**Notes by a field-naturalist in the western tropics : from a journal kept on board the Royal Mersey steam yacht "Argo" / by Henry H. Higgins.**


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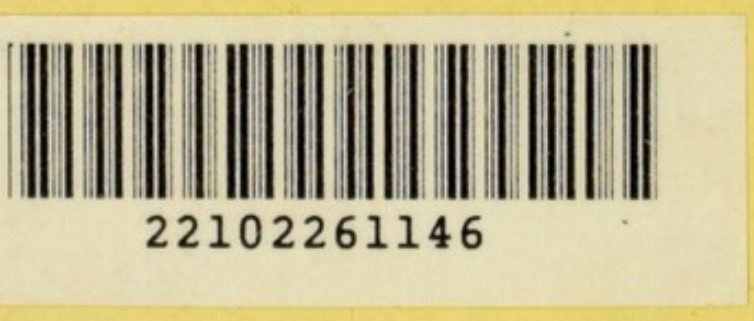

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# *NOTES BY A FIELD-NATURALIST*

IN THE

# *WESTERN TROPICS.*

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J.F. WORRALL, DEL.

VILLA IN THE WESTERN TROPICS.

# *NOTES BY A FIELD-NATURALIST*

IN THE

# *WESTERN TROPICS.*

FROM A JOURNAL KEPT ON BOARD THE ROYAL MERSEY STEAM YACHT "ARGO."

BY

HENRY H. HIGGINS, M.A.,

*President of the Liverpool Naturalists' Field Club, and of the Microscopical Society of Liverpool.*

WITH MAP AND ILLUSTRATIONS.

LIVERPOOL
EDWARD HOWELL CHURCH STREET
1877

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# LIST OF PLATES

# NOTES BY A FIELD-NATURALIST

IN THE

# WESTERN TROPICS.

TOWARDS the close of 1875, a voyage to the West Indies was planned by Reginald Cholmondeley, Esq., of Condover Hall, Salop, in pursuance of his desire to enrich his already extensive and well-stocked aviary with specimens from the Antilles and Tropical America, and to have an opportunity of observing the habits of animals, and especially of birds, in their native resorts. For this purpose he chartered a fine new steam-ship of 750 tons register, built by Alfred Holt, Esq., of Liverpool, which thus became duly qualified to leave the port as the Royal Mersey Steam Yacht "Argo."

Unwilling that so fine an opportunity for collecting in all departments of Natural History should be lost, Mr. Cholmondeley expressed to the Committee of the Liverpool Free Public Museum his readiness to accommodate in the "Argo" a member of their Institution, to be nominated by the Committee; generously offering to place the whole of the invertebrate speci-

mens collected at the disposal of the Museum. The Committee conferred the honour of their choice on myself, and, ultimately, by an extension of Mr. Cholmondeley's kind offer, I went on board accompanied by two assistants selected from the Museum staff, Mr. John Chard and James Woods. The "Argo" left Liverpool on the morning of January 16, 1876.

I fear that the following notes may be liable to the charge of extreme egotism; but I ask the indulgence of my readers on the consideration that I am in no wise writing a book of travels, or a history of the places visited, or of the things best worth notice in them. Personal incidents and impressions, scraps of information which interested me at the time, short conversations—these, together with observations, remarks, and reflections connected with Natural History, are the materials with which I have to deal; and an attempt to avoid the use of the pronoun of the first person would involve a tedious amount of circumlocution.

During the greater part of the voyage my journal was written regularly, and such quotations as I may have occasion to make from it, verbatim, will probably convey the impressions produced at the time better than any thing I could write from studied recollection.

On the 23rd of January we lay at anchor in the Bay of Funchal. I had no idea that Madeira was so alpine in its character. Houses, white and black, like rifle targets or models from a toy-box, are scattered on

the hill sides up to 1500 feet above the sea, Over these, and beyond them, are steep gorges and ravines scooped out by the great earth-plough, exhibiting all day long continued changes of deep shadow and bright sunshine.

Amongst the first to greet us in the bay were four boys in a little boat, who came alongside and made signs for us to throw silver coins into the water. They seemed in no great hurry to dive, but watched the coin descending till it was almost out of sight: then they slipped in like otters, and soon came up holding the coin and shouting its value—four-pence! loud, six-pence!! with a burst of approbation, shil-ling!!!

My first introduction to the interior of the island was on the occasion of an excursion made on horses to the Grande Corral, distant about nine miles from Funchal, along a narrow winding road so beset with steep ascents and rugged declivities as quite to confirm the impression made by our more distant view on board the "Argo;" the scenery all the way was most picturesque. In the vicinity of the town, branches of flowering trees, *Buginvillæa, Bignonia,* and others streamed over the walls, and hung profusely in festoons of purple and orange and crimson. How strange it seemed that in January, a passage of only a few days from the wintry shores of Liverpool should so entirely change the scene! But that which gave especial interest to the flora of the road-side was the intermingling of exotic beauties with plants familiar

to us in our excursions at home. The Yam, the Orange, the Vine, and the Pomegranate were there; a table-shaped *Sempervivum* was on the walls, and with it our common Navel-wort; a splendid crimson *Oxalis* adorned the banks, and close by were the Two-flowered Narcissus, the Great Blue Periwinkle and the Sweet Violet. It would be tedious to mention half the English wild-flowers I saw mingled with strangers which at the time I could not name.

As we proceeded the road became more and more alpine, now steep as a staircase, now skirting a magnificent headland, now diving into a valley only to commence a steeper climb on the other side. "Ah, sir," said our worthy guide, "you should have seen a party of young gentlemen of the navy riding along this road the other day." This pleasure was denied me, but I could form some conception of the kind of thing. We did not ride very fast, but all too fast for my powers of observation perplexed between the scenery and the botany; admiring, meanwhile, the endurance of a lithe young Portuguese, who, on foot, kept up with us carrying on his back a hamper weighing more than fifty pounds, containing our not altogether frugal provision for the day.

At length we reached the Corral. It is a grandly wooded irregular *cwm*, at an elevation of about 5000 feet. What a relief it was to fling away the bridle with a prospect of enjoying three undisturbed hours amongst the Mosses and the Lichens in such a

spot. My first specimen was a Lichen, *Sticta Pulmonaria*, gathered from a Laurel the trunk of which was seven feet in circumference. When it was known that I had no ambition to reach the highest point, but meant to botanise amongst the rocks of the Corral, my kind friends insisted upon my having a guide, and the hamper-bearer was appointed to take care of me. He could not speak English, nor I a word of Portuguese, but he soon seemed to understand which of us was to be guide.

It is needless to give details of my plant collecting, which will find a more appropriate place in a report of the specimens obtained, but I cannot refrain from recounting a little anecdote of my athletic companion. My proceedings were evidently unintelligible to him. What was to be found by turning up large stones in the water-course, or what in the green slime scraped off dripping rocks? His curiosity at length induced him to peep into my vasculum, and at once his countenance brightened. He knew what he would do. There was an old wall about twenty yards off, and to this he repaired, soon returning with a neat tuft of moss, *Polytrichum juniperinum*. I signalled my best thanks; but room in my vasculum was getting scarce, and I showed him that I had already collected it. He was evidently mortified, but after considering the thing he went back to the wall and put the moss in its place, patting the roots with his hand to make all right. It was not wanted, so why should it not still

live in its own nook? Under the impulse of disappointment many would have thrown the plant away. Its restoration was a gentle act, all the more graceful in one physically so strong.

Observing that I was very anxious to obtain a rare coral said to be found near the Island of Desertos, Mr. C. kindly arranged to detain the "Argo" for another day, in order to visit the island. The cliffs, as you approach close to them, exhibit a very interesting structure. The old red tufa rock is pierced by many dykes of greyish columnar (trachytic ?) rock, reminding one of a Wady in Arabia Petræa. We had engaged two divers, but after a couple of plunges they went on the rocks, and finally returned unsuccessful. For about two hours' work they demanded £5, but were well pleased when they got £1. Our farewell to the inhabitants of Funchal was despatched in the form of a display of fire-works from the deck of the "Argo."

*January 27th*, TENERIFFE.—From early morning and throughout the day this glorious peak has been in sight. The parting view was to me most striking. Fleecy evening clouds were resting in the sky, forming the moveless line so often seen near the horizon towards the close of day. A summer haze covered all below, but high in the clear air above the line of clouds rose the Peak, its massive cone streaked with snow, and ruddy with the reflection of the west. Pure and placid, it seemed to belong to the sky rather than to the earth.

Soon after sunset, the western sky was adorned with a rare combination of celestial appearances. Of the planets, Mars was highest, next Venus, then near together came Saturn and Mercury, and just where the greyish haze on the horizon brightened into cinnabar, in a line with the rest, was the almost thread-like crescent of the child moon, some thirty hours old. The Zodiacal light shewed with considerable precision the angle of the ecliptic with the horizon. Sirius, seen through a binocular, blazed with such palpable flashes of green and blue and crimson, as might well be compared with balls of coloured fire aloft discharged by a rocket. Far below Sirius in the south shone a glorious star, new to myself, but which I recognised from its position as *Canopus*, of the constellation Argo! A propitious omen verified throughout our subsequent voyage.

It must be admitted that in crossing the Atlantic the "Argo" was remarkably lively, and had a way of flinging people, tables, boxes, and chairs from side to side very unceremoniously. I did not suffer in the least from sea-sickness, but it was not so with all on board; accordingly we went in search of more quiet waters, and shaped our course so far south, that, to my great disappointment, we altogether missed the Sargasso Sea. We met with no really rough weather, but, in place of the N.E. trade-wind, a vigorous breeze from the south, day after day, kept old Ocean in his most joyous mood, and we saw on all sides waves forming a glorious expanse of indigo and snow.

