THE NATURAL HISTORY OF THE EASTERN ARCHIPELAGO.

TO all Europeans, except perhaps the Dutch, there is scarcely any part of the globe regarding which less is known than the Eastern or Malay Archipelago. It extends for more than 4000 miles in length, namely, from the Soloman Islands on the east, to the Nicobar Islands on the west, and is about 1300 miles in breadth from north to south, or from the Philippines to Northern Australia; and, as Mr. Wallace, in his delightful volumes on "The Malay Archipelago" tells us, it would stretch over an expanse equal to that of all Europe, from the extreme west far into central Asia; or would cover the widest part of South America, and extend far beyond the land into the Pacific and Atlantic Oceans. It includes three islands larger than Great Britain, and in one of these, Borneo, the whole of the British Isles might be included, with a goodly margin to spare on most sides. New Guinea is supposed to be larger even than Borneo, while Sumatra is equal in size to Great Britain.

In his first chapter, which treats of the Physical Geography of the Malay Archipelago, Mr. Wallace brings forward strong arguments to show that it should be divided into an Asiatic and an Australian region; or, in other words that some of these islands were originally parts of the Asiatic continent, while others formed a portion of Australia. The evidence on this point afforded by zoology is especially strong, and shows in a most striking manner that the great islands of Java, Sumatra, and Borneo, "must have once formed a part of the continent, and could only have been separated at a very recent geological epoch. The elephant and tapir of Sumatra and Borneo, the rhinoceros of Sumatra, and the allied species of Java, the wild cattle of Borneo and the kind long supposed to be peculiar to Java, are now all known to inhabit some part or other of Southern Asia. None of these large animals could possibly have passed over the arms of the sea which now separate these countries, and their presence plainly indicates that a land connection must have existed since the origin of the species. Among the smaller mammals a considerable portion are common to each island and the continent. Birds and insects illustrate the same view; for every family, and almost every genus, of these groups, found in any of the islands, occurs also on the Asiatic continent; and in a great number of cases the species are exactly identical." As might be expected from the comparative identity of the animals inhabiting the Asiatic continent and these islands, it may be mentioned that "all the wide expanse of sea which divides Java, Sumatra, and Borneo from each other and from Malacca and Siam is so shallow that ships can anchor in any part of it, since it rarely exceeds forty fathoms in depth." Hence we should infer that the present configuration of this part of the globe is due to a comparatively recent subsidence of intervening tracts of land consequent on the volcanic action which is still going on in Sumatra and Java.

Turning to the south-eastern portion of the Archipelago we find that all the islands from Celebes and Lombock, eastward, possess a fauna more or less closely resembling that of Australia, which, as is well known, differs wholly in its animals from any other part of the globe. Instead of cats, bears, wolves, deer, sheep, oxen, horses, and the other familiar types of quadrupeds, it has marsupials, such as kangaroos and opossums; while in birds it is almost as peculiar. Instead of woodpeckers and pheasants, families of which exist in every other part of the world, it has "the mound-making brush-turkeys, the honey-suckers, the cockatoos, and the brush-tongued lories, which are found nowhere else upon the globe. All these striking peculiarities are found also in those islands which form the Austro-Malayan division of the Archipelago." As in the case of the other portion of the Archipelago, so also here we find that the sea connecting New Guinea and some of the adjacent islands to Australia is uniformly shallow.

If our readers will take the trouble to glance at a map of this part of the world they will easily find a strait separating the island of Bali (which lies at the eastern extremity of Java) from that of Lombock. This narrow strip of water, which is not more than fifteen miles across, separates two great divisions of the earth, which differ as essentially in their animal life as Europe does from America. "In Bali we have barbets, fruit-thrushes, and woodpeckers. On passing over to Lombock these are seen no more; but we here have abundance of cockatoos, honey-suckers, and brush-turkeys, which are equally unknown in Bali or any island further west."

It is worthy of remark that there is nothing in the soil or in the climate to account for this difference. The great volcanic chain runs through both parts, and exercises no apparent effect upon their productions. In the corresponding group of islands (as the Moluccas and the Philippines, Borneo and New Guinea, Bali

and Timor, &c.), "constructed as it were after the same pattern, subjected to the same climate, and bathed by the same oceans, there exists the greatest possible contrast when we compare their animal productions." How is it that the fifteen miles of water which separates Bali from Lombock causes an incomparably greater zoological difference than the hundred miles which intervene between New Guinea and Australia? The difference is to be sought in the different depths of the seas. The narrow strait is of considerable depth, and a deep sea is generally an old sea; while Torres Strait is a shallow sea, and consequently, in all probability, is of recent origin, and indicates a recent land connexion.

The human inhabitants of the Malay Archipelago fall, like the other mammals and the birds, into two well marked divisions or types—the Malay or yellow, and the Papuan or black, which "differ radically in every physical, mental, and moral character." The line which separates these races approximates to that which divides the zoological regions, but is somewhat to the east of it; which is readily accounted for by the fact that man can traverse straits impassable to other mammals; and the Malays, from their higher civilization and greater enterprise, have long encroached upon the territories of their Papuan neighbours.

It may not be generally known that for these and other researches which were conducted during his eight years' wanderings (from 1854 to 1862) in the Archipelago, Mr. Wallace received, in 1868, from the Council of the Royal Society, one of the two royal medals which are annually awarded, and are regarded as the highest scientific prizes in this country. Out of the somewhat limited scientific world it is certainly not known that while on these travels he sent, in 1858, an essay to the Linnæan Society "On the Tendency of Varieties to depart indefinitely from the Original Types," containing a distinct statement of the doctrine of natural selection which he had developed independently of Mr. Darwin. "Of Mr. Wallace and his many contributions to philosophical biology it is not easy (says Dr. Hooker, in his Presidential Address to the British Association, in 1868) to speak without enthusiasm; for, putting aside their great merits, he, throughout his writings, with a modesty as rare as I believe it to be in him unconscious, forgets his own unquestioned claims to the honour of having originated, independently of Mr. Darwin, the theories he so ably defends." These remarks sufficiently attest the high position which Mr. Wallace holds in the scientific world. We shall now proceed to glean from his delightful volumes some of his most important natural history observations and discoveries; and with them we shall intermingle occasional observations by two other travellers who have recently followed more or less in Mr. Wallace's footsteps, viz., Mr. Bickmore, the author of "Travels in the East Indian Archipelago," and Dr. Collingwood, the author of "Rambles of a Naturalist on the Shores and Waters of the Chinese Sea." By a strange coincidence all three of these works were published within a few months of one another. The two last-named books, and especially Mr. Bickmore's, are very inferior, in a natural history point of view, to Mr. Wallace's volumes. Long before he started for the east, Mr. Wallace had obtained a first class place amongst men of science by his "Travels on the Amazon and Rio Negro;" while Dr. Collingwood and Mr. Bickmore make their first appearances as authors. The former is a graduate in medicine of the University of Oxford, and his explorations were made in 1866 and 1867 on board her Majesty's vessels, *Serpent* and *Scylla*; while the latter is an American professor, whose strong point is conchology, and who undertook his eastern travels, which extended from April, 1865, to May, 1866, mainly for the purpose of searching for the shells figured by Rumphius (a Dutch doctor, who lived for many years at Amboyne), in his "Rariteit Kamer," or "Chamber of Curiosities," which was published in 1705.

We shall commence with a sketch of some of the most remarkable natural history products of the island of Singapore, which, as our readers doubtless recollect, is separated by a narrow strait (at one point not more than half a mile broad) from the southern extremity of the Malay Peninsula, and lies about a degree north of the equator. It is not more than twenty-five miles long from east to west, and fourteen from north to south. In the small wood-crowned hills, which afford excellent sport to the entomologist, the inexperienced traveller must keep a sharp look-out for tigers, and, what are perhaps still more dangerous, tiger-pits. "These traps," says Mr. Wallace, "were carefully covered over with sticks and leaves; and so well concealed, that in several cases I had a narrow escape from falling into them. They are shaped like an iron-furnace, wider at the bottom than at the top, and are fifteen or twenty feet deep, so that it would be almost impossible for a person unassisted to get out of one. Formerly, a sharp stake was

stuck erect in the bottom; but, after an unfortunate traveller had been killed by falling on one, its use was prohibited. There are always a few tigers roaming about Singapore, and they kill on an average a Chinaman every day, principally those who work in the gambir plantations, which are always made in newly cleared jungle." That there are tigers in Singapore is unquestionable. Mr. Wallace himself heard a tiger roar once or twice in the evening; but Dr. Collingwood thinks that their number is overrated, and that six or eight tigers would be a nearer estimate than the twenty couple which Mr. Cameron (in "Our Malayan Possessions in Tropical India") supposes to exist in the island. In an old guide-book it is stated that the tigers were so numerous, that, on the arrival of the steamers, the passengers used to see them coming down to the water's edge to drink. Salt-water must obviously have been the favourite beverage of these remarkable animals. The officers at Fort Canning believe that in most cases in which John Chinaman mysteriously disappears, the tiger is unjustly blamed.

The Klings (a body of Mahometans from the Coromandel Coast of India, who, with the Chinese, constitute the eastern residents in Singapore) have a method of obtaining small birds which, Dr. Collingwood thinks, might prove useful to the practical ornithologist. Armed with a straight tube about six feet long, and a piece of soft clay, the bird-catcher seats himself beneath a banyan. Breaking off a morsel of the clay, he rolls it into a little ball between his hands, and placing it in the tube, takes aim at a small bird singing in the branches above him. He seldom misses, and the bird falls to the ground killed or stunned, but with its plumage uninjured.

