; or, Sketches of Domestic Education. By the *Author of the "Young Botanists,"* &c. 12mo. 3s. 6d. bound.

"This is a superior little tract for the formation of the youthful mind. The introduction possesses much interest, and the system which gradually leads the pupil to knowledge is admirably conducted."

Critical Review, Sept. 1815.

BUDS OF GENIUS: or, some Account of the early Lives of celebrated Characters who were remarkable in their Childhood. Intended as an introduction to Biography. Price 2s.

LITTLE VISITORS. In Words chiefly of one and two Syllables. Price 1s. 6d. half bound.

The **CONVERSATIONS of EMILY.** Abridged from the French. 18mo price 3s. 6d. half bound, roan backs.

Great freedom has been taken in rendering this celebrated work into English, in order to accommodate it more fully to the tastes and manners of our young readers.

LADIES' ASTRONOMY. Translated from the French of **JEROME DE LALANDE,** by *Mrs. W. Pea-gee.* 18mo. price 3s. boards.

BOOKS FOR YOUTH.

MAY-DAY; or, Anecdotes of Lydia Lively. Price 1s. 6d. half bound.

An **INTRODUCTION** to the **NATURAL HISTORY** and **CLASSIFICATION** of **INSECTS**. In a Series of familiar Letters. With illustrative Engravings. By *Priscilla Wakefield*. 12mo. price 5s. boards; or, with the Plates coloured, price 8s.

An **INTRODUCTION** to **BOTANY**, in a Series of familiar Letters, with illustrative Engravings. By *Priscilla Wakefield*. The Seventh Edition, corrected throughout, and with new Plates. Price 4s. in boards.

INSTINCT DISPLAYED, in a collection of well-authenticated Facts, exemplifying the extraordinary Sagacity of various Species of the Animal Creation. By *Priscilla Wakefield*. Second Edition. Price 5s. boards.

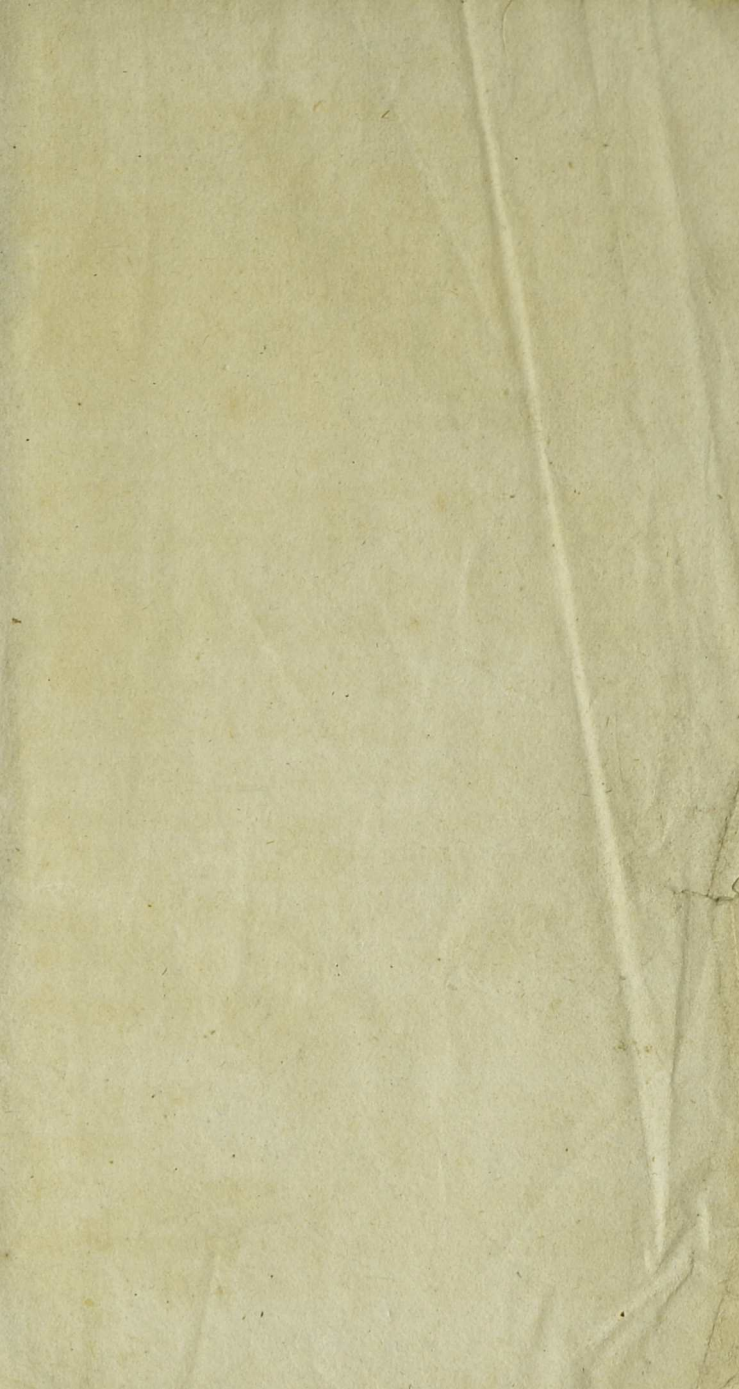
MENTAL IMPROVEMENT; or, the Beauties and Wonders of Nature and Art; in a Series of instructive Conversations. By *Priscilla Wakefield*. Eighth Edition. In Two vols. Price 5s. half bound.