*February 1st.*—Flying-fish appeared in considerable numbers for the first time yesterday. I wonder how their motion through the air could have been attributed simply to a force of projection. A vibrating tremor of their fins is distinctly visible when they are sufficiently near the observer. Their flight, moreover, is too slow for that of a projectile; and, as Mr. C. very appropriately remarked, in some parts of their flight they closely resemble the common sandpiper. The larger kinds rose from the water singly; but on our return voyage we saw a smaller species, in parties of eight or ten, taking flight and turning in the air together like a bevy of quail. Their flight, without touching the water, did not appear to exceed thirty yards. On the question whether they ever fly except when alarmed or chased by a larger fish, I have no conclusive evidence to offer. Many flying-fish came on board, chiefly at night, and were stunned by falling on deck; but I think this happened only when the waves were high. A few of the least injured were picked up, and lived for a day or two in our aquaria.

The aquaria on board the "Argo" were constructed on the excellent plan first adopted, I believe, by Captain Mortimer. A large globe, of the kind used for gold-fish, was placed on a wooden disc pierced with holes for cords by which it might be suspended. A row of these globes were hung over the bulwarks on each side the deck, and were both useful and ornamental. Before reaching the West Indies they were, however, but

slenderly stocked. The slowest pace at which the yacht could be kept moving was much too fast for the successful use of the skimming-net, even on the occasions when the sea was sufficiently tranquil. Whenever there was the slightest prospect of success, the speed of the "Argo" was slackened, and dips were made three times in the day—at noon, 4 p.m., and 8 p.m. A record was kept of the results of each trial, and the specimens were preserved in spirits, with the latitude and longtitude of their capture attached. My notes mention many Crustacea, Hydrozoa, Salpæ, and Diphyes; a few Pteropoda and Janthina, and, perhaps the most interesting of all, a few specimens of Spirula beset with a beautiful little stalked Cirripede. Most of these have yet to be worked out.

We had service of Morning Prayer every Sunday whilst we were on board, and Holy Communion on the first Sunday of the month. Everything was disposed in trim order, and the ship's bell was rung for five minutes before church-time, inviting such of the crew as could be spared from their work to appear on deck in their clean clothes and best looks. I can heartily confirm the testimony of many as to the peculiar interest of Divine Service at sea. At no other time are dear friends far away so thoroughly made present. Worship in a church, or in a cathedral, has sacred associations intensely gratifying and worthy of the highest regard; but these associations are, I think, of a narrower kind, and less in consonance with the un-

ceasing worship of the universe, than those inspired on the summit of a mountain or on the ocean.

*February 4th,* LAT. 17° 30′, LON. 46° 16′.—A beautiful horizontal rainbow, *i.e.*, a rainbow appearing to lie wholly on the water, occurred to-day during a shower. The apex of the bow was just below the horizon: the two ends faded on the water near the "Argo." This phenomenon, though very interesting and rather uncommon, was simply the result of the conditions favourable to the formation of a bow taking place whilst the sun was very high. Such a spectacle could not occur except in low latitudes.

*February 8th,* ENGLISH HARBOUR, ANTIGUA.—What must be said of my first day's ramble on a tropical shore? That it was a time of wonder and delight. Even now, though I cannot but feel that English Harbour in the dry season does not require to be described with enthusiasm, I remember the land-locked bay closely surrounded by wooded hills, the clean white buildings of the naval station with two young Cabbage Palms in front, the lighthouse, and the rocky coast, as forming a very charming picture. The woods, however, were of recent date, growing on slopes which had been cultivated in busier times. At a distance they looked wonderfully like English woods; but on closer inspection every tree was strange, and so was every roadside weed. No longer, as in Madeira, were familiar flowers mingled with the surrounding vegetation. What a vegetation! Thorns, thorns everywhere and of all kinds, sharp as

needles, strong as nails. Offenders in chief were the many kinds of the Prickly Pear: some formed bristling stockades that no one would willingly face; others were trailing things that stung one in the grass. In some places quite a feature in the landscape was formed by the great Melon or Turk's-cap Cactus, *Cactus melocactus,* with its bright flowers and pleasant crimson fruit.

A curious plant, *Verea crenata,* with brownish flowers and thick, oval, crenate leaves was not uncommon. A single leaf of this plant hung up in my cabin, had, on March 6th, put out rootlets and young plants with leaves. In the course of a walk with the Chaplain of the "Eclipse," we called at the house of a clergyman well acquainted with the trees and shrubs of the island. He quite confirmed a prevalent report as to the danger of resting during a shower under the branches of a Manchineel Tree, *Hippomane mancinella,* and had known cases of severe blistering and partial blindness ensue from exposure of the skin to drops falling from the leaves. The tree belongs to a very poisonous tribe, *Euphorbiaceæ.* I remember that on the shore of the Gulf of Akaba, Red Sea, a branch of a beautiful Euphorbia was dashed from my hand by an Arab, who made signs that the carrying of it would produce blindness.

As may well be supposed, little real work was done on the first day, during the whole of which we wandered through the woods and over the hills, bring-

ing away numerous pointed remembrances in addition to a most miscellaneous gathering of tropical odds and ends. Perhaps the most notable find was a number of large shells of the Magpie Trochus, *Livona pica*, inhabited by a fine Hermit Crab, *Cenobita*. These were found in a dry water-course high amongst the woods more than a mile from the sea. Were these crabs at home, or on an excursion? I felt here as on numberless other occasions how little is done by merely picking up a thing and bringing it away. The life history of one species is of more value than specimens of many; but then it is also much more difficult to obtain.

The next day we began dredging and shore collecting in good earnest, and met with moderate success. Antigua does not afford many species of coral; but in Falmouth harbour occurred a large Madrepore coral, so massive that our diver had to descend with an iron bar to break off branches, which were hauled up by a rope and lifted into the boat. Some fine black and red sponges were also obtained. The shells collected were chiefly of Littoral species from the rocks. A beautiful little Masked-crab was turned up in numbers from the sand awash with the tide.

Nothing could exceed the kindness and hospitality we enjoyed in the island, both at English Harbour, where we become acquainted with the officers of H.M.S. "Eclipse," and at St. John's, where, as also subsequently at St. Kitts, there seemed to be a genial

kindly feeling amongst the residents between themselves, rendering our reminiscences of these places peculiarly gratifying.

At St. John's, a lady interested in Natural Science generously gave me a choice series of specimens of silicified wood, for which the island is celebrated. They are all of trees still growing in the vicinity, and are polished on one surface shewing the grain and structure of the wood beautifully. In answer to a note of enquiry, my kind correspondent replies; "This is all I know from personal observation: The specimens of wood are found loosely lying on the earth in fragments of various sizes. The largest I have seen was the trunk of a tree about four feet in length; and different varieties are found together, as if brought down by a river through the centre of the island; but there is no water now in that neighbourhood, nor has any river been known there in any records of the island which have come to us in the last 200 years."

Leaving English Harbour we saw on the port side, a configuration of rocks close to the water's edge of singular beauty and interest. The sea had excavated recesses with arches and shafted pillars, like a bit of a clerestory in a Norman Cathedral. The material was of a yellowish colour, and from a distance appeared like sandstone, but was probably of volcanic origin.

Our visit to Barbuda was made chiefly for the purpose of shooting deer and guinea-fowl,—both of them introduced, though now quite wild. The latter

are very strong on the wing and afford capital shooting, in which our young associate from Rugby was most successful. The island is flat and uninteresting, yielding chiefly low scrub and guinea-grass. Two Europeans only reside in Barbuda, one a clergyman the other a magistrate. Dredging was unproductive except in small corals and shells; but fine specimens are occasionally thrown on the beach by storms. Some valuable shells thus obtained were given to me by the resident clergyman. The most characteristic plant was the sea-grape, *Coccoloba Uvifera*, with large glossy leaves and purple berries, not very palatable. Its runners flourished grandly on the dry and hot sand ; one that I measured was 93 feet in length.

*February 13th*, St. Kitt's.—If it came within the scope of my design to record the kind attentions which rendered our reception at the various places visited socially delightful, St. Kitt's would occupy as prominent a position in my notes as it does in my grateful recollections. The town has a thoroughly substantial, well-to-do, business-like, aspect; and one of our party to the end of the voyage preferred it to any other as a place of residence in the West Indies. Some interesting sponges and shells were given to me, but all I have to mention in the way of Natural History, relates to a rather exciting lobster chase.

A mile or so from our anchorage lay, partly on shore, the gaunt ribs and keel of a wrecked ship half flooded at low tide. The hold, open to the sky, formed

a splendid aquarium with water smooth and clear as crystal. I was lying at full length on one of the timbers examining a dark hole below me, when forth with a rush shot out a noble specimen of the Spiny Lobster, *Palinurus*, some twenty inches or more in length. What a beauty he was with his brightly variegated carapace and horns and palps quivering with life! How unlike the specimens of his kind to be seen in museums. Yes, there, a few feet off, he lay fully alive to the peculiarities of his situation, and evidently not in the least intending to be made a museum specimen. Bring the net,—bring a basket,—bring anything—jump in!—were the suggestions to my excellent assistant Mr. Chard which first occurred to me. But all would have been in vain. We dislodged him several times, but to no purpose, His back sweep was magnificent: with one downward stroke of his tail he was off like an arrow; his hinder end foremost, and his wonderful head gear streaming behind like the tail of a comet. All his kind have eyes on foot-stalks, probably a convenient arrangement for going backwards, lobster wise; a method of locomotion which at all events fully served his purpose on this occasion.

