

The Voyage of the Beagle

by Charles Darwin

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Chapter 21 - Mauritius to England

APRIL 29th. -- In the morning we passed round the northern end of Mauritius, or the Isle of France. From this point of view the aspect of the island equalled the expectations raised by the many well-known descriptions of its beautiful scenery. The sloping plain of the Pamplemousses, interspersed with houses, and coloured by the large fields of sugar-cane of a bright green, composed the foreground. The brilliancy of the green was the more remarkable because it is a colour which generally is conspicuous only from a very short distance. Towards the centre of the island groups of wooded mountains rose out of this highly cultivated plain; their summits, as so commonly happens with ancient volcanic rocks, being jagged into the sharpest points. Masses of white clouds were collected around these pinnacles, as if for the sake of pleasing the stranger's eye. The whole island, with its sloping border and central mountains, was adorned with an air of perfect elegance: the scenery, if I may use such an expression, appeared to the sight harmonious.

I spent the greater part of the next day in walking about the town and visiting different people. The town is of considerable size, and is said to contain 20,000 inhabitants; the streets are very clean and regular. Although the island has been so many years under the English Government, the general character of the place is quite French: Englishmen speak to their servants in French, and the shops are all French; indeed, I should think that Calais or Boulogne was much more Anglified. There is a very pretty little theatre, in which operas are excellently performed. We were also surprised at seeing large booksellers' shops, with well-stored shelves; -- music and reading bespeak our approach to the old world of civilization; for in truth both Australia and America are new worlds.

The various races of men walking in the streets afford the most interesting spectacle in Port Louis. Convicts from India are banished here for life; at present there are about 800, and they are employed in various public works. Before seeing these people, I had no idea that the inhabitants of India were such noble-looking figures. Their skin is extremely dark, and many of the older men had large mustaches and beards of a snow-white colour; this, together with the fire of their expression, gave them quite an imposing aspect. The greater number had been banished for murder and the worst crimes; others for causes which can scarcely be considered as moral faults, such as for not obeying, from superstitious motives, the English laws. These men are generally quiet and well-conducted; from their outward conduct, their cleanliness, and faithful observance of their strange religious rites, it was impossible to look at them with the same eyes as on our wretched convicts in New South Wales.

May 1st. -- Sunday. I took a quiet walk along the seacoast to the north of the town. The plain in this part is quite uncultivated; it consists of a field of black lava, smoothed over with coarse grass and bushes, the latter being chiefly Mimosas. The scenery may be described as intermediate in character between that of the Galapagos and of Tahiti; but this will convey a definite idea to very few persons. It is a very pleasant country, but it has not the charms of Tahiti, or the grandeur of Brazil. The next day I ascended La Pouce, a mountain so called from a thumb-like projection, which rises close behind the town to a height of 2,600 feet. The centre of the island consists of a great platform, surrounded by old broken basaltic mountains, with their strata dipping seawards. The central platform, formed of comparatively recent streams of lava, is of an oval shape, thirteen geographical miles across, in the line of its shorter axis. The exterior bounding mountains come into that class of structures called Craters of Elevation, which are supposed to have been formed not like ordinary craters, but by a great and sudden upheaval. There appears to me to be insuperable objections to this view: on the other hand, I can hardly believe, in this and in some other cases, that these marginal crateriform mountains are merely the basal remnants of immense volcanos, of which the summits either have been blown off, or swallowed up in subterranean abysses.

From our elevated position we enjoyed an excellent view over the island. The country on this side appears pretty well cultivated, being divided into fields and studded with farm-houses. I was, however, assured that of the whole land, not more than half is yet in a productive state; if such be the case, considering the present large export of sugar, this island, at some future period when thickly peopled, will be of great value. Since England has taken possession of it, a period of only twenty-five years, the export of sugar is

said to have increased seventy-five fold. One great cause of its prosperity is the excellent state of the roads. In the neighbouring Isle of Bourbon, which remains under the French government, the roads are still in the same miserable state as they were here only a few years ago. Although the French residents must have largely profited by the increased prosperity of their island, yet the English government is far from popular.

3rd. -- In the evening Captain Lloyd, the Surveyor-general, so well known from his examination of the Isthmus of Panama, invited Mr. Stokes and myself to his country-house, which is situated on the edge of Wilhelm Plains, and about six miles from the Port. We stayed at this delightful place two days; standing nearly 800 feet above the sea, the air was cool and fresh, and on every side there were delightful walks. Close by, a grand ravine has been worn to a depth of about 500 feet through the slightly inclined streams of lava, which have flowed from the central platform.

5th. -- Captain Lloyd took us to the Riviere Noire, which is several miles to the southward, that I might examine some rocks of elevated coral. We passed through pleasant gardens, and fine fields of sugar-cane growing amidst huge blocks of lava. The roads were bordered by hedges of Mimosa, and near many of the houses there were avenues of the mango. Some of the views, where the peaked hills and the cultivated farms were seen together, were exceedingly picturesque; and we were constantly tempted to exclaim, "How pleasant it would be to pass one's life in such quiet abodes!" Captain Lloyd possessed an elephant, and he sent it half way with us, that we might enjoy a ride in true Indian fashion. The circumstance which surprised me most was its quite noiseless step. This elephant is the only one at present on the island; but it is said others will be sent for.

