

ribbing in such, the aorta takes nearly two of the body, lying a little to the left of the column, and giving off numerous lateral branches, dividing within the sin, terminate in capillaries. These vessels, remaining, recombine the veins, finally return the blood to the right.

Mammalia there are one ascending aorta and one descending. The elephant and the Ornithorynchus argument similar to that met with in

Arctalia.—Remarkable networks of met with in certain individuals of this class, in the caecum of most animals that networks are seen. The vessels in and anal organs of herbivorous prevent *caecum*. As these feeding have to maintain the head in position for a considerable length of day of such networks will be evident; the too rapid flow of blood to the the limbs of the snake occur similar These are in relation to the various unusual position of this too-bearing

atic Mammalia special arrangements in both the circulatory and respiratory enable the animals to remain some water. In the circulatory apparatus the form of arrangements to prevent passage of blood to the lungs whilst it beneath the surface of the water. In the incrocantal arteries, and expansion of the iliac veins, are the most natural arrangements for this purpose. In man in the blood systems of the the *Sirenia*.

✂️ Darwin and his Work. ✂️

By EDWARD S. AYER, D.Sc., F.R.S.

PART II.

A. THE NATURALIST'S VOYAGE AROUND THE WORLD.

ON the 27th of December 1831, a ten-gun brig, the *Beagle*, sailed from Devonport. The object of the expedition was to survey certain parts of South America, and to get a girdle round the earth in the shape of chronological measurement. On the 27th of October 1846 the *Beagle* made the coast of England once again. To the Englishman with the old love of battle not quite dead within him, the *Beagle* and the

Beagle are historical names among ships; but to the student, for higher walks the name of the ten-gun brig *Beagle*, for during that period of nearly five years the vessel was accompanied by Charles Darwin. *The Naturalist's Voyage round the World* is an account, in the form of a diary, of the most interesting facts that came under the observation of the writer during that time.

Among the memories of our boyhood, not the least vivid is the recollection of two quaint, long-haired men, who told us, in language of beautiful simplicity, two stories that never failed to fascinate. They are stories that will last as long as there are boys to read them. About their names hangs an indelible charm, such as that which lies in the word "home," in the portrait of one long passed away, in the secret of a flower that one's mistress was wont to tuck in her sunny hair. The names of these two writers are Daniel Defoe and John Bunyan. Next to *Robinson Crusoe* and the *Pilgrim's Progress*, I know of no book so likely to take firm hold of a boy's mind as *The Naturalist's Voyage round the World*.

The outcry against fairy tales for boys and girls should be left to Mr. Gridgird. The root of the world must confess to a passionate admiration for Jack the Giant-killer, a passionate adoration of Cinderella, and are never tired of hearing of gnomes and goblins and halpies. On the other hand, the terrible history made by some good folks against giving facts to children is a little incomprehensible. It seems to be forgotten that to our little ones all they read and hear is true. *Hops!*—my thumb, Friday, Mr. Grouseheart, are real things to them. They know that the wonderful beards grow to that portentous height, they know that Cassin's bones are still lying in the rubber's case, they know that Aladdin's lamp is somewhere in the world if they could but find it. Let the children have the beautiful old fairy tales, but let them have, moreover, such books as that we are speaking of. They will learn for themselves, sufficiently soon, what is romance.

And, indeed, *The Naturalist's Voyage round the World* reads very much like a fairy tale. It takes us into wonderful regions where vampire bats fly through the night, where our path lies across beds of sensitive plants, and a broad track is left behind us, marked by the drooping of the tender leaf stalks, where pouch men are used for firewood, where bad falls that kills cattle, where showers of butterflies come like summer rain.

From the first page to the last, the book is crowded with facts as dazzling as any inventions of the most brilliant fancy. There is no special knowledge required to enjoy this most fascinating work. Its statements will, of course, have a deeper meaning to any one possessed of a little scientific lore; but some of the most enthusiastic admirers of the book are readers of the ordinary class, without the faintest suspicion of technical knowledge.

And yet Mr. Darwin's style can hardly be called a

popular one. He is not an elegant writer. Some of his sentences, indeed, are at times almost clumsy, but the exquisite charm of the new series of facts he tells us atones for any peculiarities of style. We forget how he talks to us, we are so delighted with what he says. If he had written nothing else, this volume alone would have stamped its author as one of the first among contributors to general scientific knowledge.

Pre-eminently in this work shine out Mr. Darwin's extraordinary powers of observation. He seems well-nigh omniscient. Nothing escapes him. Dust in the air, colour in the sea, the habits of a spider, a cuttlefish, an ostrich, an Indian, he notices all. But whilst this his first great work is specially a collection of facts, it is not that alone. Again and again are encountered instances of his capacity for abstracting from a large number of small truths the one great truth running through them all. In these pages the reader of riper mind will linger over many passages that the boys and girls will skip—passages embodying wide generalisations pregnant with interest. Especially will the student be impressed with the numerous occasions whereon he will meet hints and suggestions of the line of thought so fully worked out in later years in the *Origin of Species*. In this first publication are the germs at least of the views enunciated in the *Magnesian Opus*.