*February 14th,* GUADELOUPE.—We had a few hours only of daylight in this beautiful island, having arrived during the night and left on the following noon. The bottom of the harbour was muddy, and dredging quite unproductive; in fact, we left there more than we found; for our Skipper, in his usual extreme anxiety

to be on the safe side, anchored in such deep water, and with such a length of chain out, that in tripping anchor the end of the yacht's new cable went clean out through the hawse hole, and joined the anchor at the bottom, where, for aught I know, it may still be. Some defect in the construction, or the management, of the patent capstan caused the detent to fail, and the chain ran out with fearful velocity. One of the crew, who was in the chain-bunk coiling the cable, felt it going, and crushed himself for dear life into a cramped space barely capable of holding him, whilst the loops and doubles of the rushing chain shot by him with such speed that they would have smashed him or torn him limb from limb if they had caught him. The end was not secured, so it went out with the rest. The seaman, poor fellow, had a wondrous escape. He came out of his hiding place as pale as death, and said that the bunk had been lighted up, as with a fire, by the sparks from the cable.

*February 15th,* DOMINICA.—At length my anticipations have been more than realized. This note occurs in my journal, and certainly nothing that we saw before or after Dominica so completely fulfilled all I had expected to behold in tropical scenery and vegetation. Dominica is much more in its natural condition than other islands of the Antilles. A large portion of it is too mountainous for cultivation, and there is no dry season for harvesting the crops. The rainfall is sometimes excessive, and few days pass without a shower.

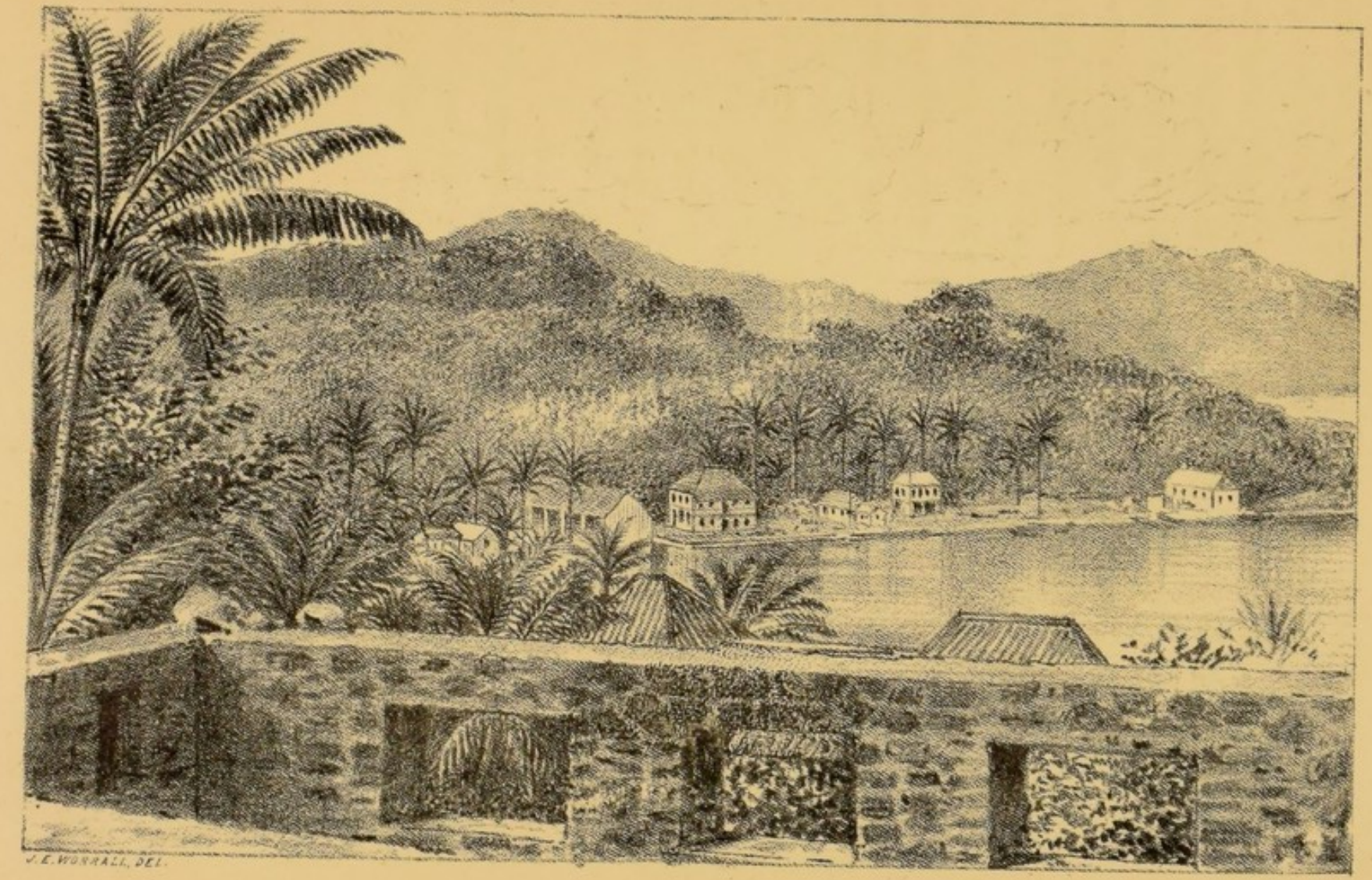
Hence the atmosphere steams with heat and moisture, and the picturesque features of every prospect are enhanced by grand effects of cloud and sunshine.

On the day after our arrival, by the most kind arrangements of the Governor, horses were prepared for the whole of our party to visit a mountain lake at an elevation of about 4000 feet in the interior of the island. To a spot immediately above this lake a bridle path had recently been constructed, cutting through the primal forest and obliquely ascending the steep northern slope of a mountain. The views from this road resembled some of Turner's pictures, but in these the details of the landscape are always rendered subordinate to some central group, a campanile with banners, or a balcony with figures in flowing draperies, something in its interest altogether human: whilst here, vigorous plant-life asserted unquestionable supremacy: a tumultuous sea of vegetation spreading over the valleys, broken by low capes and headlands, only to throw into bolder relief the magnificent proportions of stately Palms and Tree-Ferns, which otherwise would have been concealed by the very luxuriance of vegetable growth around them.

About three miles from Roseau, whence we started, the bridle-way makes a V shaped indentation deep into the side of the mountain in order to cross the bed of a water course. After a circuit of about three-quarters of a mile we gained the shoulder of the mountain forming the opposite tip of the V, and

stopped to look back across the ravine. For about 1500 feet above and 500 feet below the road we had travelled, the face of the hill was nearly perpendicular, forming a mighty wall 2000 feet in height, consisting of plumed heads of trees, and giant leaves, and drooping wreaths of climbing shrubs, at a distance from us of only a few hundred feet. The view was almost oppressive from the predominance of plant life. I felt as though I was there on sufferance only; a wayfaring animal straying in a palace of the vegetable kingdom. But newer and even more impressive scenes were before us.

As we gained a greater height on the mountain such was the density of the green canopy, 100 or 150 feet over our heads, that in some places during a cloudless noon the darkness was greater than on a summer midnight in England. The trees and shrubs of the warmer and drier region had given place to the real giants of the forest; and here, at an elevation of about 4000 feet above the sea level, mosses and scale-worts, grew with habits such as I had only read of, or imagined in dreams. Club-mosses, *Lycopodieæ*, perfect trees in miniature, thickly hung with beads of moisture, glinted back the few rays of light which found their way askance through the gloaming. Air-mosses, *Meteoria*, dangled free to such a length that one had to look up to see whence they were suspended. Pale green festoons of moss crossed and recrossed their traceries for yards along the under side of boughs; their slender fronds,




GRENADA.

all but in colour, like fishing lines hung out to dry. Graceful Filmy-ferns with tender olive-green reflections cushioned the rocks or covered the trunks of trees for many feet above the ground. Flowers were scarce, but on one side of the road the declivity was so steep that it was possible to look down upon the higher branches of trees rooted far below, and to see upon them various orchids, some of them with delicate flowers, tantalizing but quite inaccessible. One magnificent and very characteristic flower, *Heliconia Bihai*, adorned the way-side with its gorgeous scarlet and yellow spathes, and plantain-like leaves.

It is not possible to bring before my readers the details of collecting in the midst of such surroundings. From time to time fresh forms were recognised, secured, held up to the light, and hurriedly put by, for minutes were precious; and, in spite of botanical predilections, one had occasionally to stand still and take breath, fairly exhausted by the bewildering grandeur of the openings revealing masses of trees grouped in disorder, their huge crowns entangled and coiled with Lianas, air roots drooping from their branches like ropes in a belfry, their trunks leaning, standing, falling, propping; from first to last purely the work of nature untouched by the hand of man.

The sun shone brightly, but all around was wrapped in solemn gloom. How I longed to be quite alone, and to think it all in. Such a scene may be regarded as a battle field of life: the strong crushing the weak, with

no exemption from the common lot allowed even for the noblest or most beautiful of forms; but such an interpretation of nature is superficial and unworthy. Life and death thus intermingled are, in fact, a most impressive illustration of the greatest of all truths, that *in nature nothing lives or exists for its own sake alone.* The noble tree strangled and at length borne down by the noxious parasite, and the delicate fern or moss eaten by the canker-worm, have no untimely, no ignoble end. In their witness to a law involving partial evil, but securing universal good, in no very remote sense they are martyrs, and fulfil a destiny higher than even the exhibition of their own perfect and unsoiled beauty.

I have anticipated much that should rather belong to the return journey without having mentioned our arrival at the terminus, a group of shallow caves affording a welcome shelter from a smart shower that came on almost without notice. From a spot near at hand the lake was to be seen far below at the bottom of a crater-like hollow densely wooded. Here some slight refreshments we had brought were somewhat hastily discussed, and preparations were made for the immediate return of the party, in order to be in time for a banquet provided by the hospitality of the Governor.