May 9th. -- We sailed from Port Louis, and, calling at the Cape of Good Hope, on the 8th of July, we arrived off St. Helena. This island, the forbidding aspect of which has been so often described, rises abruptly like a huge black castle from the ocean. Near the town, as if to complete nature's defence, small forts and guns fill up every gap in the rugged rocks. The town runs up a flat and narrow valley; the houses look respectable, and are interspersed with a very few green trees. When approaching the anchorage there was one striking view: an irregular castle perched on the summit of a lofty hill, and surrounded by a few scattered fir-trees, boldly projected against the sky.

The next day I obtained lodgings within a stone's throw of Napoleon's tomb; [1] it was a capital central situation, whence I could make excursions in every direction. During the four days I stayed here, I wandered over the island from morning to night, and examined its geological history. My lodgings were situated at a height of about 2000 feet; here the weather was cold and boisterous, with constant showers of rain; and every now and then the whole scene was veiled in thick clouds.

Near the coast the rough lava is quite bare: in the central and higher parts, feldspathic rocks by their decomposition have produced a clayey soil, which, where not covered by vegetation, is stained in broad bands of many bright colours. At this season, the land moistened by constant showers, produces a singularly bright green pasture, which lower and lower down, gradually fades away and at last disappears. In latitude 16 degs., and at the trifling elevation of 1500 feet, it is surprising to behold a vegetation possessing a character decidedly British. The hills are crowned with irregular plantations of Scotch firs; and the sloping banks are thickly scattered over with thickets of gorse, covered with its bright yellow flowers. Weeping-willows are common on the banks of the rivulets, and the hedges are made of the blackberry, producing its well-known fruit. When we consider that the number of plants now found on the island is 746, and that out of these fifty-two alone are indigenous species, the rest having been imported, and most of them from England, we see the reason of the British character of the vegetation. Many of these English plants appear to flourish better than in their native country; some also from the opposite quarter of Australia succeed remarkably well. The many imported species must have destroyed some of the native kinds; and it is only on the highest and steepest ridges that the indigenous Flora is now predominant.

The English, or rather Welsh character of the scenery, is kept up by the numerous cottages and small white houses; some buried at the bottom of the deepest valleys, and others mounted on the crests of the lofty hills. Some of the views are striking, for instance that from near Sir W. Doveton's house, where the bold peak called Lot is seen over a dark wood of firs, the whole being backed by the red water-worn mountains of the southern coast. On viewing the island from an eminence, the first circumstance which strikes one, is the number of the roads and forts: the labour bestowed on the public works, if one forgets its character as a prison, seems out of all proportion to its extent or value. There is so little level or useful land, that it seems surprising how so many people, about 5000, can subsist here. The lower orders, or the emancipated slaves, are I believe extremely poor: they complain of the want of work. From the reduction in the number of public servants owing to the island having been given up by the East Indian Company, and the consequent emigration of many of the richer people, the poverty probably will increase. The chief food of the working class is rice with a little salt meat; as neither of these articles are the products of the island, but must be purchased with money, the low wages tell heavily on the poor people. Now that the people are blessed with freedom, a right which I believe they value fully, it seems probable that their

numbers will quickly increase: if so, what is to become of the little state of St. Helena?

My guide was an elderly man, who had been a goatherd when a boy, and knew every step amongst the rocks. He was of a race many times crossed, and although with a dusky skin, he had not the disagreeable expression of a mulatto. He was a very civil, quiet old man, and such appears the character of the greater number of the lower classes. It was strange to my ears to hear a man, nearly white and respectably dressed, talking with indifference of the times when he was a slave. With my companion, who carried our dinners and a horn of water, which is quite necessary, as all the water in the lower valleys is saline, I every day took long walks.

Beneath the upper and central green circle, the wild valleys are quite desolate and untenanted. Here, to the geologist, there were scenes of high interest, showing successive changes and complicated disturbances. According to my views, St. Helena has existed as an island from a very remote epoch: some obscure proofs, however, of the elevation of the land are still extant. I believe that the central and highest peaks form parts of the rim of a great crater, the southern half of which has been entirely removed by the waves of the sea: there is, moreover, an external wall of black basaltic rocks, like the coast-mountains of Mauritius, which are older than the central volcanic streams. On the higher parts of the island, considerable numbers of a shell, long thought to be a marine species occur imbedded in the soil.

It proved to be a *Cochlogena*, or land-shell of a very peculiar form; [2] with it I found six other kinds; and in another spot an eighth species. It is remarkable that none of them are now found living. Their extinction has probably been caused by the entire destruction of the woods, and the consequent loss of food and shelter, which occurred during the early part of the last century.

The history of the changes, which the elevated plains of Longwood and Deadwood have undergone, as given in General Beatson's account of the island, is extremely curious. Both plains, it is said in former times were covered with wood, and were therefore called the Great Wood. So late as the year 1716 there were many trees, but in 1724 the old trees had mostly fallen; and as goats and hogs had been suffered to range about, all the young trees had been killed. It appears also from the official records, that the trees were unexpectedly, some years afterwards, succeeded by a wire grass which spread over the whole surface. [3] General Beatson adds that now this plain "is covered with fine sward, and is become the finest piece of pasture on the island." The extent of surface, probably covered by wood at a former period, is estimated at no less than two thousand acres; at the present day scarcely a single tree can be found there. It is also said that in 1709 there were quantities of dead trees in Sandy Bay; this place is now so utterly desert, that nothing but so well attested an account could have made me believe that they could ever have grown there. The fact, that the goats and hogs destroyed all the young trees as they sprang up, and that in the course of time the old ones, which were safe from their attacks, perished from age, seems clearly made out. Goats were introduced in the year 1502; eighty-six years afterwards, in the time of Cavendish, it is known that they were exceedingly numerous. More than a century afterwards, in 1731, when the evil was complete and irretrievable, an order was issued that all stray animals should be destroyed. It is very interesting thus to find, that the arrival of animals at St. Helena in 1501, did not change the whole aspect of the island, until a period of two hundred and twenty years had elapsed: for the goats were introduced in 1502, and in 1724 it is said "the old trees had mostly fallen." There can be little doubt that this great change in the vegetation affected not only the land-shells, causing eight species to become extinct, but likewise a multitude of insects.