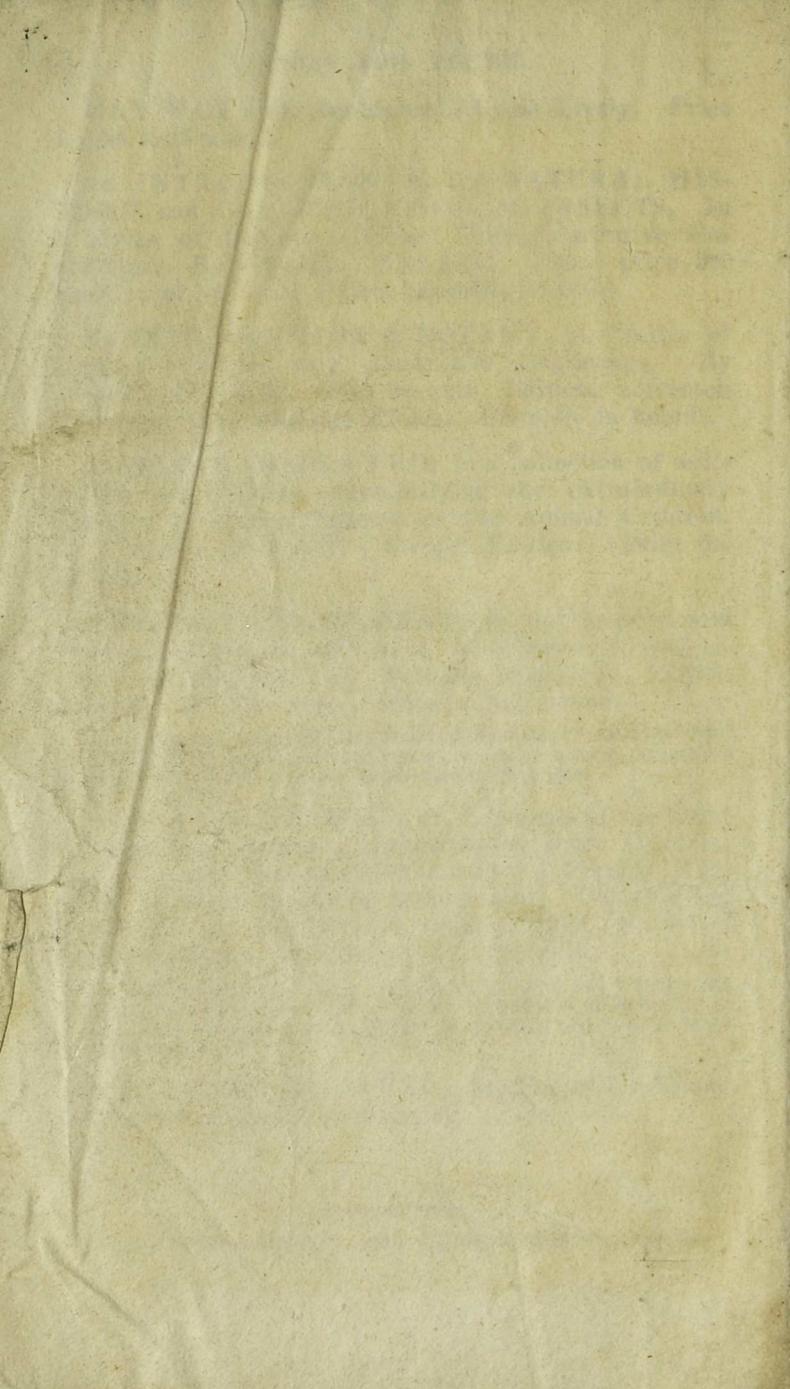
“Air, earth, and water, all bring their contributions; to which are added the operations of human skill and labour, to render natural productions beneficial and entertaining.”—*Monthly Review*, May, 1804.

ANIMATED NATURE; or, Elements of the Natural History of Animals, illustrated by short Histories and Anecdotes, and intended to afford a Popular View of the Linnæan System of Arrangement. For the Use of Schools. By the *Rev. W. Bingley, A.M.* Enriched with Engravings. 12mo. price 6s. in boards.

This work has been prepared in the hope of affording such a simple and amusing, and, at the same time, such a systematical introduction to zoology, as might induce young persons to an earnest pursuit of the study of natural history.

The **INFANT MINSTREL**; or, Poetry for Young Minds. Price 1s. 6d. half bound.





✓ c