At my earnest request I was permitted to remain behind, and a negro lad was left with me to take charge of my horse whilst I was collecting. He was a pleasant-

looking boy, speaking and understanding English sufficiently to comprehend that I wished him to go on down the road about two miles, and there await my coming. But, unfortunately for Quassie, those two miles afforded me occupation for nearly four hours, and long before I reached the place where he was to wait I saw him, patience exhausted, slowly leading the horse back to meet me. Poor fellow, the turf under his master's wall in sunny Roseau was pleasanter to him than that dark mountain's side. Quassie tried all sorts of little stratagems to induce me to mend my pace; and, at intervals, there occurred something like the following dialogue :—

"Mas'r, no make haste, no catch other gentlemen."

"I don't want."

"Mas'r, me very hungry."

"Well, Quassie, you can't eat me."

"Mas'r, night come on; dark soon; yes, sure."

"Three o'clock, Quassie."

Quassie meets an acquaintance, and has a very long talk.

"Well, Quassie, you seem to have had a deal to say to your friend. What did he tell you?"

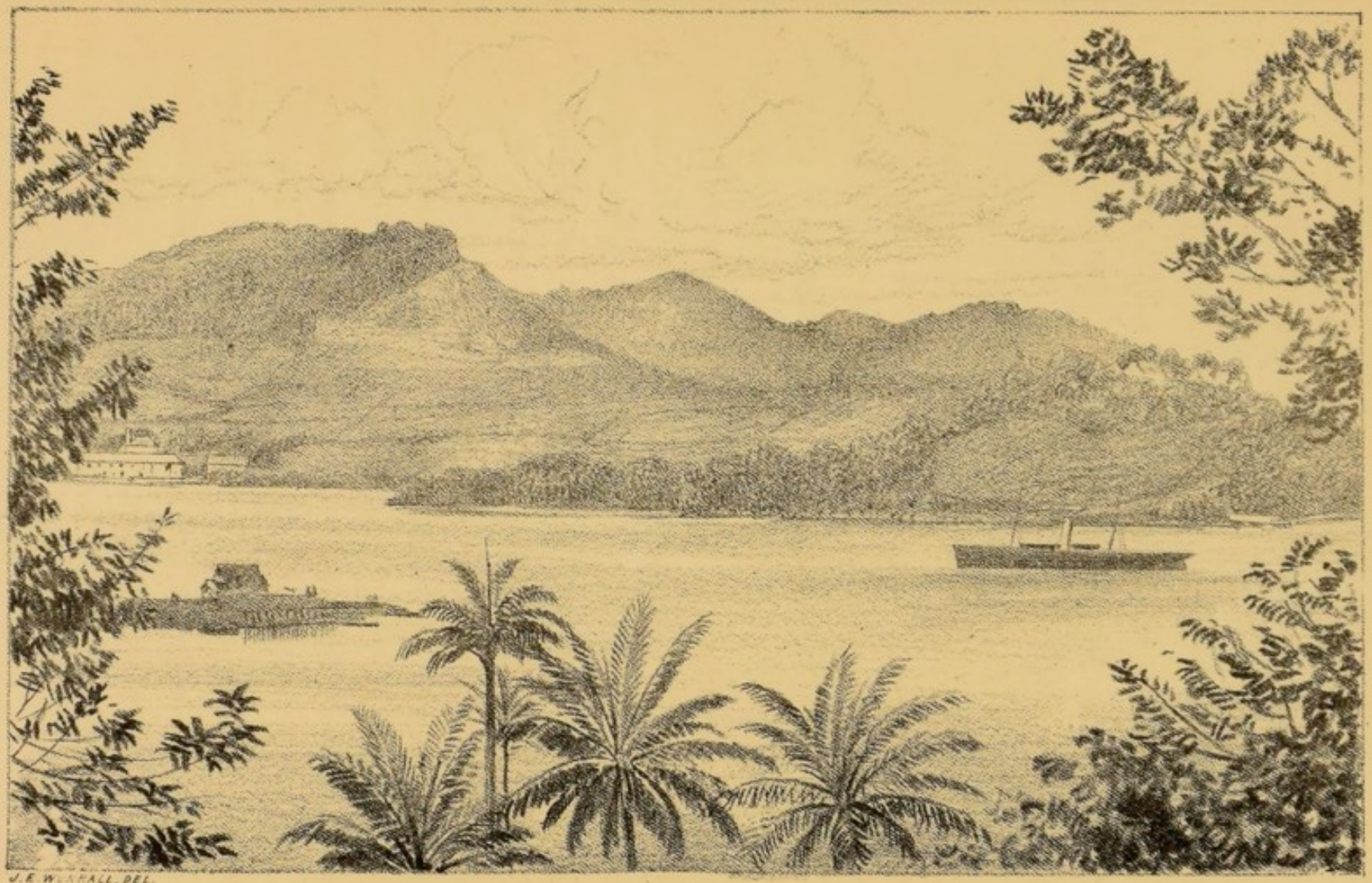
"O mas'r, him say, other gentlemen waiting for you down below!"

"Fie, Quassie, you are blushing, I know, if one could but see it." After all, I could not but feel that the lad might very reasonably wish to get back, and accordingly, my receptacles of various kinds being already

more than full of Lycopods, Mosses, and Lichens, I signed to him for my horse and commenced a more speedy return. The change from the misty gloom of the upper road to the warm glow of the lower landscape, rich with the hues of a tropical sunset, was not the least among the many gratifications crowded together in the few hours of this most memorable excursion.

The day following, most of the party rode to the Sulphur Springs, but my wrist, which I had sprained in slipping from a wet rock, being very painful, I walked with J. C. up the valley of the River Douce. Insects of various orders were plentiful, but there were few butterflies. I had not yet seen a single species of the genus Papilio. The valley soon became contracted into a gorge in which grew Bananas and Bread-fruit, *Artocarpus Incisa*, introduced into the West Indies in 1793. In its magnificent dark green foliage it is the most handsome of tropical trees.

*February 17th*, MARTINIQUE.—The town of St. Pierre is quite a little French metropolis in the West Indies. It is charmingly situated, and the mountain scenery in its vicinity must apparently be very grand. Tastefully built villas, boulevards, large open spaces with alcoves for bands, and long rows of benches for auditors, indicate that social life need not be dull in St. Pierre. About a mile from the town a rocky glen, transformed into a Botanic garden, exhibits to great advantage a fine collection of Palms and other trees.



J.E. WORRALL, DEL.

GRENADA,

CARINAGE WITH THE "ARGO"

Amongst these I was searching for lichens when A. W. called my attention to a loose tuft, made up of various materials, in the fork of a tree. On examination by gentle probing, out came a *Mygale* or Bird-Spider not of the largest kind, but nevertheless with an abdomen larger than a sparrow's egg. At the head of the glen was a small museum with class-rooms attached, in which lectures were going on. My impressions derived in the course of a few hours only may have been erroneous, but certainly led me to the conclusion that in Martinique might be found something of European social habits and animation, combined with the enjoyments peculiar to the tropics.

*February 18th, 19th,* ST. VINCENT.—We passed St. Lucia in the dark and came at break of day to the very pretty bay which forms the harbour of Kingstown in this island. An early walk to the hills, which form a crescent to the east of the bay, afforded some delightful prospects but was very unproductive in specimens; no land-shells, no mosses, and very few insects. In fact I was gradually learning to regard some Utopian ideas I had entertained concerning collecting in the tropics, much as a Londoner regards the notion that the streets of his city are paved with gold. He knows that an abundance of gold is to be picked up in London, but only at the right time and place, and not without industry and perseverance.

Here for the first time in the West I saw fire-flies. They were in a lane bordered by sugar-canes. The

light was very brilliant, but was shewn only in flashes or scintillations lasting one or two seconds. These fire-flies were soft-bodied beetles allied to our glow-worm, *Lampyris*. I was told that later in the season larger fire-flies, luminous for a much longer time, would appear. These I did not see anywhere, but there is no doubt they would be the light-giving *Elateridæ* or Skip-jack beetles. It was interesting to notice a similarity of habit between the sparkling fire-flies and our own sombre English night-flying moths, *Noctuæ*. About half an hour after sunset the fire-flies, like the November shooting-stars, crossed and re-crossed in all directions; but the busy scene was soon over, and in a little more than an hour the darkness was relieved only by an occasional twinkle.

My indifferent success on land was made up for by the results of collecting on a really fine shore. By wading about knee-deep we reached many large stones covered with Chitons, Limpets, Purples, and various other shells. From the wet sand we dislodged quite a number of delicately painted Masked Crabs, *Corystes*, and on the stones grew a fine Campanularian Zoophyte on which was an exquisite white *Coryne*. It was moreover great fun, for waves of respectable size came in very irregularly, and our sudden flight from them was not always a complete escape.

*February 20th*, GRENADA.—Sunday morning found us at anchor about a mile from the lovely Island of Grenada. After Morning Prayer, we arranged our

plans and landed, forming three parties for exploration. Together with my fellow-workers from the Museum, I followed a road up a valley towards the north of the island. For several miles the way led through a kind of wild garden of Cocoa-nut Palms, Bananas, and Cocoa Trees, amongst which the houses, or rather huts, of the negro population were thinly scattered in complete seclusion, like nests. A net-work of unenclosed paths led to these dwellings, each picturesquely hidden in a leafy bower, the homes probably of squatters finding employment in the neighbourhood. There is in manners and civility a difference amounting to a contrast between the negroes of one island and those of another. Amongst all I saw, I must give the preference to the negroes of Grenada. As we came back we met scores of them returning from church, and scarcely one passed without returning my "good evening" civilly and even gracefully.

On the following day I had a long conversation with a negro who had charge of a party working on the roads. Of this conversation I made at the time the following note :—

"Your people seem to take their families to Church on Sundays."

"Yes, sir ; we all go at least once in the day."

"It seems there are three chief congregations in George-town,—Church of England, Dissenters, and Roman Catholics. How do they get on together ?"