St. Helena, situated so remote from any continent, in the midst of a great ocean, and possessing a unique Flora, excites our curiosity. The eight land-shells, though now extinct, and one living *Succinea*, are peculiar species found nowhere else. Mr. Cuming, however, informs me that an English *Helix* is common here, its eggs no doubt having been imported in some of the many introduced plants. Mr. Cuming collected on the coast sixteen species of sea-shells, of which seven, as far as he knows, are confined to this island. Birds and insects, [4] as might have been expected, are very few in number; indeed I believe all the birds have been introduced within late years. Partridges and pheasants are tolerably abundant; the island is much too English not to be subject to strict game-laws. I was told of a more unjust sacrifice to such ordinances than I ever heard of even in England. The poor people formerly used to burn a plant, which grows on the coast-rocks, and export the soda from its ashes; but a peremptory order came out prohibiting this practice, and giving as a reason that the partridges would have nowhere to build.

In my walks I passed more than once over the grassy plain bounded by deep valleys, on which Longwood stands. Viewed from a short distance, it appears like a respectable gentleman's country-seat. In front there are a few cultivated fields, and beyond them the smooth hill of coloured rocks called the Flagstaff, and the rugged square black mass of the Barn. On the whole the view was rather bleak and uninteresting. The only inconvenience I suffered during my walks was from the impetuous winds. One day I noticed a curious circumstance; standing on the edge of a plain, terminated by a great cliff of about a thousand feet in depth, I saw at the distance of a few yards right to windward, some tern, struggling against a very strong breeze, whilst, where I stood, the air was quite calm. Approaching close to the brink, where the current seemed to be deflected upwards from the face of the cliff, I stretched out my

arm, and immediately felt the full force of the wind: an invisible barrier, two yards in width, separated perfectly calm air from a strong blast.

I so much enjoyed my rambles among the rocks and mountains of St. Helena, that I felt almost sorry on the morning of the 14th to descend to the town. Before noon I was on board, and the *Beagle* made sail.

On the 19th of July we reached Ascension. Those who have beheld a volcanic island, situated under an arid climate, will at once be able to picture to themselves the appearance of Ascension. They will imagine smooth conical hills of a bright red colour, with their summits generally truncated, rising separately out of a level surface of black rugged lava. A principal mound in the centre of the island, seems the father of the lesser cones. It is called Green Hill: its name being taken from the faintest tinge of that colour, which at this time of the year is barely perceptible from the anchorage. To complete the desolate scene, the black rocks on the coast are lashed by a wild and turbulent sea.

The settlement is near the beach; it consists of several houses and barracks placed irregularly, but well built of white freestone. The only inhabitants are marines, and some negroes liberated from slave-ships, who are paid and victualled by government. There is not a private person on the island. Many of the marines appeared well contented with their situation; they think it better to serve their one-and-twenty years on shore, let it be what it may, than in a ship; in this choice, if I were a marine, I should most heartily agree.

The next morning I ascended Green Hill, 2840 feet high, and thence walked across the island to the windward point. A good cart-road leads from the coast-settlement to the houses, gardens, and fields, placed near the summit of the central mountain. On the roadside there are milestones, and likewise cisterns, where each thirsty passer-by can drink some good water. Similar care is displayed in each part of the establishment, and especially in the management of the springs, so that a single drop of water may not be lost: indeed the whole island may be compared to a huge ship kept in first-rate order. I could not help, when admiring the active industry, which had created such effects out of such means, at the same time regretting that it had been wasted on so poor and trifling an end. M. Lesson has remarked with justice, that the English nation would have thought of making the island of Ascension a productive spot, any other people would have held it as a mere fortress in the ocean.

Near this coast nothing grows; further inland, an occasional green castor-oil plant, and a few grasshoppers, true friends of the desert, may be met with. Some grass is scattered over the surface of the central elevated region, and the whole much resembles the worse parts of the Welsh mountains. But scanty as the pasture appears, about six hundred sheep, many goats, a few cows and horses, all thrive well on it. Of native animals, land-crabs and rats swarm in numbers. Whether the rat is really indigenous, may well be doubted; there are two varieties as described by Mr. Waterhouse; one is of a black colour, with fine glossy fur, and lives on the grassy summit, the other is brown-coloured and less glossy, with longer hairs, and lives near the settlement on the coast. Both these varieties are one-third smaller than the common black rat (*M. rattus*); and they differ from it both in the colour and character of their fur, but in no other essential respect. I can hardly doubt that these rats (like the common mouse, which has also run wild) have been imported, and, as at the Galapagos, have varied from the effect of the new conditions to which they have been exposed: hence the variety on the summit of the island differs from that on the coast. Of native birds there are none; but the guinea-fowl, imported from the Cape de Verd Islands, is abundant, and the common fowl has likewise run wild. Some cats, which were originally turned out to destroy the rats and mice, have increased, so as to become a great plague. The island is entirely without trees, in which, and in every other respect, it is very far inferior to St. Helena.