In about two months Mr. Wallace obtained no less than 700 species of beetles, a large proportion of which were quite new, and amongst them were 130 distinct kinds of the elegant Longicorns, so much prized by collectors. Almost all of these were collected in one patch of jungle not more than a square mile in extent. The cocoa-nut, which of late years has been planted largely in Singapore, suffers from two terrible enemies in the shape of beetles, which destroy thousands of nuts. One is a large *Curculio*, nearly as big as the English stag-beetle, and is called by the inhabitants the *red beetle*, from a blood-like mark on the thorax: while the other is an *Oryctes (O. Rhinoceros)*, so-called from its projecting horn. Men ascend the trees in search of these enemies, which they find in abundance; and, after piercing them with a sharp stick, pass a string through them, and hang them in festoons at the entrance of the plantation.

In all tropical regions there seems to be a superabundance of ants—at all events so far as the personal comfort of travellers is concerned. Singapore is no exception to this rule, for it abounds in different kinds, from the small red ants only just visible to the eye, to gigantic black fellows (*Formica Gigas*) of an inch in length; while there are brown ants half an inch long, armed with formidable pincers, which they will freely use whenever they have a chance. These brown ants make curious nests of leaves, resembling a ball as large as the head, which are often found amongst the foliage of small trees.

In an excursion which Dr. Collingwood took to the rocks on which the Horsburgh Lighthouse stands, about twenty-eight miles east of Singapore, he met with the remarkable animals known as leaping-fish (*Periophthalmus*). They "were of a large size, and were pretty numerous; and it was amusing to see them climb up the steep and smooth sides of the rocks, by a series of jumps, assisted by a wriggling movement from side to side, so that each time they alighted the tail was strongly curved on either side alternately."

Still more wonderful perhaps was a curious little crab which was common on the sandy beaches of the coast. Dr. Collingwood has the credit of being the discoverer of this little animal, which he found not only at Singapore, but at Labuan and other places, and which has consequently been named the *Sphærapœia Collingwoodii*, or Collingwood's Pill-maker. Immediately after the tide has gone down, the smooth beach presents numerous holes of various sizes, from that of a small pea to that of a large filbert, the former being the most common size. From these holes there are minute radiating paths, amongst which are little balls or concretions of sand, of a size proportionate to the calibre of the holes. How the little animal makes these balls is not very clear from Dr. Collingwood's description. Kneeling down and remaining motionless for a few minutes on a patch covered with their holes, he noticed a slight evanescent appearance, like a flash or bursting bubble, which the eye could scarcely follow. This was produced by one or more of the crabs coming to the surface, and instantly darting down again as if alarmed at his presence. Seeing that he remained motionless they at length ventured to come out and set to work. Their most common size was that of a largish

pea. Each little crab, after coming to the surface and seeing that all was apparently safe, would venture about its own length from the mouth of the hole; and then rapidly taking up particles of sand in its claws, it deposited them in a groove beneath the thorax. "As it did so, a little ball of sand was rapidly projected as though from its mouth, which it seized with one claw and deposited on one side, proceeding in this manner until the smooth beach was covered with these little pellets or pills corresponding in size to its own dimensions and powers. It was evidently its mode of extracting particles of food from the sand." These little crabs are so swift in their movements that they are not easily caught. It was only after repeated attempts that Dr. Collingwood secured two specimens, which immediately curled themselves up and feigned death; and one of these he lost, for putting it on the sand to see what it would do, "it rapidly sunk into the sand, and disappeared by a twisting and wriggling movement."

It is not our intention in these sketches to enter, as a general rule, into any notice of the vegetable products of the Islands of the Eastern Archipelago. We must, however, make occasional exceptions, and Singapore produces some plants of so singular a character that we cannot pass them over in silence. This island is one of the localities in which the Traveller's Tree (*Urania Speciosa*) is to be found. Its banana-like leaves spring, says Dr. Collingwood, from the opposite sides of the stem, the whole tree representing a gigantic fan. The rain falling on the leaves and leafstalks runs down a channel in the latter until it reaches the base, where a reservoir is formed by the sheathing petioles, which so closely embrace one another that it cannot escape. Hence, an incision through these sheaths produces a constant fountain of pure, refreshing fluid, of which the thirsty traveller may avail himself. Another tree, or rather shrub, found here, and described by Dr. Collingwood, is the Face-leaved plant or Caricature plant (*Justicia Picta*), every leaf of which exhibits a caricature resemblance to the human face.

It is worthy of record that gutta percha was first introduced from Singapore. In consequence of the great and sudden demand for this substance, the gutta percha tree (*Isonandria Gutta*), which was formerly abundant, has now disappeared from the island. The forests of Johore in the adjacent peninsula yield a vast supply, although these must fail in time unless duly protected, since the method of obtaining the juice is by cutting down the tree, and each tree does not afford an average of more than twelve pounds of gutta percha.

In our next sketch we shall consider the most remarkable of the forms of animal life occurring in Borneo, "The Land of the Orang-utan."

THE NATURAL HISTORY OF THE EASTERN ARCHIPELAGO.

NO. II.

ONE of Mr. Wallace's chief objects in visiting Borneo was to see the Orang-utan (or great man-like ape of the Eastern Archipelago) in his native haunts; and with this view he started in March, 1863, for the coal-works which were being opened near the Simunjon River, a small branch of the Sadong, a river east of Sarawak which it enters about twenty miles up. In this region was abundance of swamp, jungle, and virgin forest, and the Orang-utan, or "Mias," as it is called by the natives, was reported to exist here in considerable numbers.

Those who wish to make themselves acquainted with the natural history of the man-like apes, should study Professor Huxley's admirable essay upon this subject in "Man's Place in Nature." In this essay the Professor gives an historical sketch of the knowledge of these animals from 1598—when Pigafetta's "Description of the History of Congo" appeared—to the present date, when we recognise four distinct kinds, namely, the gibbons and the orangs of the East, and the chimpanzees and the gorillas which are found only in Western Africa; a fact which it has taken naturalists nearly two centuries to establish. For a long time there was a great confusion between the apes of Africa and of the Eastern Archipelago — pongos, mandrills, boggoes, pygmies, jockos, and orangs being regarded as more or less synonymous.

The first true orang that was ever brought alive to Europe was one that was sent from Borneo to Holland in 1778. It was well described and figured by Vosmaer, and after its death, which occurred in less than a year, it was dissected by the famous Dutch anatomist, Camper.

A couple of years later, M. Palm, the Dutch resident at Rembang, gave a graphic description of an orang hunt. After offering in vain a hundred ducats to the natives for an orang of four or five feet high, he heard that a live one had been seen in his neighbourhood. "For a long time, indeed, we did our best to take the frightful beast alive in the dense forest half way to Landok. We forgot even to eat [what can more clearly express the intensity of a Dutchman's feelings!] so anxious were we not to let him escape. This game lasted from eight to four o'clock in the afternoon, when we determined to shoot him, in which I succeeded very well, for the bullet went just into the side of his chest. We got him into the prow still living and bound him fast, but next morning he died of his wounds." His length from the head to the heel was forty-nine inches; and his body was sent to Europe in brandy, but unfortunately the ship was wrecked.

This is probably the earliest authentic history of an orang hunt. There are few animals whose habits and mode of life are so hard to study as the different kinds of man-like apes. They inhabit regions impregnated with jungle-fever, and bounded for the most part by highly malarious coasts; and as Professor Huxley eloquently observes:—

"Once in a generation a Wallace may be found physically, mentally, and morally qualified to wander unscathed through the tropical wilds of America and of Asia; to form magnificent collections as he wanders, and, withal, to think out sagaciously the conclusions suggested by his collections."

Even with all his physical qualifications Mr. Wallace explored only an infinitesimal quantity of the great superficies of Borneo, as may be seen by a reference to the map of his travels; and what natural history wonders may be discovered when another Wallace arises and penetrates fairly into the interior it is impossible to conceive.

The following is a very brief abstract of Mr. Wallace's game-book, during his residence amongst the Orang-utans. Just a week after his arrival at the coal-mines, as he was collecting insects about a quarter of a mile from his house, he saw his first Mias. It was a large red-haired animal, hanging from the branches of a tree under which he was standing. It passed on from tree to tree till it was lost in the jungle. On this occasion the traveller seems not to have had his gun with him. About a fortnight afterwards he was told that one was feeding in a tree, in a swamp just below his house, and got a shot at it, the second barrel causing it to fall almost dead. It was a male about half grown, and scarcely three feet high.

On April 26th, when he was out with two Dyaks, he found another of about the same size, which, when he fired, fell with a broken

arm and a wound in its body. The two Dyaks attempted to secure it alive; but even in its wounded state, and although it was only half-grown, "it was too strong for these young savages, drawing them towards its mouth, notwithstanding all their efforts, so that they were obliged to leave go, or they would have been seriously bitten." It was then shot through the heart.

On May 2nd, he found one on the top of a very high tree, and fired at but did not kill it.

On May 12th, he secured a full-grown female, three feet six inches high, and with a width of arms of six feet six inches. She required five shots, but at last fell dead on a fork of the tree, from whence she was brought down by an agile Dyak.

Only four days afterwards a rather large female was reported as seen, and was killed after three shots. When preparing to carry it home they found a young one face downwards in the bog, and apparently unhurt. Of this interesting baby we shall say more presently.

Exactly a week after its capture (on May 23rd), Mr. Wallace succeeded in shooting a full-grown male Orang-utan. The history of his capture occupies several pages, and it was not till he had received six shots that he fixed himself on the branches of a tree, "in such a position that he could not fall, and lay all in a heap as if dead or dying." A messenger was sent for two Chinamen with axes to cut down the tree; in his absence, a plucky Dyak climbed towards the Mias, who then moved to a neighbouring tree, in the dense branches and creepers of which he almost completely hid himself. The tree was luckily a small one, and when the axes arrived its stem was soon cut through; but it was so braced by jungle-ropes and climbers to adjoining trees that it would not fall into more than a sloping position. At last a long and strong pull at the creepers caused it to shake very much, "and when we had almost given up all hopes, down he came with a crash and a thud like the fall of a giant. And he was a giant; his head and body being full as large as a man's. His out-stretched arms measured seven feet three inches across, and his height, measuring fairly from the top of the head to the heel, was four feet two inches. The body just below the arms was three feet two inches round, and was quite as long as a man's, the legs being exceedingly short in proportion. He had been dreadfully wounded; both legs were broken, one hip-joint and the root of the spine completely shattered, and two bullets were found flattened in his neck and jaws! Yet he was still alive when he fell." His skeleton and skin now adorn the museum at Derby.