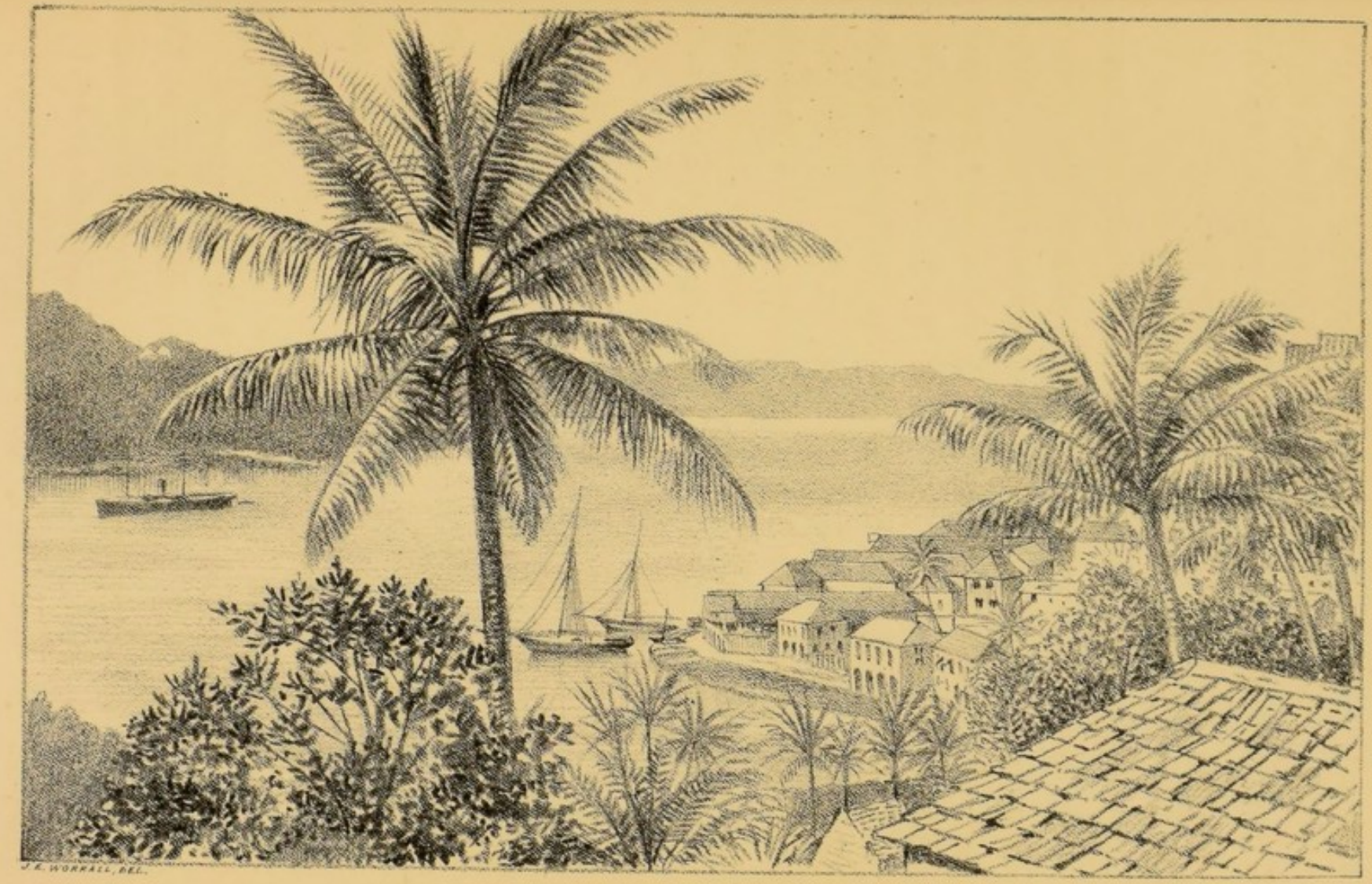
"Well, sir, we all like to please our own ministers,

and to tell them we think they are quite right; but we have a good understanding that there shall be no difference amongst ourselves; and we help one another without distinction."

My reply was, of course, congratulatory.

On regaining the shore at the mouth of a small river, after our Sunday afternoon's walk, I was resting on a stone when two well-dressed coloured boys, about nine or ten years of age came up, and one of them said, "This is a bad place to sit down in, sir. That house," pointing to one close by, "has no one to live in it now: the people who did live in it were ill, and all of them died of fever." I am glad to put on record this anecdote in favour of the much-abused fraternity of small boys. Subsequently I learned from a Creole of great experience, that the worst kinds of fever prevail in spots where the fresh-water from a stream mingles with the sea-water. He added that he knew of several cases of small bays at the mouths of streams, infested with most malignant malaria; whilst other bays only a few hundred yards away were perfectly healthy.

No sooner were we on board than a secret was told us. Two of our exploring parties had seen the *Carinage*, the most beautiful of all harbours in the Antilles; in which nine ships of war together had ridden and found ample space and good anchorage. We were in the wrong place! Our Skipper had cautiously determined to give the "Argo" a berth in the open roadstead, a mile or more from land. I could not help expressing



THE CARINAGE GRENADA.

"ARGO" AT ANCHOR.

extreme disappointment, and Mr. C. kindly granted another day. So into the Carinage the "Argo" had to steam, and truly this wonderful harbour deserves all that has been said in its praise.

The bay is crater-like; surrounded by finely wooded and rocky slopes on all sides, except where a deep but narrow opening forms the entrance. George-town, small in size and irregularly built, spreads from the crest of a low ridge to the water's edge, its houses and churches with white fronts and scarlet roofs forming a refreshing contrast with the colours prevailing all around.

J. C. was busy with his photographic camera, but sun-light cannot depict itself; and no artist could reproduce on his canvas the panorama of the Carinage, where every object appeared as if it were steeped in light.

The additions to our natural history collections made during our stay at Grenada were not numerous, but included some of the most beautiful corals, sponges, and shells obtained during the voyage.

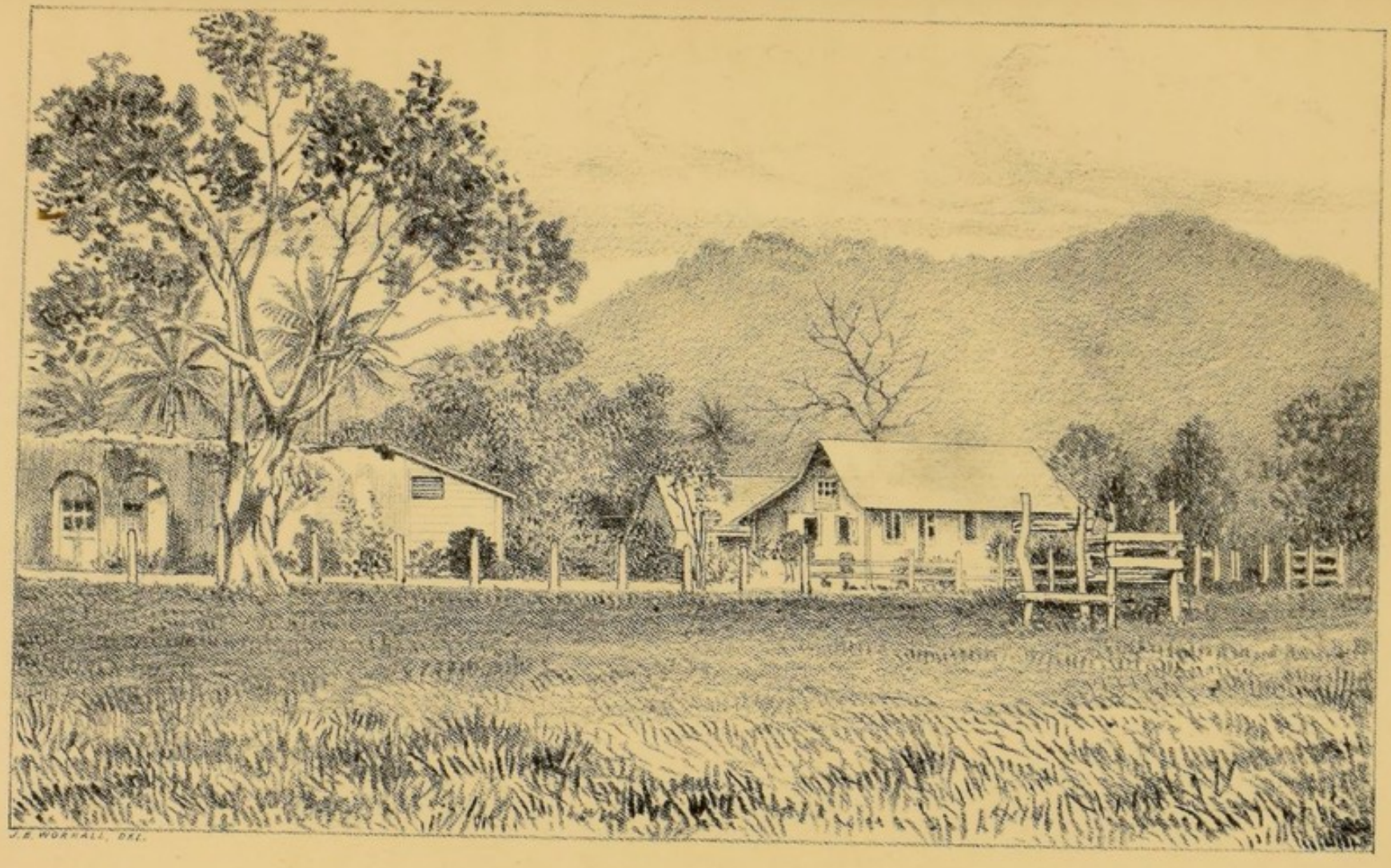
*February 22nd*, TRINIDAD.—All our party went on shore at the earliest opportunity, and on landing there was an immediate rush to the Post Office, where I found letters from home announcing all well.