One of my excursions took me towards the S. W. extremity of the island. The day was clear and hot, and I saw the island, not smiling with beauty, but staring with naked hideousness. The lava streams are covered with hummocks, and are rugged to a degree which, geologically speaking, is not of easy explanation. The intervening spaces are concealed with layers of pumice, ashes and volcanic tuff. Whilst passing this end of the island at sea, I could not imagine what the white patches were with which the whole plain was mottled; I now found that they were sea-fowl, sleeping in such full confidence, that even in midday a man could walk up and seize hold of them. These birds were the only living creatures I saw during the whole day. On the beach a great surf, although the breeze was light, came tumbling over the broken lava rocks.

The geology of this island is in many respects interesting. In several places I noticed volcanic bombs, that is, masses of lava which have been shot through the air whilst fluid, and have consequently assumed a spherical or pear-shape. Not only their external form, but, in several cases, their internal structure shows in a very curious manner that they have revolved in their aerial course. The internal structure of one of these bombs, when broken, is represented very accurately in the woodcut. The central part is coarsely cellular, the cells decreasing in size towards the exterior; where there is a shell-like case about the third of an inch in thickness, of compact stone, which again is overlaid by the outside crust of finely cellular lava. I think there can be little doubt, first that the external crust cooled

rapidly in the state in which we now see it; secondly, that the still fluid lava within, was packed by the centrifugal force, generated by

[picture]

the revolving of the bomb, against the external cooled crust, and so produced the solid shell of stone; and lastly, that the centrifugal force, by relieving the pressure in the more central parts of the bomb, allowed the heated vapours to expand their cells, thus forming the coarse cellular mass of the centre.

A hill, formed of the older series of volcanic rocks, and which has been incorrectly considered as the crater of a volcano, is remarkable from its broad, slightly hollowed, and circular summit having been filled up with many successive layers of ashes and fine scoriae. These saucer-shaped layers crop out on the margin, forming perfect rings of many different colours, giving to the summit a most fantastic appearance; one of these rings is white and broad, and resembles a course round which horses have been exercised; hence the hill has been called the Devil's Riding School. I brought away specimens of one of the tufaceous layers of a pinkish colour and it is a most extraordinary fact, that Professor Ehrenberg [5] finds it almost wholly composed of matter which has been organized: he detects in it some siliceous-shielded fresh-water infusoria, and no less than twenty-five different kinds of the siliceous tissue of plants, chiefly of grasses. From the absence of all carbonaceous matter, Professor Ehrenberg believes that these organic bodies have passed through the volcanic fire, and have been erupted in the state in which we now see them. The appearance of the layers induced me to believe that they had been deposited under water, though from the extreme dryness of the climate I was forced to imagine, that torrents of rain had probably fallen during some great eruption, and that thus a temporary lake had been formed into which the ashes fell. But it may now be suspected that the lake was not a temporary one. Anyhow, we may feel sure, that at some former epoch the climate and productions of Ascension were very different from what they now are. Where on the face of the earth can we find a spot, on which close investigation will not discover signs of that endless cycle of change, to which this earth has been, is, and will be subjected?

On leaving Ascension, we sailed for Bahia, on the coast of Brazil, in order to complete the chronometrical measurement of the world. We arrived there on August 1st, and stayed four days, during which I took several long walks. I was glad to find my enjoyment in tropical scenery had not decreased from the want of novelty, even in the slightest degree. The elements of the scenery are so simple, that they are worth mentioning, as a proof on what trifling circumstances exquisite natural beauty depends.

The country may be described as a level plain of about three hundred feet in elevation, which in all parts has been worn into flat-bottomed valleys. This structure is remarkable in a granitic land, but is nearly universal in all those softer formations of which plains are usually composed. The whole surface is covered by various kinds of stately trees, interspersed with patches of cultivated ground, out of which houses, convents, and chapels arise. It must be remembered that within the tropics, the wild luxuriance of nature is not lost even in the vicinity of large cities: for the natural vegetation of the hedges and hill-sides overpowers in picturesque effect the artificial labour of man. Hence, there are only a few spots where the bright red soil affords a strong contrast with the universal clothing of green. From the edges of the plain there are distant views either of the ocean, or of the great Bay with its low-wooded shores, and on which numerous boats and canoes show their white sails. Excepting from these points, the scene is extremely limited; following the level pathways, on each hand, only glimpses into the wooded valleys below can be obtained. The houses I may add, and especially the sacred edifices, are built in a peculiar and rather fantastic style of architecture. They are all whitewashed; so that when illumined by the brilliant sun of midday, and as seen against the pale blue sky of the horizon, they stand out more like shadows than real buildings.