Nearly a fortnight after this adventure (on June 4th), some Dyaks killed a very fine full-grown male with spears and choppers, a few miles from the mines. The animal seized its first assailant's arm in its mouth, "making his teeth meet in the flesh above the elbow, which he tore and lacerated in a dreadful manner."

On June 18th, Mr. Wallace shot another fine adult male in the act of feeding on an oval green fruit having a fine red arillus, like the mace which surrounds the nutmeg, and which alone he seemed to eat, biting off the thick outer rind, and dropping it in a continual shower.

On the 21st, he secured an adult female: on the 24th, he killed a male of the largest size, who, after an arm had been broken, "reached the very highest part of an immense tree, and immediately began breaking off boughs all around, and laying them across and across to make a nest, so that in a few minutes he had formed a compact mass of foliage which entirely concealed him from our sight." From this retreat he could not be stirred by further shots, and it was only after the lapse of a couple of months that two Malays brought down the dried remains, when the skull was found much shattered by balls.

Three days later, he and his English assistant, Charlie, had a long chase after three small Orangs, who passed from tree to tree, at the rate of six miles an hour, so as to keep their pursuers on the run. One of these was killed, but could not be secured.

For six weeks from this time the author was kept a prisoner in the house with an inflamed ulcer.

He then proceeded up a branch of the Simunjon River to Semábang, where Orangs were said to abound. On the fourth day after his arrival he shot a full-grown male, of a different species from any he had previously seen. Finding no more Orangs here, he returned to the mines, and went up another branch of the river to a place called Menyille, where he was accommodated in the verandah of a Dyak house, in which were several great baskets of dried human heads. The very day of his arrival he shot an adult male of the small Orang,* which fell dead, but was caught

* Mr. Wallace met with two distinct species of Mias, one considerably larger than the other. He

in the fork of a tree, which was tall, perfectly straight, and smooth barked, and without a branch for fifty or sixty feet. He tried to persuade two young Dyaks to cut down the tree, but they preferred climbing up it. They first went to a neighbouring clump of bamboo, and cut out one of the largest stems. From this they chopped off about a foot, which they split, and thus made a couple of stout pegs, which they sharpened at one end. With an extemporised mallet they drove one of the pegs into the tree, and tested its secureness by hanging their whole weight upon it. When about two dozen of these pegs were made, they cut some very long and slender bamboo from another clump, and prepared some cord from the bark of a small tree. "They now drove in a peg very firmly at about three feet from the ground, and bringing one of the long bamboos, stood (*sic*) it upright close to the tree, and bound it firmly to the two first pegs, by means of the bark-cord and small notches near the head of each peg. One of the Dyaks now stood on the first peg, and drove in a third, about level with his face, to which he tied the bamboo in the same way, and then mounted another step, standing on one foot, and holding by the bamboo at the peg immediately above him, while he drove in the next one. In this manner he ascended about twenty feet, when the upright bamboo becoming thin, another was handed up by his companion, and this was joined on by tying both bamboos to three or four of the pegs. When this was also nearly ended, a third was added, and shortly after the lowest branches of the tree were reached, along which the young Dyak scrambled, and soon sent the Mias tumbling headlong down."

At this station he afterwards shot two adult females and two young ones; and on his return down the stream he had the good fortune to secure, after a long chase, with the water of the flooded country up to his waist, a very old male Mias, which, when measured, turned out to be by far the largest specimen he had met with; for though the standing height was the same as the others (4 feet 2 inches), yet the outstretched arms were 7 feet 9 inches (which was 6 inches more than in the animal killed on May 23rd), while the immense broad face was 13½ inches, whereas the widest he had previously seen was only 11½ inches, and the girth of the body was 3 feet 7½ inches. From these measurements Mr. Wallace is inclined to believe that "the length and strength of the arms, and the width of the face continue increasing to a very great age, while the standing height, from the sole of the foot to the crown of the head, rarely, if ever, exceeds 4 feet 2 inches."

This was the last Mias that Mr. Wallace shot, making his sixteenth victim, and as nine of these were killed between April 24th and June 27th, the sport must be regarded as decidedly good. We give these details of his successful sport in the hope that we may induce some enterprising countryman to forego his deer-stalking for a season, with a view of trying his hand at his "poor relations" in Borneo, where he will not only find a hearty welcome from the Dyaks, who regard the Mias as their natural enemy, but may succeed in solving the problem referred to by Mr. Wallace, as to the supposed existence of a Bornean Orang as large as the gorilla.

At first sight it appears inexplicable why the Mias should only be found in special parts of Borneo and Sumatra; why, for example, it should be quite unknown in the Sarawak Valley, while it is abundant in the valleys east and west of Sarawak. The habits and mode of life of the animal explain this apparent difficulty. It requires a wide extent of unbroken and equally lofty virgin forest, where the country is low, level, and swampy, for its comfortable existence. "Such forests form their open country, where they can roam in every direction, passing from tree-top to tree-top without ever being obliged to descend to the earth." These conditions exist where the Mias is found, while in Sarawak there is no continuous forest, the soil being principally occupied by the Nipa palm.

The following is a brief summary of Mr. Wallace's account of the habits and mode of life of the Mias when at home in his native forests:—

He may be seen walking deliberately along the larger branches, in the semi-erect attitude consequent on the great length of his arms and the shortness of his legs; and this disproportion between the limbs is further increased by his walking on his knuckles and not on the palms of the hands. He chooses branches which intermingle with an adjoining tree, and seizing the opposing boughs, tries their strength and quickly slings onwards; never jumping or springing, yet managing to get along at the rate of six miles an hour. The long and powerful arms are of the greatest use in enabling the animal to climb with ease the loftiest

doubts the accuracy of the measurements of observers who have described Orangs more than five feet high.

trees, to pluck fruits for its food, and to gather leaves and branches with which to make its nest. We have already described how it forms a nest when wounded, but it uses a similar one to sleep on; and each animal is said to make a fresh one every night. If, however, this were the case, Mr. Wallace thinks that the deserted nests or their remains would be far more abundant than is actually the case. The Dyaks say that when it is very wet, the Mias covers himself over, after he has gone to bed, with leaves of pandanus or large ferns. He remains in bed till the sun has dried up the dew from the leaves. These animals feed all through the middle of the day; their diet consisting almost exclusively of fruit (which they prefer when unripe, sour, and very bitter), with occasional leaves, buds, and seeds. The celebrated Durian is a special favourite, and is eaten voraciously wherever it grows surrounded by forest, but they will not cross clearings to get at it. It is only in extreme cases—as when severely pressed by hunger or thirst—that they will descend to the ground.

According to the Dyaks, the only animals that ever venture to attack the Mias are the crocodile and the python; and they always fall victims to their temerity. The only chance which the crocodile has of attacking him is when the Mias is driven to seek food on the banks of a river; but on trying to seize him, the Mias springs on his enemy's back, and kills him by main strength, pulling open the jaws and ripping up the throat. One of Mr. Wallace's informants stated that he had seen such a fight. What a splendid subject for a picture by Landseer!

The habit which these animals have of throwing down branches upon their assailants, has been doubted by some writers; but Mr. Wallace has seen it on at least three separate occasions, in all of which, however, it was a female who behaved in this way.

These animals exhibit no gregarious tendencies. "I have never," says Mr. Wallace, "seen two full-grown animals together; but both males and females are sometimes accompanied by half-grown young ones, while, at other times, three or four young ones were seen in company." Thankful as we are to this distinguished traveller for the information which he has been able to collect regarding these hideous prototypes of man, we cannot help feeling that there is much yet to learn regarding their social life. "The Memoirs of a Myas," written by himself, would fill up many blanks which no human observer could ever have an opportunity of supplying. Unfortunately for science—through perhaps we should say fortunately for humanity and propriety—no credence can be attached to the stories of the anthropoid apes carrying off native women to share their nests; otherwise we might in this way have acquired some trustworthy information regarding their manners and habits of life.

There is one topic of extreme interest to which Mr. Wallace briefly refers, regarding which we are, at present, totally destitute of information. Palæontologists have clearly shown that the existing animals in different parts of the world were, in preceding geological periods, represented by allied yet distinct and frequently much enlarged forms; or, as Professor Owen definitely propounds it, that "with extinct as with existing mammalia, particular forms were assigned to particular provinces, and that the same forms were restricted to the same provinces at a former (*i. e.*, the more recent tertiary) geological period, as they are at the present day." Thus—to give one or two striking illustrations of this remarkable law—South America is the sole *habitat* of the sloths and armadillos, and no fossil remains of animals allied to these genera have yet been discovered anywhere but in that region, where we find the fossil remains of gigantic sloths, measuring eighteen feet in length, and of monstrous armadillos, nine feet long, belonging to geological periods immediately preceeding our own; while, in Australia, the present kangaroos were represented by a gigantic prototype—the *Diprotodon Australis* of Owen—whose skull, a specimen of which is now in the British Museum, measures three feet in length. Why then should not the Orang-utan, the chimpanzee, and the gorilla, also have had their forerunners? There are vast caverns in many parts of Borneo, which, when duly examined, will probably prove to be ossiferous; and we may fairly entertain the hope that their contents may soon be revealed to us, for a promising young geologist, Mr. Everett, is now on his way to Borneo with the special view of exploring some of these caves; and before starting he did his best to complete his qualifications for the task by spending two days in Kent's Hole (the celebrated Torquay cavern, which, with the neighbouring Brixham cavern, has mainly contributed to settle the question of the comparative antiquity of man), under the guidance of Mr. Pengelly, our highest authority in cave-researches. Even if Mr. Everett should not have the good fortune to discover the remains of a fossil Mias bearing the same relations in point of size to the present species

that Owen's fossil kangaroo bears to the existing species, we have no doubt that his explorations will be fruitful in good results.