So much has been written by my honoured friend of blessed memory, Charles Kingsley, on Trinidad, that I can find but little to say of this magnificent island which has not already by him been better said. One of my chief anticipations, from the time of my first

prospect of a voyage to the West, was to visit scenes which he had visited, and to glean where he had harvested overflowing stores of noble thoughts for the benefit of all who read what is best worth reading.

A peculiar and highly characteristic feature in "At Last," is the care with which the keenly sensitive author refrains from mentioning the names of the many friends he found or made in Trinidad. It will not be necessary for me to follow his example so far as to withhold the name of a most highly respected family resident in Port of Spain. To the head of this family I became indebted for my chief opportunities for seeing what I most wanted to see in the island. It was as a friend of the author of "At Last" that I was introduced to the Honourable H. Mitchell, M.D., who, on learning the object of my visit to the Antilles, gave me a kind note of introduction to his son, Mr. J. Mitchell, of Paradise Estate, about ten miles from Port of Spain, with the assurance that I should find there a hearty welcome extending for as long a time as I might be able to remain. The morning had been a happy one, and I returned on board the "Argo," glad with the tidings from home, and with anticipations of the morrow.

So this is the celebrated Gulf of Paria. Certainly it is rightly called by the Spaniards the *Melancholy Gulf*, for a dreary sheet of water it is, notwithstanding the presence of quite a fleet of ships with their boats and steam launches constantly going and returning to



J. E. WORSALL, DEL.

RESIDENCE

PARADISE ESTATE, TRINIDAD.

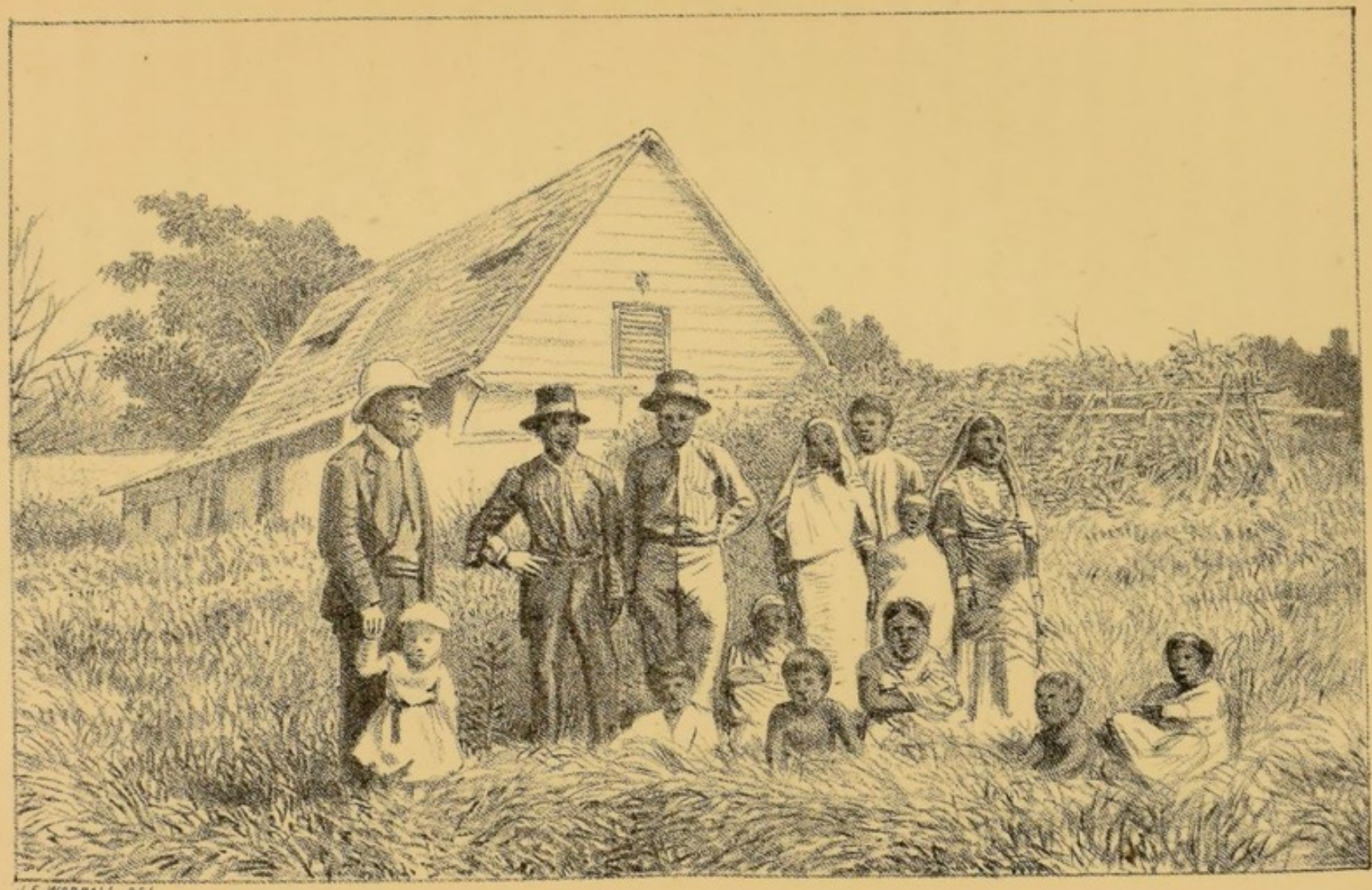
and from the town. But this kind of scene has often been described, and I need only express in few words all I wish to say of our surroundings when we were on board the "Argo" during the fortnight of our stay at Trinidad.

The water of the Gulf is unpleasantly discoloured, and looks as if it had not been changed for years. The bottom is muddy, and it seems probable that a sediment is being deposited which will eventually transform Port of Spain, if it lasts long enough, into an inland town. Dredging was out of the question, and, with the exception of occasional shoals of a small jelly-fish beautifully marked with brown veins, life on the surface was scarce. Strange noises were heard at night from cat-fish prowling about the ship, an unlucky one sometimes finding that a choice morsel it had swallowed contained a hook attached to a line leading straight to the hands of a fisherman. The Gulf being entirely sheltered by the island, the refreshing influence of the N.E. trade is scarcely felt on its waters; and the heat during the hot season has been described as terrific.

*February 23rd*, PARADISE ESTATE.—Sundry small settlements of coolies, negroes, and Chinese gave a pleasant variety to the dusty road along which we travelled to our destination. Some of the most productive estates in Trinidad are situated at the southern base of a mountainous region extending along the north side of the island. That portion of the property which is nearest the great plain being cultivated for sugar,

whilst the steeper slopes and ravines are adapted for Cocoa plantations and provision grounds. Small sparkling rivers descend from the mountains and cross the plain in a southerly direction. On the borders of one of these streams was situated the residence which was to be my home for a few days. Kingsley had been there, but the house in which he was a guest had become the prey of White Ants, which had reduced the timbers of the floors and ceilings to mere thin outer shells, threatening at any moment a complete collapse of the whole edifice. A new residence was built almost close by the old one, the ruins of which still remain.

The busy season of the year was at its height, and the works were in full operation. Large bundles of sugar canes were being brought to the boiler house, where, having been passed through rollers and their rich juice thoroughly squeezed out, they were exposed for a day or two to the sun, and were thus dried into excellent fuel. The scene at the furnaces on the night of my arrival was lively in the extreme. The fire light was reflected by the dark skins of the coolies as they hurried up with bundles of dried canes ready to be thrust into the open door of the furnace, which seemed to require a continuous supply of fuel. Around the tanks were grave old coolies—men of consideration and responsibility—watching the progress of the boiling, and superintending the clearing of the surface of the bubbling cane-juice. This was done with scrapers



J. E. WORRALL, DEL.

PARADISE ESTATE.

GROUP AT THE BOILER HOUSE

fixed on long handles, much in the same way that one would rake a flower bed in a garden.

It was late before my kind host, having explained to me all the various stages of sugar making, suggested a return to the house where I was to pass my first night on shore in the tropics. Coffee 5-30 A.M., breakfast 11 A.M., luncheon 3 P.M., and dinner at 7 P.M., were the hours of the establishment; and most kindly, at my urgent request, assurance was given me that my presence or absence should in no wise interrupt the ordinary programme of proceedings for the day.

One of the most pleasant recollections of my visit to Paradise Estate vividly restores to me the first moments out of doors before the cup of coffee at sun-rise. The Dawn, the true unfailing Dawn, *Ushas*, daughter of the sky, whom our eastern forefathers greeted with the prayer: "Make the pasture wide; give us safety!" What, or Who was it that the Arians worshipped as *Ushas*, and the Greeks as *Eōs?* Lovely indeed, but how fleeting. Scarcely had one time to notice the copper tint on the crowns of lofty palms,—before it was day, and the Dawn was gone.

Then the coffee, and the saunter in the fresh morning air down to the magnificent wood of the many-shafted Bamboo on the borders of the river; and the bath in the clear pool; and the feeling that there was no reason for either hurrying or waiting; and that one might be at home in the lovely spot for a whole day with no need to go even a mile except by choice; that there was no

danger of being left behind, or of keeping others waiting, or of finding oneself too late. All these thoughts passed, very deliberately, through my mind before I set steadily to work to observe and to collect.