Such are the elements of the scenery, but it is a hopeless attempt to paint the general effect. Learned naturalists describe these scenes of the tropics by naming a multitude of objects, and mentioning some characteristic feature of each. To a learned traveller this possibly may communicate some definite ideas: but who else from seeing a plant in an herbarium can imagine its appearance when growing in its native soil? Who from seeing choice plants in a hothouse, can magnify some into the dimensions of forest trees, and crowd others into an entangled jungle? Who when examining in the cabinet of the entomologist the gay exotic butterflies, and singular cicadas, will associate with these lifeless objects, the ceaseless harsh music of the latter, and the lazy flight of the former, -- the sure accompaniments of the still, glowing noonday of the tropics? It is when the sun has attained its greatest height, that such scenes should be viewed: then the dense splendid foliage of the mango hides the ground with its darkest shade, whilst the upper branches are rendered from the profusion of light of the most brilliant green. In the temperate zones the case is different -- the vegetation there is not so dark or so rich, and hence the rays of the declining sun, tinged of a red, purple, or bright yellow color, add most to the beauties of those climes.

When quietly walking along the shady pathways, and admiring each successive view, I wished to find language to express my ideas.

Epithet after epithet was weak to convey to those who have not visited the intertropical regions, the sensation of delight which the mind experiences. I have said that the plants in a hothouse fail to communicate a just idea of the vegetation, yet I must recur to it. The land is one great wild, untidy, luxuriant hothouse, made by Nature for herself, but taken possession of by man, who has studded it with gay houses and formal gardens. How great would be the desire in every admirer of nature to behold, if such were possible, the scenery of another planet! yet to every person in Europe, it may be truly said, that at the distance of only a few degrees from his native soil, the glories of another world are opened to him. In my last walk I stopped again and again to gaze on these beauties, and endeavoured to fix in my mind for ever, an impression which at the time I knew sooner or later must fail. The form of the orange-tree, the cocoa-nut, the palm, the mango, the tree-fern, the banana, will remain clear and separate; but the thousand beauties which unite these into one perfect scene must fade away: yet they will leave, like a tale heard in childhood, a picture full of indistinct, but most beautiful figures.

August 6th. -- In the afternoon we stood out to sea, with the intention of making a direct course to the Cape de Verd Islands. Unfavourable winds, however, delayed us, and on the 12th we ran into Pernambuco, -- a large city on the coast of Brazil, in latitude 8 degs. south. We anchored outside the reef; but in a short time a pilot came on board and took us into the inner harbour, where we lay close to the town.

Pernambuco is built on some narrow and low sand-banks, which are separated from each other by shoal channels of salt water. The three parts of the town are connected together by two long bridges built on wooden piles. The town is in all parts disgusting, the streets being narrow, ill-paved, and filthy; the houses, tall and gloomy. The season of heavy rains had hardly come to an end, and hence the surrounding country, which is scarcely raised above the level of the sea, was flooded with water; and I failed in all my attempts to take walks.

The flat swampy land on which Pernambuco stands is surrounded, at the distance of a few miles, by a semicircle of low hills, or rather by the edge of a country elevated perhaps two hundred feet above the sea. The old city of Olinda stands on one extremity of this range. One day I took a canoe, and proceeded up one of the channels to visit it; I found the old town from its situation both sweeter and cleaner than that of Pernambuco. I must here commemorate what happened for the first time during our nearly five years' wandering, namely, having met with a want of politeness. I was refused in a sullen manner at two different houses, and obtained with difficulty from a third, permission to pass through their gardens to an uncultivated hill, for the purpose of viewing the country. I feel glad that this happened in the land of the Brazilians, for I bear them no good will -- a land also of slavery, and therefore of moral debasement. A Spaniard would have felt ashamed at the very thought of refusing such a request, or of behaving to a stranger with rudeness. The channel by which we went to and returned from Olinda, was bordered on each side by mangroves, which sprang like a miniature forest out of the greasy mud-banks. The bright green colour of these bushes always reminded me of the rank grass in a church-yard: both are nourished by putrid exhalations; the one speaks of death past, and the other too often of death to come.

The most curious object which I saw in this neighbourhood, was the reef that forms the harbour. I doubt whether in the whole world any other natural structure has so artificial an appearance. [6] It runs for a length of several miles in an absolutely straight line, parallel to, and not far distant from, the shore. It varies in width from thirty to sixty yards, and its surface is level and smooth; it is composed of obscurely stratified hard sandstone. At high water the waves break over it; at low water its summit is left dry, and it might then be mistaken for a breakwater erected by Cyclopean workmen. On this coast the currents of the sea tend to throw up in front of the land, long spits and bars of loose sand, and on one of these, part of the town of Pernambuco stands. In former times a long spit of this nature seems to have become consolidated by the percolation of calcareous matter, and afterwards to have been gradually upheaved; the outer and loose parts during this process having been worn away by the action of the sea, and the solid nucleus left as we now see it. Although night and day the waves of the open Atlantic, turbid with sediment, are driven against the steep outside edges of this wall of stone, yet the oldest pilots know of no tradition of any change in its appearance. This durability is much the most curious fact in its history: it is due to a tough layer, a few inches thick, of calcareous matter, wholly formed by the successive growth and death of the small shells of *Serpulae*, together with some few barnacles and nulliporae. These nulliporae, which are hard, very simply-organized sea-plants, play an analogous and important part in protecting the upper surfaces of coral-reefs, behind and within the breakers, where the true corals, during the outward growth of the mass, become killed by exposure to the sun and air. These insignificant organic beings, especially the *Serpulae*, have done good service to the people of Pernambuco; for without their protective aid the bar of sandstone would inevitably have been long ago worn away and without the bar, there would have been no harbour.