It will be well to consider (1) the nature of the facts communicated to the world in *The Naturalist's Voyage*; (2) the nature of the chief generalisations contained in the volume. It is especially difficult to do this with such a writer as Mr. Darwin, but the attempt will be made.

(1) *An Account of some of the most important facts contained in The Naturalist's Voyage round the World.*—On the 6th of December 1834, on the island of San Pedro, off the coast of Chili, were to be seen two English naval officers, engaged in taking a row of angles with a particular astronomical instrument known as the theodolite. Upon this island of San Pedro at that time resided a certain fox, who on the day and at the hour in question was indulging in his customary evening stroll. Beholding the strangers in the course of his peregrinations, the perambulating animal stopped and took a cautious survey of them. His curiosity was aroused. He grew deeply interested in these men performing such strange antics with such a queer-looking instrument. He became absorbed in contemplation. On the rocks behind him, a naturalist, even on the look-out for new specimens, happened to be walking. He became absorbed in contemplation of the rare animal before him. The animal was curious in two senses of the word. The interest of the scientific fox took the passive form of close observation. The interest of the scientific man took the active form of cautious advancing. The former stood wrapt in wonder. The latter drew near and smote a deadly blow, with a geologist's hammer, on the head of the observing one. The name of the fox, whose

remains are to be seen to this day, in the museum of the Zoological Society, was *Canis Meliops*. The name of the naturalist was Charles Darwin.

The earth is one great battle-field. Between the innumerable races of animals dwelling on the bosom of that which is the mother of them all, endless struggle occur. No mere skirmishes are these contests as a rule but battles wherein death is the penalty of defeat. *Vie victis* is the cry of all nature. No matter of surprise, therefore, is it that in *The Naturalist's Voyage round the World* stories such as the above are not infrequent; no wonder is it that some of the most fascinating parts of the book are those wherein are recorded the life and death struggles of the animal creation. We read with deepest interest, whereunto something of horror lends a zest, of the weird, ghoul-like wasps that sting spiders or caterpillars not to death, but half way thereto; then store up their victims till such time as the wasp larve, emerging from the eggs, devour at their leisure the inert yet living bodies of their prey. We watch eagerly the fight between wasp and spider, the wounding of the latter, its temporary escape, the wondrous systematic hunt for it by its unrelenting foe, the discovery, and finally, after much arduous manœuvring, the deadly stab that narcotizes the unfortunate Arachnid. It is with a pained sense of that poetic justice so dear to us all, when it is dealt out to other people, that we read, on the other hand, of the terrible spider which wraps round and round the miserable wasp entangled in its web, a fatal mesh; then inflicting the death-bite, waits with a fearful patience till the poison has done its work, and the blood of the victim may be sucked from the lifeless corpse.

There are endless tales, moreover, in these pages for those who object even to an extreme extent to the element of horror. The very spider mentioned immediately above, when disturbed, has all kinds of various ways of saving itself from peril. How it runs from one side of its huge web through a central passage to the other; how it drops into the dense thicket beneath, often letting fall a fine rope previously, down which it lowers itself with marvellous rapidity; how, standing in the middle of the web, it jerks the gossamer circles backwards and forwards with such speed that, in the rapid vibration, the outline of the creature's body becomes indistinct and lost!

Amongst curious animals, tortoises again rank high. Some met with in Chatham Island weighed respectively more than fourteen stone. These huge monsters, suggestive of antediluvian beings, when encountered, usually fall to the ground as if dead, with a deep hiss and sudden and somewhat alarming disappearance of head and limbs. A few taps on their shells would reassure them, and, rising, they would march sedately onwards even with a man standing erect on their backs. Very sedate, in truth, are their movements. Some six yards per minute was all that could be accomplished by one of average speed, even when

not suffering from the pressure of a superimposed naturalist. A very powerful attachment to water is characteristic of these Chelonia, and near the springs are to be seen two sets of the reptiles—the one hastening with outstretched necks and longing aspirations towards their watery elysium; the other returning calm and composed, with all the complacent though somewhat irritating equanimity of satiety. In this way they tread out broad, well-beaten paths from the coast inland—paths which led to the first discovery of the watering-places by the Spaniards.

These beings live apparently to an exceedingly venerable age. Slow in living, they seem to be equally so in dying, generally terminating their years by a fall from a precipice or by some other accident. In connection with this same subject of death, a curious fact is recorded in relation to certain parasites on birds that reminds us forcibly of the half mythological tales of rats deserting a ship doomed to destruction. For several hours before a huge condor, one of the carrion fowl of America, died, the parasites upon it were seen crawling to the outside feathers.