At last I had found a place where there were butterflies, real tropical butterflies and plenty of them. Not the gorgeous Glory-of-Brazil butterflies, *Morpho*, but Meadow-russets, *Satyridæ*, in swarms, and Skippers, *Hesperidæ*, and, best of all, the lovely butterflies with long narrow wings and long slender bodies, and long horns looking as if they had been dipped in pollen, *Heliconidæ*, of which I could distinguish as I thought at least six species; one velvet black with a blood red blotch on each fore wing; two kinds, black with sulphur streaks, one of them a sharp fellow,—I saw him and that was all; two or three tiger-coloured; and two or three of no colour at all, transparent shadowy things like skeleton leaves, but with fewer veins. Sometimes as many as twenty *Heliconiæ* might be seen in the air at one time, and occasionally a true *Papilio* swept by with a lordly air which did not always save his course from interruption.

There is a curious entomological statement, known to some of you, to the effect that these lovely *Heliconidæ* are protected against fly-eating birds by a disagreeable odour which they emit when crushed; and moreover that certain other Lepidopterous insects, which otherwise would have belonged to the class of unprotected females, have through a process of natural selection


BAMBOO GROVE.

come to share the immunities of the *Heliconidæ* by assuming their likeness. Their mates remain unchanged.

To make observations in connexion with this hypothesis was with me an object of greater interest than to collect specimens. It was therefore with much satisfaction that I saw here two species of fly-catchers actively at work in the immediate neighbourhood of the *Heliconidæ*. I watched them for parts of three days. Few of the insects caught by them were visible to me. One large Hymenopterous insect resembling *Ophion* was seized and immediately dropped. Not a butterfly of any kind was touched. I caught two Lepidopterous insects very like *Heliconia* —one a moth, the other a *Leptalis*; but the mode of flight in these feeble mimetic forms was so unlike the flight of a *Heliconia* that no moderately sensible bird could have been deceived by them for a moment.

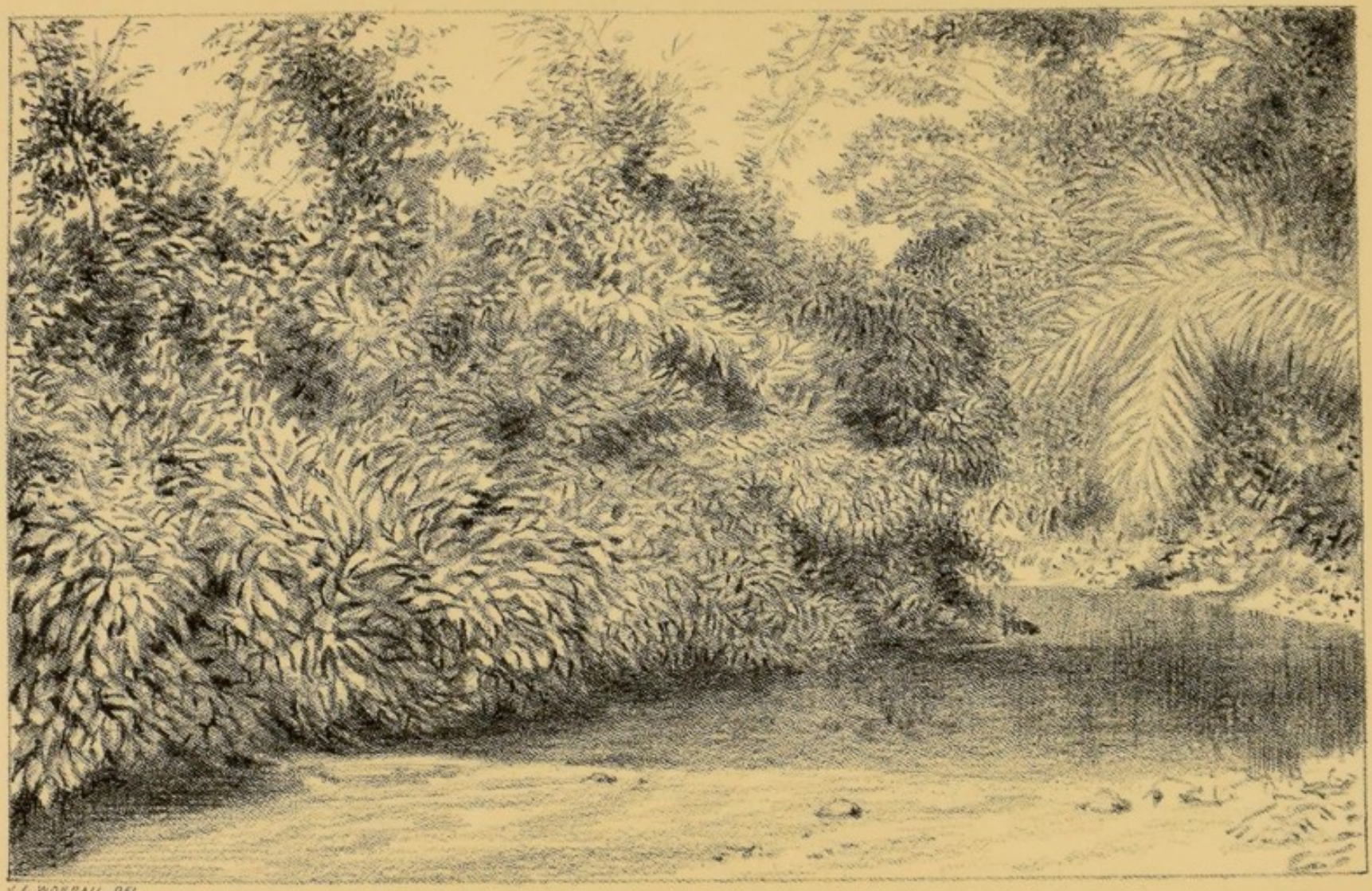
During the entire journey I did not see a butterfly of any kind attacked by a bird. Nor is it a thing of more than occasional occurrence in this country. The floors of churches and barns and summer-houses bear witness to a prodigious destruction of our night-flying moths; but our butterflies are I think seldom molested.

J. C. was chiefly occupied with the camera, and succeeded in getting some fair negatives on the Paradise Estate.

In a shallow part of the river near the Bamboo grove, lay a structure of a very peculiar kind. It

resembled a large cage of wicker-work in the form of a building with many porticoes and gables, constructed artistically and with considerable skill. The following explanation was subsequently given to me: The coolies from India, unlike the negro population, almost invariably retain the faith and the religious customs of their native country. On a certain yearly festival they assemble in large numbers around a shrine prepared for the occasion. Each coolie contributes some ornament which is hung upon the shrine till the whole structure is covered with silver bangles, bracelets, necklaces, and strings of gold and silver coins. Around this highly decorated fane, hymns and prayers are chanted till midnight, when all the ornaments are restored to their owners, and the denuded structure is taken with much ceremony to a running stream where it is cast in and abandoned. This had happened two nights before my visit, and was the history of an object which had much excited my curiosity.

On the following morning I was present at a *levée* in the court-yard of the residence. Men, women, and children, Chinese, coolies, and negroes had met to present their grievances, ailments, and claims of all kinds before the governor, doctor, and magistrate of their community—all represented in the person of one very young man. All went away apparently well satisfied. I must not say much, but I *was* struck with the entire absence of assumed dignity, and by the fewness of the words spoken with a very gentle voice



J. E. WORRALL, DEL.

BATHING POOL,

PARADISE ESTATE, TRINIDAD.

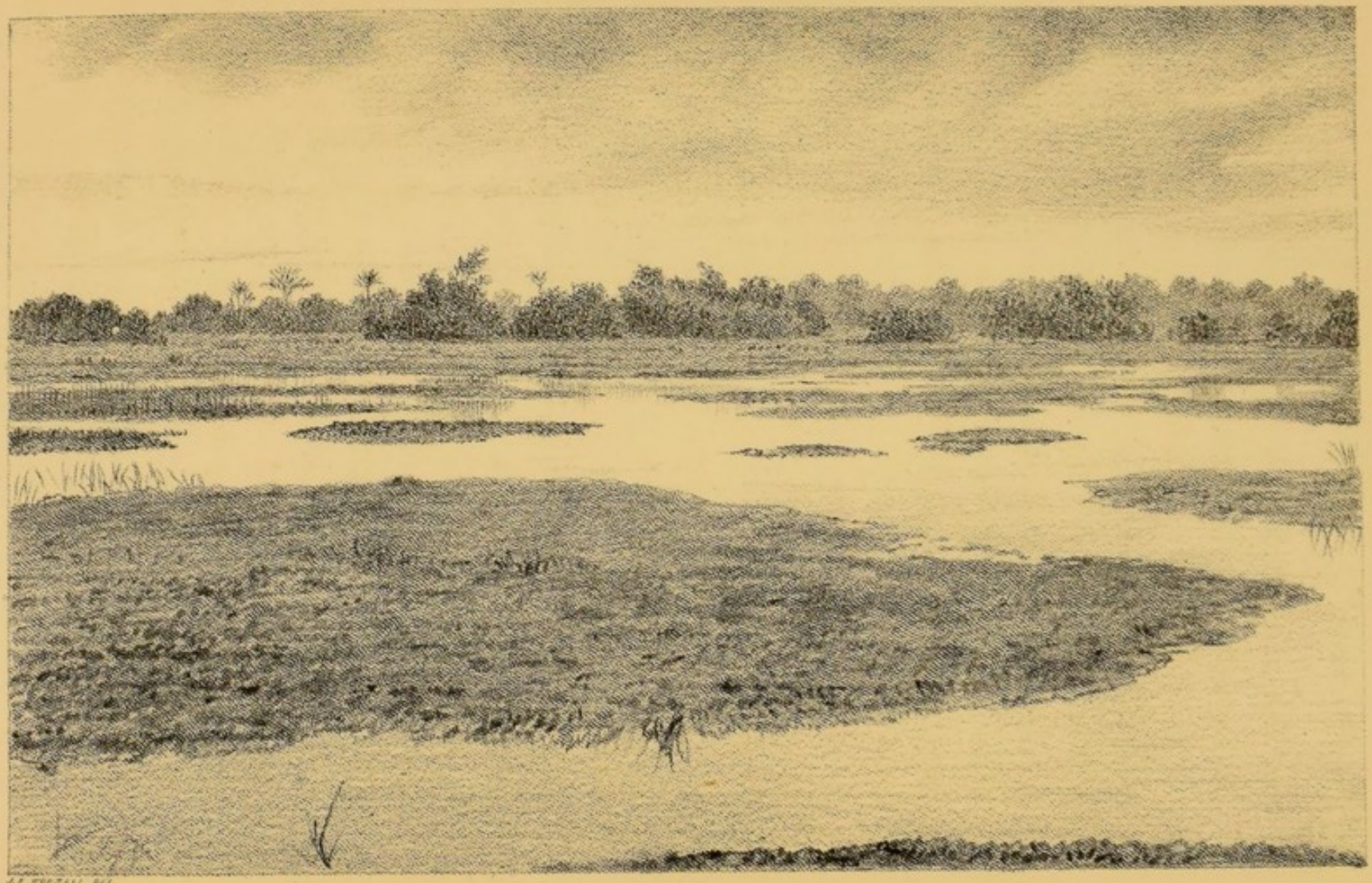
which seemed to be sufficient for the transaction of all the business brought to be settled by that chattering many-coloured crowd.