On the 19th of August we finally left the shores of Brazil. I thank God, I shall never again visit a slave-country. To this day, if I hear a distant scream, it recalls with painful vividness my feelings, when passing a house near Pernambuco, I heard the most pitiable moans, and could not but suspect that some poor slave was being tortured, yet knew that I was as powerless as a child even to remonstrate. I suspected that these moans were from a tortured slave, for I was told that this was the case in another instance. Near Rio de

Janeiro I lived opposite to an old lady, who kept screws to crush the fingers of her female slaves. I have stayed in a house where a young household mulatto, daily and hourly, was reviled, beaten, and persecuted enough to break the spirit of the lowest animal. I have seen a little boy, six or seven years old, struck thrice with a horse-whip (before I could interfere) on his naked head, for having handed me a glass of water not quite clean; I saw his father tremble at a mere glance from his master's eye. These latter cruelties were witnessed by me in a Spanish colony, in which it has always been said, that slaves are better treated than by the Portuguese, English, or other European nations. I have seen at Rio de Janeiro a powerful negro afraid to ward off a blow directed, as he thought, at his face. I was present when a kind-hearted man was on the point of separating forever the men, women, and little children of a large number of families who had long lived together. I will not even allude to the many heart-sickening atrocities which I authentically heard of; -- nor would I have mentioned the above revolting details, had I not met with several people, so blinded by the constitutional gaiety of the negro as to speak of slavery as a tolerable evil. Such people have generally visited at the houses of the upper classes, where the domestic slaves are usually well treated, and they have not, like myself, lived amongst the lower classes. Such inquirers will ask slaves about their condition; they forget that the slave must indeed be dull, who does not calculate on the chance of his answer reaching his master's ears.

It is argued that self-interest will prevent excessive cruelty; as if self-interest protected our domestic animals, which are far less likely than degraded slaves, to stir up the rage of their savage masters. It is an argument long since protested against with noble feeling, and strikingly exemplified, by the ever-illustrious Humboldt. It is often attempted to palliate slavery by comparing the state of slaves with our poorer countrymen: if the misery of our poor be caused not by the laws of nature, but by our institutions, great is our sin; but how this bears on slavery, I cannot see; as well might the use of the thumb-screw be defended in one land, by showing that men in another land suffered from some dreadful disease. Those who look tenderly at the slave owner, and with a cold heart at the slave, never seem to put themselves into the position of the latter; what a cheerless prospect, with not even a hope of change! picture to yourself the chance, ever hanging over you, of your wife and your little children -- those objects which nature urges even the slave to call his own -- being torn from you and sold like beasts to the first bidder! And these deeds are done and palliated by men, who profess to love their neighbours as themselves, who believe in God, and pray that his Will be done on earth! It makes one's blood boil, yet heart tremble, to think that we Englishmen and our American descendants, with their boastful cry of liberty, have been and are so guilty: but it is a consolation to reflect, that we at least have made a greater sacrifice, than ever made by any nation, to expiate our sin.

On the last day of August we anchored for the second time at Porto Praya in the Cape de Verd archipelago; thence we proceeded to the Azores, where we stayed six days. On the 2nd of October we made the shore, of England; and at Falmouth I left the Beagle, having lived on board the good little vessel nearly five years.

Our Voyage having come to an end, I will take a short retrospect of the advantages and disadvantages, the pains and pleasures, of our circumnavigation of the world. If a person asked my advice, before undertaking a long voyage, my answer would depend upon his possessing a decided taste for some branch of knowledge, which could by this means be advanced. No doubt it is a high satisfaction to behold various countries and the many races of mankind, but the pleasures gained at the time do not counterbalance the evils. It is necessary to look forward to a harvest, however distant that may be, when some fruit will be reaped, some good effected.

Many of the losses which must be experienced are obvious; such as that of the society of every old friend, and of the sight of those places with which every dearest remembrance is so intimately connected. These losses, however, are at the time partly relieved by the exhaustless delight of anticipating the long wished-for day of return. If, as poets say, life is a dream, I am sure in a voyage these are the visions which best serve to pass away the long night. Other losses, although not at first felt, tell heavily after a period: these are the want of room, of seclusion, of rest; the jading feeling of constant hurry; the privation of small luxuries, the loss of domestic society and even of music and the other pleasures of imagination. When such trifles are mentioned, it is evident that the real grievances, excepting from accidents, of a sea-life are at an end. The short space of sixty years has made an astonishing difference in the facility of distant navigation. Even in the time of Cook, a man who left his fireside for such expeditions underwent severe privations. A yacht now, with every luxury of life, can circumnavigate the globe. Besides the vast improvements in ships and naval resources, the whole western shores of America are thrown open, and Australia has become the capital of a rising continent. How different are the circumstances to a man shipwrecked at the present day in the Pacific, to what they were in the time of Cook! Since his voyage a hemisphere has been added to the civilized world.

If a person suffer much from sea-sickness, let him weigh it heavily in the balance. I speak from experience: it is no trifling evil, cured in a week. If, on the other hand, he take pleasure in naval tactics, he will assuredly have full scope for his taste. But it must be borne in mind, how large a proportion of the time, during a long voyage, is spent on the water, as compared with the days in harbour. And what are the boasted glories of the illimitable ocean. A tedious waste, a desert of water, as the Arabian calls it. No doubt there are

some delightful scenes. A moonlight night, with the clear heavens and the dark glittering sea, and the white sails filled by the soft air of a gently blowing trade-wind, a dead calm, with the heaving surface polished like a mirror, and all still except the occasional flapping of the canvas. It is well once to behold a squall with its rising arch and coming fury, or the heavy gale of wind and mountainous waves. I confess, however, my imagination had painted something more grand, more terrific in the full-grown storm. It is an incomparably finer spectacle when beheld on shore, where the waving trees, the wild flight of the birds, the dark shadows and bright lights, the rushing of the torrents all proclaim the strife of the unloosed elements. At sea the albatross and little petrel fly as if the storm were their proper sphere, the water rises and sinks as if fulfilling its usual task, the ship alone and its inhabitants seem the objects of wrath. On a forlorn and weather-beaten coast, the scene is indeed different, but the feelings partake more of horror than of wild delight.