The length to which this article has already run precludes us from giving more than a passing reference to Mr. Wallace's most amusing account of how he acted as dry nurse to the infant Mias, which he secured on the 16th of May. For his account of how it held on by his beard as he was carrying it home in his arms—how, as he could not secure a wet nurse, he made it a sucking bottle—how he washed it, wiped it, and brushed its hair—how he made it a small gymnastic apparatus—how he tried to make it happy by constructing an artificial mother of a piece of buffalo skin, which nearly choked it—how he found it an agreeable companion in the shape of a young monkey, who sat upon its face and otherwise insulted it, although their friendship remained unbroken—and how, after he had kept it nearly three months, it sickened and died—we must refer our readers to Mr. Wallace's pages. We cannot conceive a better subject for a penny-reading than the history of this interesting orphan.

Dr. Collingwood, in his rambles around Sarawak, saw large numbers of flying squirrels (*Galeopithecus*), and of flying foxes (*Pteropus*), and one little flying lizard (*Draco volans*). As the galeopithecus (which, strictly speaking, is a lemur rather than squirrel) is more abundant in Sumatra than in Borneo, we shall postpone our remarks on that remarkable animal to our next article, and shall proceed to a short notice of the two other animals described by Dr. Collingwood. Every evening, about sunset, the air in the neighbourhood of the Sarawak River was alive with large bats or flying foxes. They appeared with great regularity, a few stragglers first coming, while in a quarter of an hour they might be seen all over the sky, flying just out of gun-range, and all taking the same direction, from N.E. to S.W. They might easily have been taken by a casual observer for rooks returning to their nests; but there is a peculiar bat-like form of wing, which is very observable when they are directly over head. They spend the night in feasting in the forest districts, and return home shortly before sunrise. They are very pugnacious, and if brought down with a broken wing are apt to bite fiercely, and in this condition it is a common sport to match them against a terrier.

The little flying lizard, which, according to Professor Owen, seldom exceeds 110 grains in weight (see his "Comparative Anatomy of the Vertebrates," vol. i., p. 264, in which there is a figure of this remarkable animal), was observed by Dr. Collingwood to alight upon a tree by the road-side. It flew quickly along, and straight, like a bird, without any butterfly-like fluttering, and suddenly settled upon the bark, just as a creeper (*Certhia*) would do, for which he at first mistook it. It then ran a little way up the trunk in a spiral direction; after which it stood still, and, twisting its head completely round, took a good look at its observer, "while its little conical pouch, which hung flaccid beneath the throat, was from time to time momentarily distended, pointing forward in a menacing manner, and then falling again." Trying to make it fly, with the wish to observe its movements, he pelted it with small bits of sticks, but only succeeded in making it run higher up the tree. It is to be regretted that he failed in his attempt, because definite information regarding the use of its membranous expansions is still a desideratum, the generally accepted view being that the membranes, which can be expanded and folded up at will, serve merely, like a parachute, to break the little animal's fall when it springs from a height.

The last animal we shall notice is the flying frog, which is entirely new to science and of special interest to Darwinians, "as showing that the variability of the toes, which have been already modified for purposes of swimming and adhesive climbing, has been taken advantage of to enable an allied species to pass through the air like a flying lizard."

This animal was brought to Mr. Wallace by a Chinese workman, who saw it come down in a slanting direction from a high tree, as if it flew.

"The toes were very long and fully webbed to their very extremity, so that when expanded they offered a surface much larger than the body. The fore-legs were also bordered by a membrane, and the body was capable of considerable inflation. The back and limbs were of a very deep shining green colour, the under surface and the inner toes yellow, while the webs were black, rayed with yellow. The body was about four inches long, while the webs of each hind foot, when fully expanded, covered a surface of four square inches, and the webs of all the feet together about twelve square inches. As the extremities of the toes have dilated discs for adhesion, showing the creature to be a true tree-frog, it is difficult to believe that this immense membrane can be for the purpose of swimming only, and the account of the Chinaman that it

flew down from the tree becomes more credible." As we already know of a large Indian frog which can run along the surface of the water, nothing regarding the varieties of locomotion of these animals need astonish us.

THE NATURAL HISTORY OF THE EASTERN ARCHIPELAGO.

NO. III.

FROM Borneo, where we left him in our last article, Mr. Wallace proceeded to Java, where he spent about three months and a half, from July 18th to October 31st, 1861.

Taking it as a whole, and surveying it from every point of view, he considers it as "probably the very finest and most interesting tropical island in the world." In area it is nearly equal to England. Its whole surface is magnificently varied with mountain and forest scenery. It possesses thirty-eight volcanic mountains, several of which are 10,000 or 12,000 feet high and some of which are in constant activity. "The animal productions, especially the birds and insects, are beautiful and varied, and present many peculiar forms found nowhere else upon the globe." At Wonosalem, where he first settled, Mr. Wallace obtained several specimens of the magnificent Java peacock—which is a different species from that of India, the neck being covered with scale-like green feathers, and the crest of a different form. "It is," he observes, "a singular fact in geographical distribution, that the peacock should not be found in Sumatra or Borneo, while the superb Argus, Fire-backed, and Ocellated pheasants of those islands are equally unknown in Java. Exactly parallel is the fact that in Ceylon and southern India, where the peacock abounds, there are none of the splendid Lophophori and other gorgeous pheasants which inhabit northern India. It would seem as if the peacock could admit of no rivals in its domains." In two of the peacocks which Mr. Wallace obtained here the tails were more than seven feet long. In the course of a month, he collected ninety-eight species of birds, including the rare green jungle-fowl (*Gallus furcatus*); six kinds of woodpeckers; four kingfishers; "the fine hornbill (*Bucerus lunatus*), more than four feet long; and the pretty little lorikeet (*Loriculus pusillus*) scarcely more than as many inches."

In November, 1861, we find Mr. Wallace at Lobo Raman, in the centre of the east end of Sumatra. Although it was so rainy that he could not do much in the way of collecting, he succeeded in working out a most marvellous butterfly problem. The male Papilio memnon is a splendid butterfly of a deep black colour, dotted over with lines and groups of scales of a clear ashy hue. Its wings are five inches in expanse, and the hind wings are rounded with scalloped edges. The females not only

differ from the males but from one another, and may be divided into two groups—those which resemble the male in shape and only differ in colour, being often nearly white; and those which have no resemblance to the male in shape, the hind wings being lengthened out into spoon-shaped tails, no rudiment of which is perceptible in the males or in the other group of females. These tailed females are remarkable for a peculiar ornamentation of the surface of the hind wings with stripes and patches of white or buff; and from this peculiarity these females, when flying, closely resemble another butterfly of the same genus—the Papilio coön. The use of this resemblance—which there are sound natural history reasons for our knowing not to be accidental—appears to be, that the butterflies imitated belong to a section of the genus Papilio, which for some unknown cause are not attacked by birds; and by so closely resembling these in form and colour, the female of the P. memnon escapes persecution. The most singular fact connected with these distinct female forms is, that they are both the offspring of either form. A single brood of caterpillars is found to produce males as well as tailed and tailless females; and forms intermediate in character seem never to occur.

Mr. Wallace's quaint illustration will, perhaps, make this strange story clearer to the minds of our readers. "Let us suppose," he says, "a roaming Englishman in some remote island to have two wives—one a black-haired red-skinned Indian, the other a woolly-headed sooty-skinned negress; and that instead of the children being mulattoes of brown or dusky tints, mingling the characteristics of each parent in varying degrees, all the boys should be as fair-skinned and blue-eyed as their father, while the girls should altogether resemble the mothers. This would be thought strange enough, but the case of these butterflies is yet more extraordinary, for each mother is capable not only of producing male offspring like the father and female like herself, but also other females like her fellow-wife, and altogether different from herself!"

Another strange story, in which protective resemblances of another kind come in play, is told of the Leaf butterfly, which is of the same family and about the same size as our Purple Emperor. Its upper surface is of a rich purple, variously tinged with ash colour, and across its fore wings is a broad bar of deep orange, so that when on the wing it is very conspicuous; yet, though he often watched it flying into a bush among dry or dead leaves, he could never detect it, till it suddenly flew out and similarly disappeared. One day, however, he saw the exact spot where the butterfly had settled, and although it was close before his eyes, he was some time in discovering it, for "in its position of repose it so closely resembled a dead leaf attached to a twig as almost certainly to deceive the eye, even when gazing full upon it." For an account of the way in which it can effect this wonderful disguise that saves it from the observations of birds and reptiles, we must refer our readers to pp. 204-7 of Mr. Wallace's first volume. This is, perhaps, the most remarkable case of protective imitation known, but there are hundreds of similar resemblances in nature.