Let us now look at the brighter side of the past time. The pleasure derived from beholding the scenery and the general aspect of the various countries we have visited, has decidedly been the most constant and highest source of enjoyment. It is probable that the picturesque beauty of many parts of Europe exceeds anything which we beheld. But there is a growing pleasure in comparing the character of the scenery in different countries, which to a certain degree is distinct from merely admiring its beauty. It depends chiefly on an acquaintance with the individual parts of each view. I am strongly induced to believe that as in music, the person who understands every note will, if he also possesses a proper taste, more thoroughly enjoy the whole, so he who examines each part of a fine view, may also thoroughly comprehend the full and combined effect. Hence, a traveller should be a botanist, for in all views plants form the chief embellishment. Group masses of naked rock, even in the wildest forms, and they may for a time afford a sublime spectacle, but they will soon grow monotonous. Paint them with bright and varied colours, as in Northern Chile, they will become fantastic; clothe them with vegetation, they must form a decent, if not a beautiful picture.

When I say that the scenery of parts of Europe is probably superior to anything which we beheld, I except, as a class by itself, that of the intertropical zones. The two classes cannot be compared together; but I have already often enlarged on the grandeur of those regions. As the force of impressions generally depends on preconceived ideas, I may add, that mine were taken from the vivid descriptions in the Personal Narrative of Humboldt, which far exceed in merit anything else which I have read. Yet with these high-wrought ideas, my feelings were far from partaking of a tinge of disappointment on my first and final landing on the shores of Brazil.

Among the scenes which are deeply impressed on my mind, none exceed in sublimity the primeval forests undefaced by the hand of man; whether those of Brazil, where the powers of Life are predominant, or those of Tierra del Fuego, where Death and decay prevail. Both are temples filled with the varied productions of the God of Nature: -- no one can stand in these solitudes unmoved, and not feel that there is more in man than the mere breath of his body. In calling up images of the past, I find that the plains of Patagonia frequently cross before my eyes; yet these plains are pronounced by all wretched and useless. They can be described only by negative characters; without habitations, without water, without trees, without mountains, they support merely a few dwarf plants. Why, then, and the case is not peculiar to myself, have these arid wastes taken so firm a hold on my memory? Why have not the still more level, the greener and more fertile Pampas, which are serviceable to mankind, produced an equal impression? I can scarcely analyze these feelings: but it must be partly owing to the free scope given to the imagination. The plains of Patagonia are boundless, for they are scarcely passable, and hence unknown: they bear the stamp of having lasted, as they are now, for ages, and there appears no limit to their duration through future time. If, as the ancients supposed, the flat earth was surrounded by an impassable breadth of water, or by deserts heated to an intolerable excess, who would not look at these last boundaries to man's knowledge with deep but ill-defined sensations?

Lastly, of natural scenery, the views from lofty mountains, through certainly in one sense not beautiful, are very memorable. When looking down from the highest crest of the Cordillera, the mind, undisturbed by minute details, was filled with the stupendous dimensions of the surrounding masses.

Of individual objects, perhaps nothing is more certain to create astonishment than the first sight in his native haunt of a barbarian -- of man in his lowest and most savage state. One's mind hurries back over past centuries, and then asks, could our progenitors have been men like these? -- men, whose very signs and expressions are less intelligible to us than those of the domesticated animals; men, who do not possess the instinct of those animals, nor yet appear to boast of human reason, or at least of arts consequent on that reason. I do not believe it is possible to describe or paint the difference between savage and civilized man. It is the difference between a wild and tame animal: and part of the interest in beholding a savage, is the same which would lead every one to desire to see the lion in his desert, the tiger tearing his prey in the jungle, or the rhinoceros wandering over the wild plains of Africa.

Among the other most remarkable spectacles which we have beheld, may be ranked, the Southern Cross, the cloud of Magellan, and the other constellations of the southern hemisphere -- the water-spout -- the glacier leading its blue stream of ice, over-hanging the sea in a bold precipice -- a lagoon-island raised by the reef-building corals -- an active volcano -- and the overwhelming effects of a

violent earthquake. These latter phenomena, perhaps, possess for me a peculiar interest, from their intimate connection with the geological structure of the world. The earthquake, however, must be to every one a most impressive event: the earth, considered from our earliest childhood as the type of solidity, has oscillated like a thin crust beneath our feet; and in seeing the laboured works of man in a moment overthrown, we feel the insignificance of his boasted power.

It has been said, that the love of the chase is an inherent delight in man -- a relic of an instinctive passion. If so, I am sure the pleasure of living in the open air, with the sky for a roof and the ground for a table, is part of the same feeling, it is the savage returning to his wild and native habits. I always look back to our boat cruises, and my land journeys, when through unfrequented countries, with an extreme delight, which no scenes of civilization could have created. I do not doubt that every traveller must remember the glowing sense of happiness which he experienced, when he first breathed in a foreign clime, where the civilized man had seldom or never trod.