Some years afterwards, when studying the fauna of the Moluccas, Mr. Wallace first discovered an undoubted case of mimicry amongst birds. If the Leaf butterfly, being a savoury morsel to birds, had closely resembled another butterfly which was disagreeable to them, and therefore never eaten by them, it would be as well protected as if it resembled a leaf. These cases of almost exact resemblance of one creature to quite a different one (as, for example, the clear-winged moths in our own country, which resemble wasps and hornets) were confined to insects, till he found two birds in the island of Banda (one of the Moluccas) which he constantly mistook for each other, although they belonged to two distinct and somewhat distant families. One of these is a honeysucker, and the other a kind of oriole. The oriole resembles the honeysucker in the following points: the upper and under surface of both are exactly of the same tints of dark and light brown; the honeysucker has a large bare black patch round the eyes, and this is copied in the oriole by a patch of black feathers. The top of the head of the former has a scaly appearance that is imitated by the latter. The honeysucker has a pale ruff formed of recurved feathers on the nape (whence the name of friar-birds to the whole genus) and this ruff is represented in the oriole by a pale band. Lastly, the bill in both birds is round, with a protuberant keel, although this condition is not common to the orioles generally. Hence, on a superficial examination, the birds seem to be identical, although, in reality, they have important structural differences, and cannot be placed near each other in any natural arrangement.

In the adjacent island of Ceram, we find a precisely parallel case. There is a species of honeysucker in that island which is of an

earthy brown colour, washed with ochre-ish yellow, with bare orbits, dusky cheeks, and the usual recurved nape-ruff; and accompanying it is a species of oriole which is absolutely identical with it, so far as a superficial examination can show. Here then we have two species of orioles which seem to have departed from the gay yellow tints so common amongst their allies, in order to imitate the normal colour of the honeysucker family. The orioles are clearly the mimics in these cases, and it is not difficult to see the advantage they obtain from the imitation. The orioles are weak birds, with small feet and claws, while the honeysuckers are very strong active birds, with powerful claws and long sharp beaks. Hence the smaller birds of prey, in all probability, mistake the weaker orioles for their strong and pugnacious friends, and respect them accordingly. "The laws of Variation and Survival of the Fittest," says Mr. Wallace, "will suffice to explain how the resemblance has been brought about, without supposing any voluntary action on the part of the birds themselves."

The reader who wishes to learn more on this interesting subject may be referred to an article by Mr. Wallace, published in the *Westminster Review* for 1867, entitled "Mimicry and other Protective Resemblances among animals."

A very curious animal which he met with in Borneo, but which is more abundant in Sumatra, is the *Galeopithecus*, or flying lemur. This creature has a broad membrane extending all round its body, to the extremities of the toes, and to the point of the tail, and enabling it to pass obliquely through the air, from one tree to another. During the day, it is sluggish, and rests clinging to the trunks of trees; and as its olive or brown fur closely resembles the colour of the mottled bark, it readily escapes observation. "Once," says Mr. Wallace, "in a bright twilight, I saw one of these animals run up a trunk in a rather open place, and then glide obliquely through the air to another tree, on which it alighted near the base, and immediately began to ascend. I paced the distance from the one tree to the other, and found it to be seventy yards; and the amount of descent I estimated at not more than thirty-five or forty feet, or less than one in four. This, I think, proves that the animal must have some power of guiding itself through the air, otherwise it would have little chance of alighting exactly upon the trunk." Dr. Collingwood, who had a good opportunity of observing the habits of these animals, from the verandah of a friend's house, at Sarawak, declares that they can glide from near the top of one high tree to the lower branches of another tree about 150 yards distant. This seems almost a mechanical impossibility, and we prefer accepting Mr. Wallace's figures.

Before leaving Sumatra, he had the good fortune to obtain a family of the large hornbill, known as *Bucerus bicornis*. As he was sitting at breakfast, his hunters brought in a fine large male, which was shot while in the act of feeding the female, who was shut up in the hole of a tree. The size of this specimen is not mentioned, but the full-grown bird usually is fully four feet in length. The tree was at once visited, and, "at a height of about twenty feet, appeared a small hole, and what looked like a quantity of mud which had been used in stopping up the large hole." The harsh cry of the bird inside was soon heard, and she was seen to put out the white extremity of her bill. A rupee was in vain offered to anyone who would ascend the tree and secure the bird, with the egg or young one; and, with a sad heart, he returned to his breakfast. In about an hour afterwards, a tremendous hoarse screaming was heard, and the bird, together with a young one, which had been found in the hole, was triumphantly brought in. If the young bird was at all like its picture, which may be seen at page 212 of Mr. Wallace's first volume, it must have been a most remarkable object. It was "as large as a pigeon, but without a particle of plumage on any part of it. It was exceedingly plump and soft, and with a semi-transparent skin, so that it looked more like a bag of jelly, with head and feet stuck on, than like a real bird." This extraordinary habit on the part of the male in plastering up the female, with her egg, and feeding her, not only during incubation, but till the young one is fledged, has been long known to be common to several of the larger hornbills.

Lombock was the first island in his journey eastward on which our author met with the strange bird known as the mound-maker (*Megapodius gouldii*), which is also found in Australia, the Philippines, and north-west Borneo, and a species of which has just been reported as discovered in the New Hebrides. The Megapodidæ (so called from their large feet) are allied to the gallinaceous birds, but differ from these and other birds in never sitting upon their eggs, which they bury in sand, earth, or rubbish, and leave to be hatched by the heat of the sun or of fermentation. Their large feet terminate in long curved claws, with which they rake and scratch together

dead leaves, sticks, earth, rotten wood, &c., till they form a large mound often six feet high and twelve feet across, in the middle of which they bury their eggs. The natives can tell whether the mounds contain eggs—which are as large as those of a swan, of a brick-red colour, and highly esteemed by them as food. A number of birds combine to make a nest, in which forty or fifty eggs may be found. The species found in Lombock is about the size of a small hen, and of a dark olive or brown colour. It is a very miscellaneous feeder eating fruits, worms, snails, and centipedes; but its flesh, when properly cooked, is white and well flavoured.

Mr. Wallace subsequently found these birds very abundant in the Moluccas, where they were generally of a dark ashy or sooty colour.

On the jungles along the sea-shore, where sticks, shells, sea-weed, leaves, &c., abound, they were seen by our author in the act of constructing their nests, which were often six or eight feet high and twenty or thirty feet in diameter, by running a few steps backwards, grasping a quantity of loose material in one foot and throwing it a long way behind them. The eggs were found in these large mounds at a depth of two or three feet. It is not easy to understand how the young birds, when hatched, can work their way to the surface; but they seem to do so without any external aid. They come out of the egg covered with thick downy feathers, and have no tail, but the wings are fully developed; and in this state they run off at once into the forest. Mr. Wallace had the good fortune to discover a new species, which is named after him, *Megapodius wallacei*. It is the handsomest of the group, and, instead of making a mound, burrows into the sand on the sea-shore to the depth of about three feet, obliquely downwards, and deposits its eggs at the bottom. It then loosely covers up the mouth of the hole, and is said to obliterate its own footsteps by making scratches and tracks over them.

Mr. Bickmore, when staying in Buru, obtained a specimen of the *Megapodius wallacei*, which was caught by a native while she was crawling up from her hidden nest. She lived "for some time" (which is a very vague expression for a professed naturalist to use), "but after laying an egg more than one-third as large as her whole body she died."

Dr. Collingwood observed another species in the jungles at Labuan, which, although less than a guinea-fowl, laid eggs as large as those of the turkey, long and pointed at both ends, and of a brownish-buff colour. He observes that the young are highly developed when they leave the shell, at once running freely on their large, strong feet, and capable of using their wings in a few hours.

Lombock abounds with beautiful birds. Large green pigeons, brilliant kingfishers, the Australian bee-eaters, splendidly coloured ground thrushes, grass-green doves, little crimson and black flower-peckers, large black cuckoos, metallic king-crows, golden orioles, and fine jungle-cocks—the origin of all our domestic breeds of poultry—were some of the most valuable treasures which he secured in this comparatively small island.

From Lombock he sailed to Macassar, in the southern region of Celebes, and on proceeding to occupy a house that had been assigned him by a friendly Rajah in a village where a European had never previously been seen, he found himself an object of universal terror. "Wherever I went, dogs barked, children screamed, women ran away, and I was stared at as though I were some strange and terrible cannibal monster." Even the pack horses on the roads would rush into the jungle on his approach; while the buffaloes that he met "would rush away helter-skelter as if a demon were after them;" so that when he saw these animals coming to the village with packs he was obliged to turn into the jungle and hide himself.

Mr. Bickmore's experience regarding the buffaloes is similar to that of Mr. Wallace. He observes in his notices of these useful animals in different parts of his extensive travels, that while they are usually so docile that Malay children can drive them, "they dislike the appearance of a European, and have a peculiar mode of manifesting their aversion by breathing heavily through the nose." He was often requested by the owners to get out of their way, lest he should be attacked.

From this inhospitable district Mr. Wallace subsequently proceeded to Menado, a pretty little town in the north-eastern extremity of Celebes, known as Minahasa. To all who take an interest in the civilization of savage races we would strongly recommend the careful study of Mr. Wallace's remarks on the system of government now adopted by the Dutch in their eastern possessions generally, and especially in Celebes, where "the people are now the most industrious, peaceable, and civilized in the whole Archipelago." (Vol. i., pp. 397-401.)

THE NATURAL HISTORY OF THE EASTERN ARCHIPELAGO.

NO. IV.