There are several other sources of enjoyment in a long voyage, which are of a more reasonable nature. The map of the world ceases to be a blank; it becomes a picture full of the most varied and animated figures. Each part assumes its proper dimensions: continents are not looked at in the light of islands, or islands considered as mere specks, which are, in truth, larger than many kingdoms of Europe. Africa, or North and South America, are well-sounding names, and easily pronounced; but it is not until having sailed for weeks along small portions of their shores, that one is thoroughly convinced what vast spaces on our immense world these names imply.

From seeing the present state, it is impossible not to look forward with high expectations to the future progress of nearly an entire hemisphere. The march of improvement, consequent on the introduction of Christianity throughout the South Sea, probably stands by itself in the records of history. It is the more striking when we remember that only sixty years since, Cook, whose excellent judgment none will dispute, could foresee no prospect of a change. Yet these changes have now been effected by the philanthropic spirit of the British nation.

In the same quarter of the globe Australia is rising, or indeed may be said to have risen, into a grand centre of civilization, which, at some not very remote period, will rule as empress over the southern hemisphere. It is impossible for an Englishman to behold these distant colonies, without a high pride and satisfaction. To hoist the British flag, seems to draw with it as a certain consequence, wealth, prosperity, and civilization.

In conclusion, it appears to me that nothing can be more improving to a young naturalist, than a journey in distant countries. It both sharpens, and partly allays that want and craving, which, as Sir J. Herschel remarks, a man experiences although every corporeal sense be fully satisfied. The excitement from the novelty of objects, and the chance of success, stimulate him to increased activity. Moreover, as a number of isolated facts soon become uninteresting, the habit of comparison leads to generalization. On the other hand, as the traveller stays but a short time in each place, his descriptions must generally consist of mere sketches, instead of detailed observations. Hence arises, as I have found to my cost, a constant tendency to fill up the wide gaps of knowledge, by inaccurate and superficial hypotheses.

But I have too deeply enjoyed the voyage, not to recommend any naturalist, although he must not expect to be so fortunate in his companions as I have been, to take all chances, and to start, on travels by land if possible, if otherwise, on a long voyage. He may feel assured, he will meet with no difficulties or dangers, excepting in rare cases, nearly so bad as he beforehand anticipates. In a moral point of view, the effect ought to be, to teach him good-humoured patience, freedom from selfishness, the habit of acting for himself, and of making the best of every occurrence. In short, he ought to partake of the characteristic qualities of most sailors. Travelling ought also to teach him distrust; but at the same time he will discover, how many truly kind-hearted people there are, with whom he never before had, or ever again will have any further communication, who yet are ready to offer him the most disinterested assistance.

End

[1] After the volumes of eloquence which have poured forth on this subject, it is dangerous even to mention the tomb. A modern traveller, in twelve lines, burdens the poor little island with the following titles, -- it is a grave, tomb, pyramid, cemetery, sepulchre, catacomb, sarcophagus, minaret, and mausoleum!

[2] It deserves notice, that all the many specimens of this shell found by me in one spot, differ as a marked variety, from another set

of specimens procured from a different spot.

[3] Beatson's St. Helena. Introductory chapter, p. 4.

[4] Among these few insects, I was surprised to find a small *Aphodius* (nov. spec.) and an *Oryctes*, both extremely numerous under dung. When the island was discovered it certainly possessed no quadruped, excepting perhaps a mouse: it becomes, therefore, a difficult point to ascertain, whether these stercovorous insects have since been imported by accident, or if aborigines, on what food they formerly subsisted. On the banks of the Plata, where, from the vast number of cattle and horses, the fine plains of turf are richly manured, it is vain to seek the many kinds of dung-feeding beetles, which occur so abundantly in Europe. I observed only an *Oryctes* (the insects of this genus in Europe generally feed on decayed vegetable matter) and two species of *Phanaeus*, common in such situations. On the opposite side of the Cordillera in Chiloe, another species of *Phanaeus* is exceedingly abundant, and it buries the dung of the cattle in large earthen balls beneath the ground. There is reason to believe that the genus *Phanaeus*, before the introduction of cattle, acted as scavengers to man. In Europe, beetles, which find support in the matter which has already contributed towards the life of other and larger animals, are so numerous that there must be considerably more than one hundred different species. Considering this, and observing what a quantity of food of this kind is lost on the plains of La Plata, I imagined I saw an instance where man had disturbed that chain, by which so many animals are linked together in their native country. In Van Diemen's Land, however, I found four species of *Onthophagus*, two of *Aphodius*, and one of a third genus, very abundantly under the dung of cows; yet these latter animals had been then introduced only thirty-three years. Previous to that time the kangaroo and some other small animals were the only quadrupeds; and their dung is of a very different quality from that of their successors introduced by man. In England the greater number of stercovorous beetles are confined in their appetites; that is, they do not depend indifferently on any quadruped for the means of subsistence. The change, therefore, in habits which must have taken place in Van Diemen's Land is highly remarkable. I am indebted to the Rev. F. W. Hope, who, I hope, will permit me to call him my master in Entomology, for giving me the names of the foregoing insects.

[5] Monats. der Konig. Akad. d. Wiss. zu Berlin. Vom April, 1845.

[6] I have described this Bar in detail, in the Lond. and Edin. Phil. Mag., vol. xix. (1841), p. 257.

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