HEARING that the north-eastern extremity of Celebes, between the islands of Banca and Limbé, abounded in the remarkable birds known as Maleos (*Megacephalon rubripes*), Mr. Wallace proceeded there with the view of securing specimens; and he was accompanied by two European friends who hoped to hunt wild pigs, Babizusa, &c., in the locality. The Maleos deposit their eggs in a loose hot black sand of volcanic origin, just above high-water mark. They come down in pairs from the interior to this, and one or two other favourite spots, in the months of August and September. The male and female co-operate in making a hole three or four feet deep, in which the female deposits one large egg, which she covers with about a foot of sand, and then returns to the forest. At intervals of about ten days, she returns to the same spot and lays another egg, till at length six or eight are deposited and the process is completed. The male always comes down and returns with the female. Many birds lay in the same hole, for a dozen eggs are often found together; and these are so large that it is not possible for the body of the bird to contain more than one fully-developed egg at the same time. In confirmation of this view it may be mentioned, that in all the female birds that were shot on their way to the shore there was one large egg, and eight or nine others not exceeding peas in size. After the eggs are deposited in the sand, no further attention is paid them by the parent birds;

and, considering the great distances they come from the interior (often ten or fifteen miles), this at first sight seems strange. As, however, the eggs are deposited by a number of hens in succession in the same hole, it would be impossible for each bird to distinguish its own property; and as the food (consisting entirely of fallen fruit) necessary for such large birds, can only be obtained by roaming over an extensive district, it is clear that if the number of birds which come down to a single beach in the breeding season were obliged to remain in the vicinity of their nests, many would perish from hunger. Moreover, both in the Maleos and the Mound-makers, the fact of only one egg being laid after a considerable interval (of thirteen days, according to the natives) necessitates a long period of two or three months, between the laying of the first and the last egg, assuming that each bird lays six or eight eggs. "Now," says Mr. Wallace, "if these eggs were hatched in the ordinary manner, either the parents must keep sitting continually for this long period, or if they only began to sit after the last egg was deposited, the first would be exposed to injury by the elements, or to destruction by the large lizards, snakes, and other animals which abound in the district. The males and females differ little in appearance, and when walking on the beach the birds present a very handsome appearance. The glossy black and rosy white of the plumage, the helmeted head and elevated tail, like that of the common fowl, give a striking character, which their stately and somewhat sedate walk renders still more remarkable." The colour of the egg-shell is a pale brick red, or, very rarely, pure white; and its dimensions are from four to four and a half inches long, by about two and a half wide. The eggs are esteemed so great a delicacy that the natives come for fifty miles round to obtain them. They are richer than hen's eggs, and of a fine flavour; each one completely fills an ordinary tea-cup, and forms with bread or rice a very good meal.

As one of the great objects, if not the greatest, of Mr. Wallace's numerous journeys in the Malay Archipelago was to obtain specimens of the Birds of Paradise, and to learn something of their habits and distribution—and being (as far as he is aware) the only Englishman who has seen these wonderful birds in their native forests, and obtained specimens of many of them—it is not surprising that a large proportion of his second volume should be devoted to their consideration.

The early history of these birds is wonderfully mixed up with fiction. The late Mr. Broderip, in an excellent article upon them, which originally appeared in the *Penny Cyclopædia*, states that "from one fabulist to another came the tradition that these 'gay creatures of the element' passed their whole existence in sailing in the air, where all the functions of life were carried on, even to the production of their eggs and young. The dew and the vapours were said to be their only food; nor were they ever supposed to touch the earth till the moment of their death; never taking rest except by suspending themselves from the branches of trees by the shafts of the two elongated feathers which form a characteristic of their beautiful race. The appellations of Lufft-Vogel, Paradyss-Vogel, Passeros de Sol, Birds of Paradise, and God's Birds, kept up the delusion that originated in the craft of the inhabitants of the eastern countries in which they are found; for the natives scarcely ever produced a skin in former times from which they had not carefully extirpated the feet. Nor was it only the extreme elegance and richness of their feathers that caused these birds to be sought as the plume for turbans of oriental chiefs; for he who wore that plume, relying implicitly on the romantic account of the life and habits of the bird, and impressed with its sacred names, believed that he bore a charmed life, and that he should be invulnerable, even where the fight raged most furiously." John van Linschoten, who wrote in 1598, gives the above names, and adds, that they have neither feet nor wings, and that no one has seen them alive, "for they live in the air, always turning towards the sun."

Pigafetta, who is supposed to have been the first who made these birds known in Europe, represented them with legs; and although he was supported in the leg-question by several eminent Dutch naturalists, fiction was too strong for him, and he was charged by Aldrovandus, and others, with falsehood. Linnæus, in 1760, only described two species, to one of which, in commemoration of the fable of the want of feet, he gave the name of *Apoda*. Since then nine or ten others have been named, all of which were described from more or less imperfect skins; and now Mr. Wallace gives us a list of eighteen species, with the places they are believed to inhabit (see vol. ii., pp. 419, 420). During a residence of many months in the Aru Islands, New Guinea, and Waigiou, —their most abundant *habitats*,—Mr. Wallace obtained five species; while his assistant, Mr. Allen, did not find a single additional species;

but as they had both been told of a place called Sorong, on the mainland of New Guinea, where all the kinds they desired could be obtained, Mr. Allen was sent, with a lieutenant and two soldiers, to this favoured spot to obtain supplies of these rare creatures. Native jealousies, however, stood in the way, the chiefs of the coast-valleys having a monopoly in this department of commerce; and Mr. Allen found that so many difficulties were thrown in his way, that, after a month, he had to return almost empty-handed. From the strange fact that during five years' residence in the land of the Birds of Paradise, Mr. Wallace was unable to purchase skins of half the species which Lesson forty years ago obtained during the voyage of the *Coquille* in the course of a few weeks, it may be safely inferred that all, except the common species of commerce, are daily becoming more hard to obtain. Of the eighteen species enumerated by Mr. Wallace, eleven inhabit New Guinea, and eight of these are entirely confined to that country and the hardly separated island of Salvatty; and as, in consequence of the shallow intervening seas, the Aru Islands and Waigiou were probably once united with it, we shall find that no less that fourteen of the Paradise birds belong to that region, while of the remaining four, three inhabit the north-east of Australia, and one the Moluccas. Hence New Guinea is essentially "the land of the Bird of Paradise." In March, 1857, he arrived at the Aru Islands, where he stayed for two months, mainly in search of these birds. The natives, who were in the habit of shooting them, informed him that they used a bow and arrow; the latter terminating in a conical wooden cap as large as a tea-cup, which kills the bird without injuring the skin or feathers. As the trees frequented by these birds are very lofty, the hunters construct a leafy hut amongst the branches into which they enter before daylight and remain there all day. This was all he could learn from the natives, except that it was too early to obtain birds of good plumage. After two or three thoroughly wet days in which he got nothing, and just as he was beginning to despair, his boy returned with a small bird rather less than a thrush, which amply repaid him for months of delay. It was the King Bird of Paradise (*Paradisea regia*). We will not attempt to describe its beauty further than to observe that "the greater part of its plumage was of an intense cinnabar red, with a gloss as of spun silk," and that "springing from each side of the head, and ordinarily concealed under the wings, were little tufts of greyish feathers about two inches long, terminating in a band of intense emerald green, and capable of being raised at will and spread out into a pair of elegant fans, when the wings are elevated"—and that the two middle feathers of the tail are in the form of slender wires about five inches long, diverging in a beautiful double curve, and at about an inch from the end, curving spirally inwards, so as to form a pair of glittering metallic-green buttons, hanging five inches below the body and at some distance apart. "These two ornaments," says Mr. Wallace, —"the breast-fans and the spiral-tipped tail wires—are altogether unique, not occurring in any other species of the eight thousand different birds that are known to exist upon the earth."

We can heartily enter into the emotions excited in the mind of the enthusiastic naturalist wandering in a forest hitherto traversed only by savages, and far from the busy haunts of civilized man, when he gazed upon this "thing of beauty." He soon afterwards obtained another equally beautiful specimen, and had the opportunity of, to a certain degree, seeing a little of the habits of both it and a larger species, the Great Bird of Paradise. As the spring merges into early summer, the plumage of the great birds increases in brilliancy, and they commence a series of dancing parties in certain trees having spreading branches and large scattered leaves, which give free space for the birds to play and exhibit their plumes. The following is Mr. Wallace's account of a dance. "On one of these trees a dozen or twenty full-plumaged male birds assemble together, raise up their wings, stretch out their necks, and elevate their exquisite plumes, keeping them in a continual vibration. Between whiles they fly across from branch to branch in great excitement, so that the whole tree is filled with waving plumes in every variety of attitude and motion. The wings are raised vertically over the back, the head is bent down and stretched out, and the long plumes are raised up and expanded, till they form two magnificent golden fans, striped with deep red at the base, and fading off into the pale brown tint of the finely divided and softly waving points. The whole bird is then overshadowed by them, the crouching body, yellow head, and emerald green throat forming but the foundation and setting to the golden glory which waves above. When seen in this attitude, the Bird of Paradise really deserves its name, and must be ranked as one of the most beautiful

and most wonderful of living things." In the frontispiece to his second volume Mr. Wallace depicts these gorgeous birds, which are of about the size of our common crow, in the full enjoyment of their dance; but as is ever the case in all terrestrial happiness,

Medio de fonte leporum
Surgit amari aliquid.

The picture, alas! also shows two natives, under umbrella-like coverings amongst the leaves, aiming at their prey, while a third is seen collecting the victims as they fall!

Mr. Wallace's visit to these almost unknown Aru Islands, extended from January to the beginning of July, 1857, when he sailed with a convoy of praus to Macassar, accomplishing the voyage of more than a thousand miles in nine and a-half days. He describes his expedition to these islands as eminently successful, and so it certainly was; for, notwithstanding much illness and many other drawbacks, he brought away more than 9000 specimens of about 1600 distinct species; he enjoyed the rare delights of exploring one of the most remarkable and least-known faunas in the world, and succeeded in the main object of his journey—namely, in securing fine specimens of the Birds of Paradise, and observing them in their native forests. By this success he was stimulated to continue his researches for five years longer in the far east; and we will now follow him to New Guinea—a country in which no naturalist had ever previously resided, and which is supposed to contain more strange and beautiful natural history objects than any other part of the globe.

Starting from Ternata on the 25th of March, 1858, in a Dutch trading schooner, with four servants, Mr. Wallace proceeded on his long projected voyage to New Guinea; and as he knew that he should have to build his own house at Dorey, on the north coast of the island, where he was to be landed, he took with him eighty waterproof mats, made of Pandanus leaves, to protect his baggage on first landing, and to form the roof of his residence. On the 11th of April he arrived at Dorey, and for the first three days was fully occupied from morning to night in building a house, with the assistance of a dozen Papuans and his own men. On the next day the schooner left for the more eastern islands, and Mr. Wallace found himself "fairly established as the only European inhabitant of the vast island of New Guinea," and the proprietor of a wooden house, twenty feet long by fifteen broad, with a bamboo floor, a single door of thatch, and a large window. Outside was a little hut that served for cooking purposes, and a bench roofed over, where his men could sit and skin birds and animals. For the first ten days it generally rained every afternoon, and all night; in the intervals of fine weather, however, he and his men secured many beautiful birds, but only the common Bird of Paradise, the finer species being brought for sale from Amberbaki, a hundred miles west. Here he procured four distinct species of a group of horned flies, belonging to a genus previously undiscovered, and to which the term *Elaphomia*, or "deer flies," has since been given. The horns spring from beneath the eye, and seem to be a prolongation of the lower part of the orbit. In the largest species they are nearly as long as the body, and have two branches. These appendages are peculiar to the male insects.

On board the Dutch steamer, *Etna*, which waited for some weeks in the harbour for coal, Mr. Wallace saw a pair of those rare animals, the tree-kangaroos, alive. They differ, he tells us, from the ground-kangaroo in having a more hairy tail, not thickened at the base, and not serving for a third leg or support; and in having powerful claws on the fore-feet by which they grasp the bark and branches, and seize the leaves on which they feed. They seem to have gradually undergone these modifications to enable them to feed ont he foliage in the forests of New Guinea.

This long-desired expedition to a vast, unexplored country unfortunately turned out a complete failure. "Continual rain, continual sickness, little wholesome food, with a plague of ants and flies surpassing anything I had before met with, required," says Mr. Wallace, "all a naturalist's ardour to encounter, and when they were not compensated by great success in collecting, became all the more insupportable;" and so, after a three months' residence, he bade adieu to Dorey, with intense disappointment. Instead of obtaining several of the rarer Birds of Paradise, Mr. Wallace never saw even one of them, and he did not secure any one superlatively fine bird or insect. Although he never returned to the main-land, he subsequently spent three months of the summer of 1860 in Waigiou, an island on the north-western extremity of New Guinea. He made Muka, a village on the south-east of the island, situated about fifteen miles south of the equator and in east long. 131°, his head quarters, and, as at Dobbo, at once proceeded to build a house. Here he very soon succeeded in obtaining specimens of the rare red Bird of Paradise (*Paradisea rubra*), which is found

nowhere except in this island. Fancy the delight of a naturalist who, when quietly sipping his coffee by the open window in the early morning, can watch these gorgeous creatures settling on the top branches of an adjacent lofty fig-tree, and flying from branch to branch. This fig-tree only yielded him two male birds, as they soon ceased visiting it, either from a sense of danger or from the fruit becoming scarce. From Muka he proceeded to a village called Bessir, lying some miles westward, where there are a number of Papuans, who catch and preserve these birds. Here he resided for six weeks in a residence offered to him by the chief. It was just eight feet square, raised on posts, so that the floor was four and a half feet above the ground, and the highest part of the roof only five feet above the floor. Mr. Wallace, who is more than six feet high, was just able, by bending double and carefully creeping in, to sit on his chair with his head just clear of the ceiling. Having explained to the bird-catchers the price he would give, in advance, for fresh skins, in hatchets, beads, &c., he found only one who ventured to take goods equivalent to two birds: the rest being suspicious of the white stranger; but when they found that their companion was fairly dealt with, six others took away goods, for from one to six birds each. As the birds were caught a long way off in the forest, they did not care to return with one, but would tie it by the leg to a stick till they caught another. The birds, thus tied, injured or destroyed themselves in struggling to escape. "One had its beautiful head all defiled by pitch from a dammar torch; another had been so long dead that its stomach was turning green." He had therefore to insist on the birds being brought alive, and a large bamboo cage, fitted up with troughs for food and water, was constructed to keep them alive, if possible. The birds were not only supplied with their favourite fruits, but indulged freely in grasshoppers, and drank plenty of water; and yet on the second day they always showed less activity, while on the morning of the third day they were almost always found dead without any apparent cause. "Some of them," says Mr. Wallace, "ate boiled rice, as well as fruits and insects; but after trying many in succession not one in ten lived more than three days. I tried immature as well as full-plumaged birds, but with no better success, and at length gave it up as a hopeless task, and confined my attention to preserving specimens in as good a condition as possible." On his return home, in 1862, he was, however, so fortunate as to find, at Singapore, two adult males of the true Paradise Birds; and as they appeared to be healthy and fed voraciously on rice, bananas, and cockroaches, he determined on purchasing them and attempting to bring them to England by the overland route. Their price was one hundred pounds! At Bombay he stayed a week to lay in a fresh stock of bananas. On board the steamer he set traps for cockroaches, which were rare in those well-appointed vessels; but at Malta, where he stayed a fortnight, he procured a large supply from a bake-house. Notwithstanding the sharp frost they experienced between Marseilles and Paris, the birds arrived in London in perfect health. One of them lived for a year, and the other for two years, in the Zoological Gardens, and they often displayed their beautiful plumage. "It is evident, therefore," he observes, "that the Paradise Birds are very hardy, and require air and exercise rather than heat; and I feel sure that if a good sized conservatory could be devoted to them, or if they could be turned loose in the tropical department of the Crystal Palace, or the great palm house at Kew, they would live in this country for many years." Mr. Wallace's opinion that with moderate care these birds may be kept in slight confinement is corroborated by the observations made by Mr. Bennett more than thirty years previous. This eminent naturalist, in his "Wanderings in New South Wales, Batavia, Singapore, and China," published in 1834, describes a live specimen of the great Bird of Paradise that had lived in Mr. Beale's possession at Macao for nine years. He was enclosed in a large and roomy cage, and for all we know to the contrary may have survived Mr. Bennett's visit many years. Mr. Beale was very desirous of obtaining a living female, but there is no evidence that he was successful.

The methods employed by the natives for securing these birds are various. The red birds are in general noosed by the leg as they come to eat a favourite fruit, while according to Mr. Bennett, they are also caught with birdlime made from the pulpy juice yielded by the trunk of the bread-fruit tree. The native mode of preparing the birds for the market is to cut off the wings and feet, and then skin the body up to the beak, taking out the skull. A short stick is then run up through the specimen, coming out at the mouth. Round this some leaves are stuffed, and the whole is wrapped up in a palm spathe, and dried in the smoky huts. By this plan the head and body are much reduced, and the greatest prominence is given to the flowing plumage.

THE NATURAL HISTORY OF THE EASTERN ARCHIPELAGO.

NO. V.

FOR much interesting matter regarding the Birds of Paradise, into which we have not space to enter, we may refer to the thirty-eighth chapter of Mr. Wallace's second volume, which is devoted to these birds; and many details regarding their habits not noticed by our author will be found in the third chapter of Mr. Bennett's second volume.

These articles would be incomplete without some reference to the most important fruit-trees of the Eastern Archipelago—such as the bread-fruit, jack, dookoo, mangusteen, pine-apple, plantain, rambootan, custard-apple, mango, guava, and durian; which, with many others, are found in Singapore, and in many of the cultivated parts of Borneo, Java, &c. Dr. Collingwood, from whose book (see p. 271), we extract the above list, observes with regard to the durian, that it is a great favourite with some, and detested by others; and in Mr. Wallace and Mr. Bickmore we have the two parties very decidedly represented. When brought into a house, the smell of this fruit is so offensive that some persons can not even be made to taste it. This was Mr. Wallace's own case when he first tried it at Malacca; but in Borneo he found a ripe fruit on the ground, and eating it out of doors, he at once became a confirmed durian-eater. The fruit is round, as large as a good-sized cocoa-nut, of a green colour, and covered all over with short stout spines, the bases of which touch each other; and it is thus so completely armed, that if the stalk is broken off, it is not easy to raise it from the ground. The rind is so thick that from whatever height the fruit falls, it is never broken. From the base to the apex are five faint lines, where, with a heavy knife and a strong hand, the fruit may be divided. These sections divide the interior into five cells, each of which has a satiny white lining, and is filled with an oval mass of cream-coloured pulp in which are two or three seeds about the size of chesnuts. "This pulp," says Mr. Wallace, "is the eatable part, and its consistence and flavour are indescribable. A rich butter-like custard highly flavoured with almonds, gives the best general idea of it, but intermingled with it come wafts of flavour that call to mind cream-cheese, onion-sauce, brown sherry, and other incongruities. Then there is a rich glutinous substance in the pulp, that nothing else possesses, but which adds to its delicacy. It is neither acid, nor sweet, nor juicy, yet one feels the want of none of these qualities, for it is perfect as it is. In fact to eat durians is a new sensation, worth a voyage to the East to experience." For so delicious a fruit as this, need we wonder at Dr. Collingwood's statement that at Singapore fifty dollars are given for the produce of a single tree?

Mr. Bickmore, on the other hand, finds in the durian "a pale, yellow, salvy, half-rotten substance having an odour of putrid animal matter. Its simple odour is generally quite enough for most Europeans."

In his remarks on the true bread-tree, or bread-fruit, Mr. Wallace is much more enthusiastic than Mr. Bickmore. It grows in several parts of the Archipelago, and has been largely cultivated around Amboyna, where Mr. Wallace first tasted it. "It is generally about the size of a melon, a little fibrous towards the centre, but everywhere else quite smooth and puddingy [we thank Mr. Wallace for this expressive term], something in consistence between yeast-dumplings and batter-pudding. It is baked entire in the hot embers, and the inside scooped out with a spoon. I compared it to Yorkshire pudding; Charles Allen said it was like mashed potatoes and milk. In no way is it so good as simply baked. With meat and gravy it is a vegetable superior to any I know, either in temperate or tropical climates. With sugar, milk, butter, or treacle, it is a delicious pudding, having a very slight and delicate, but characteristic flavour, which, like that of good bread and potatoes, one never gets tired of." Considering the high character assigned by Mr. Wallace to this fruit, it is no wonder that he suggests that we should try to acclimatise it in our West India islands; and, as the fruit will keep some time after being gathered, we might then be able to obtain this tropical luxury in Covent Garden Market. Mr. Bickmore states that the *Artocarpus incisa*, which we presume is the species referred to by Mr. Wallace, has already been introduced from the Pacific Islands into the West Indies* and tropical America; but, so far from endorsing his enthusiastic views regarding its culinary value, states that "it tastes somewhat like a potato, except that it is very fibrous."

* Many of our readers will, doubtless, recollect that the main object of the voyage of the *Bounty*, in 1787, under the command of Captain Bligh, was to discover whether the bread-fruit tree could be transplanted from Otaheite, and cultivated in the West Indies with success. The well-known mutiny that occurred shortly after the *Bounty* left Otaheite, of course, stopped the experiment.

In these hard times, and with all the olden cheap quarters—such as the Isle of Man, the Channel Islands, &c.—over-peopled, it may be worth while mentioning that Mr. Wallace has discovered a country where a person may live luxuriously, in so far as his food is concerned, for twelve shillings a year; and as this happy land, the island of Ceram, lies within three degrees of the equator, the expenses of dress need hardly equal those of food. For his most interesting account of how to make sago bread and cakes, with little labour or preparation, from a tree-trunk twenty feet long and five in circumference, we must refer to pages 216-222 of his second volume; and the food is not to be despised. "The hot cakes are very nice with butter; and when made with the addition of sugar and grated cocoa nut are quite a delicacy. They are soft, and something like corn-flour cakes, but have a slight characteristic flavour, which is lost in the refined sago we use in this country."

There is unfortunately an article of diet occasionally enjoyed in the Malay Archipelago that is not yielded by the vegetable kingdom—namely human flesh. Mr. Wallace gives us no information on the subject further than hinting at the dangerous character of the savages inhabiting the best Bird of Paradise localities. Mr. Bickmore, however, speaks very decidedly regarding cannibalism being still practised by the Battas—a hill tribe inhabiting the central parts of Sumatra, and quite distinct, as a race, from the Malays. He spent (we are happy to say, safely) some time in a Batta village, where there were two German missionaries one of whom stated "that he knew of a Batta who had been guilty of stealing an article of only very little value, according to their ideas of wealth, yet he was seized, his arms extended at full length and fastened to a bamboo, a sharpened prop placed under his chin, so that he could not move his head, and in this condition he was bound fast to a tree. The knife was then handed to the native who had lost the article, and he was ordered to step forward and cut out of the living man what piece he preferred. This he did promptly; the rajah took the second choice and then the people finished the cold-blooded butchery, and thus their victim died. This revolting feast, he assures me, took place but a short distance from the village where he resides. The parts that are esteemed the greatest delicacies are the palms of the hands, and, after them, the eyes. As soon as a piece is cut out it is dipped, still warm and steaming, in *sambal*, a common condiment of red or Chili peppers and a few grains of coarse salt, ground up between two flat stones. Formerly it appears to have been the custom to broil the human flesh, for Mr. Marsden states that, in December, 1780, a native of Nias, who stabbed a Batta at Batang Taroh, the river I crossed on the suspension bridge, was seized at six one morning, and without any judicial process, was tied to a stake, cut in pieces with the utmost eagerness while yet alive, and eaten on the spot, partly broiled but mostly raw."

"The Battas," he adds, "certainly do not eat human flesh for lack of food, nor wholly to satisfy revenge, but chiefly to gratify their appetites. The governor at Padang informed me that these people gave him this odd origin of their cannibal customs:—Many years ago one of their rajahs, committed a great crime, and it was evident to all that, exalted as he was, he ought to be punished, but no one would take upon himself the responsibility to punish a prince. After much consultation, they at last hit upon the happy idea, that he should be put to death, but they would all eat a piece of his body, and in this way all would share in punishing him. During this feast each one, to his astonishment, found the portion assigned him a most palatable morsel, and they all agreed that whenever another convict was to be put to death they would allow themselves to gratify their appetites again in the same manner, and thus arose the custom which has been handed down from one generation to another to the present day" (p. 446).

From this demoniacal feature of human nature, let us turn to a lovely scene beneath the waters, for the sketch of which we are indebted to Dr. Collingwood. The scene that he so vivedly depicts occurred on the Fiery Reef, in the China sea; and he dropt, as it were, upon it while on a voyage to Labuan. "The surface of the sea was perfectly smooth and glass-like, so that at the depth of sixty or seventy feet we could see the anchor lying at the bottom among blocks of coral as distinctly as if it had been but six feet from the surface. Taking a boat, with a couple of rowers, I left the ship and steered in search of the shallowest portions of the coral-strewn sea. A short row brought us upon a two fathom patch, over which I allowed the boat to drift slowly; and leaning over the side and looking down into the mirror-like sea I could admire at leisure the wonderful sight, undistorted as it was by the slightest ripple. Glorious masses of living coral strewed the bottom; immense globular madrepores, vast overhanging mushroom-shaped

expansions, complicated ramifications of interweaving branches, mingled with smaller and more delicate species—round, finger-shaped horn-like, and umbrella-form—lay in wondrous confusion: and these painted with every shade of delicate and brilliant colouring—grass-green and deep blue, bright-yellow, pure white, rich buff, and more sober brown—altogether forming a kaleidoscopic effect of form and colour unequalled by anything I had ever seen. Here and there was a large clam shell (*chama*) wedged in between masses of coral, the gaping zigzag mouth covered with the projecting mantle of the deepest Prussian blue; beds of dark purple, long spined echini, and the thick black bodies of sea cucumbers (*Holothuriæ*), varied the aspect of the sea bottom. In and out of these coral groves, like gorgeous birds in a forest of trees, swarm the most beautifully coloured and grotesque fishes, some of an intense blue, others bright red, others yellow, black, salmon-coloured, and every colour of the rainbow, curiously barred and banded and bearded, swarming everywhere in little shoals which usually included the same species, though every moment new species, more striking than the last, came into view" (p. 147).

In his observations on this naturalist's paradise, Dr. Collingwood made "the discovery of some *Actiniæ* of enormous size, and of habits no less novel than striking." The habits are not so novel as our author supposes; similar habits having been observed and recorded by Mr. Peach, regarding the common jelly-fish* of our own coasts. In a shallow spot he saw a large and beautiful convoluted mass of a deep blue colour, which, at first, he supposed to be a coral. On placing his hand upon it, the peculiar tenacious touch of the sea-anemone revealed its true nature, shreds of the tentacles adhering to his hand. When fully expanded it measured fully two feet in diameter. While standing in the water, admiring this beautiful creature, he noticed a pretty little fish about six inches long, and beautifully banded, vertically, with alternate white and orange rings, hovering just over the anemones, and remaining there so long as to excite Dr. Collingwood's suspicion that some connection existed between the two. This suspicion was subsequently confirmed on a reef off Labuan, where the same sea-anemone was seen to discharge six of these fishes from its interior or digestive cavity. There are at least two anemone-inhabiting fishes in these seas; the second species having black and cream-coloured vertical bands, instead of orange and white. Dr. Collingwood observes that the nature and object of the connection yet remains to be proved. Mr. Peach, if we rightly recollect, suggests that, in the case of the jelly-fish, the fishes swim under the umbrella-like disc for shelter from their enemies. We should be glad if some of our readers who are dwellers on the sea-side would turn their attention to this singular subject.

Subsequently, while sailing homewards, in June, in the Atlantic (lat. 13° S. long. 22° W.), he fell in with numbers of splendid Physaliæ, or Portuguese men-of-war, the largest having the well-known bladder 8 in. long and 2¾ in. above water, while the greatest vertical circumference was 10½ in. Each of these magnificent creatures, as it floated by, had beneath it a peculiar appearance, which was found to be due to a shoal of fishes from 2 in. to 6 in. long, and looking precisely like the pilot-fish, accompanying the man-of-war, under the protection of its vertical appendages. Under small Physaliæ the fishes were small, while under large species the fishes were comparatively large. Considering the intensely irritating properties of the tentacles, it is strange that fishes should choose such a harbour of refuge.

And now it is full time that we should bid our adventurous travellers farewell. They have all done well in their respective departments; but, as we observed in our first article, Mr. Wallace stands *facile princeps*.

We are not informed as to the number of specimens brought home by Dr. Collingwood. Mr. Bickmore tells us that he fully succeeded in accomplishing the object of his voyage, (which was to re-collect the shells figured by Rumphius) and gives us a list of the birds which he collected on the island of Buru; while Mr. Wallace's eastern collections included no less than 125,660 specimens of natural history, of which 310 were mammals, 100 reptiles, 8,050 birds, 7,500 shells, and 109,700 insects. In so far as new animals are concerned, it is in the insect world that he has made the most discoveries; in illustration of which we may mention that he has brought back, at least, nine hundred species of Longicorn beetles, and two hundred of ants new to European cabinets. Mr. Wallace is still a comparatively young man, and we heartily trust that his travels are not yet over.

* The sea-anemones and jelly-fishes are so far allied that they are both included in the sub-kingdom, *Cœlenterata*, the former belonging to the class *Anthozoa* (known also as Polyps or coral animals), and the latter to the class *Hydrarnedusæ*.