Not far from the house were many trees supporting, at the height of 30 feet or more from the ground, dark brown masses as large as the body of a small bear. These were ants' nests, and for some time I watched them, without being able to detect a single ant going up or coming down the trunk of the tree. On further examination I found a covered way ascending from the ground, formed of materials much lighter in colour than the nest, and so much resembling the bark of the tree as to escape notice unless especially looked for. Across this covered passage I placed two obstacles, one several inches below the other, that I might the better distinguish the outgoing from the returning ants. The down stream soon ceased altogether, whilst the returning ants continued to issue from the lower breach. I regret that my observations were interrupted; for I anticipated with much interest the arrival of ants from the nest. Perhaps it was not the "down-line," though I did not notice any other.

The woods on the Paradise Estate are on lands which at one time were cultivated; and not very long ago useless woods or scrub extended over nearly the whole of the estate. The tide has turned. A firm and kind administration, securing even-handed justice between the employer and his *employé*, has given

confidence to the coolies and other immigrants; and labour can now be obtained on terms making it quite worth while for capital to be expended in clearing encumbered ground. I am touching on subjects from which, as a rule, I refrain; but Trinidad has, I think, a bright future, and in that future will be revered the name of one who, in the most troublous times, never lost heart or hope for the coming prosperity of the island.

*February 28th.*—Arrangements had been made for an excursion in the "Argo," to visit the great Pitch Lake. The party included His Excellency the Governor, the Admiral from the "Bellerophon," the Colonel-Commander at West Indian head-quarters in Barbadoes, and the Captain of H.M.S. "Eclipse." These, with their ladies, came on board at 10 A.M. The "Argo," towing a boat-full of blue-jackets, arrived in about two hours at the landing place, 1½ miles from the Lake. The whole region was of pitch, pitchy. The Lake was a plain of pitch, intersected by shallow channels of water. I am not going to inflict a forty-first description of the place on my readers. That a mass of ancient vegetable matter should assume a bituminous condition: that under great pressure it should ooze out in the direction of least resistance, is no great wonder: not half so wondrous as that it should assume a mineral, quasi-crystalline condition, as in coal. I certainly am indebted to the Pitch Lake for no small measure of enjoyment. Of course



PITCH LAKE

TRINIDAD.

with such a party it was lively, agreeable, in fact charming; and if there was no beauty *in* the Lake, there was *on* it.

*February 29th.*—About six miles from the harbour commences the mountain glen of Maraval, which is to Port of Spain what Rivington Pike is to Liverpool. In some parts the valley is very narrow, with thickly wooded slopes. On our way we heard, from a house completely hidden by the trees, the loud tones of a piano, on which some one was vigorously practising scales of octaves, both hands together. The sound filled the whole glen, and had a strange effect. My visit to this beautiful valley was made chiefly in search of Mosses and Lichens; but the locality was too dry for cellular plants. In a very dark spot, at the foot of a trickling stream, I found a very rare scale-moss, *Bryopteris filicina*, growing with a good deal of the habit of an air plant. It filled a space between rocks, two feet apart. The plants were united, but had an appearance as if the fronds had been separated and lightly tossed together. It was interesting to observe a habit so singular; associated with a plant not in the least like any other scale-moss with which I am acquainted.

On our return the wonderful jets and corresponding cascades of octaves still proceeded from the invisible piano; varied this time, however, with familiar portions of Cramer's exercises. Music is popular in Trinidad. Almost every well-to-do house

in Port of Spain seems to contain a piano and an instrumentalist; but the *suaviter in modo* is greatly sacrificed to the *fortiter in re.*

When we reached Port of Spain in the evening the festivities of the carnival were at their height. The actors were principally negroes, who retaliated on the dominant race their custom of wearing a black mask for the purpose of assuming a comic aspect. They, the negroes, almost invariably adopted white masks got up with flaxen hair and florid complexions. Carts full of groups representing the celebrities of the day filled the streets. Dr. Kenealy and the Claimant were conspicuous. A troupe of *White* Minstrels was received with uproarious applause. A well known enthusiastic Lady Naturalist, with her umbrella and collecting boxes, was greeted with kindly merriment; the lady being evidently a favourite. One group, in which the performers were almost weighed down by prodigious armlets and necklaces, and other ornaments glittering with tinsel, was apparently a skit on the proclivities of the coolies. I was glad to escape from the noisy throng, and to take up my quarters for the night at the hotel familiarly known as Miss Emma Clarke's.

*March 1st.*—It has been my experience during a life which has included fully an average share of travelling, that when circumstances induce you to converse with a fellow-traveller, you generally find that if you had been silent you would have lost a

gratification. This designedly didactic reflection arises in connection with my passage by a little steamer which left the light-house wharf at 6 A.M., for the mouth of the Chagunas River.

Again I was to be indebted to the kindness of my revered friend, Dr. Mitchell, who had given me a note of introduction to the Superintendent of a depôt in the heart of the high woods of Trinidad. The island is celebrated for the many valuable kinds of wood found in its forests. To render these accessible, a tramway has been constructed leading to a station where the labour of convicts is utilised in preparing timber and logs for shipment.

The house of the Superintendent was a true forest home, provided with comforts and needful resources rather than with luxuries. A small library, containing chiefly works on History, Biography, and Natural Science, was shown to me with something of the satisfaction with which a librarian might exhibit his priceless Caxtons. The respect with which my host handled his favourite volumes was good to see. He next conducted me to his garden, which contained certain old-fashioned plants that in British cottage gardens thrive like weeds, but which here had to be tended with the greatest care. Amongst these treasures I recognised Honesty, London Pride, and Michaelmas Daisy.

The scenes and forest productions of this spot are grandly and very faithfully described in "At Last."

By an unfortunate mishap the first volume of the copy of "At Last" on board the "Argo" was mislaid at starting, and I had not access to Kingsley's account of Trinidad till my return to Liverpool. To myself the perusal of the chapter on the high woods is almost like revisiting the place. The Chagunas Creek, the mangrove swamp, the *four-eyes*, the deadly Brinvilliers, the water-vine, the gorgeous *Rosa del Monte*, and forty other *notabilia* are not left for the like of me to describe, though many of them attracted my notice and admiration. Here is Kingsley's picture of a liana. "You follow it up with your eye, and find it entwine itself with three or four other bars, and roll over with them in great knots and festoons, and loops, 20 feet high, and then go up with them into the green cloud over your head, and vanish, as if a giant had thrown a ship's cable into the tree-tops."

I may safely take it for granted that many of my readers are familiar with the chapter in "At Last" in which the "High Woods" of Trinidad are described; nevertheless three such days as those I spent at the depôt must not be altogether unrepresented. Repeated walks with my forester host convinced me that path or no path was all one with him. Cutlass in hand, he made his way through miles of entanglements, never wasting a stroke, and very seldom having to retrace his steps even for a few yards. This kind of work seemed to be easy enough; but when the cutlass was in my hands our progress was speedily

reduced to a minimum. Vegetable ropes of all thicknesses were the chief obstructions, and to cut a wrong one only served to bring down two in its place.

One day, long after I had lost all notion of the direction in which we were going, we came almost suddenly on a true monarch of the woods, a silk-cotton tree, *Bombax Ceiba*, said to be the largest tree but one in the island. When young, the trunk of the Ceiba is round and beset with sturdy spines, capable, as I well know, of inflicting a severe wound. As it increases in age and size the thorns fall off and five or six broad, buttress-shaped supports, are developed star-wise from the trunk, propping the tree in various directions against the enormous overturning force which must bear upon it during tropical storms. I could form no estimate of the height of this Ceiba; its head being lost to view far above the "green cloud." A rough measurement taken round the extremities of the buttresses, where they entered into the ground, gave a circumference of more than 80 yards, or a diameter of about 80 feet.

The compartments between the buttresses resembled small angular courts divided by high walls. Estimating the buttresses as six in number, though I think there were only five, and the diameter of the trunk as equal to one-third of the whole diameter; and allowing two square feet as standing room for an individual, each compartment would accommodate 450 people, and all the compartments together 2700. This computation allows

for the room taken up by the solid trunk, but does not allow for the thickness of the buttresses, which, as compared with their immense breadth, appeared to be thin and plate-like. If my measurement made on the spot be correct, 2400 people could stand round this Ceiba enclosed by a ring of rope touching the buttresses.

In one of these compartments I was busy with my note-book, when something like a fluttering bird brushed by, and, for the first time, I saw close to me a magnificent Glory-of-Brazil Butterfly: a Morpho, probably *Morpho Leontes*, its wings being of a silvery blue, shaded off to black, with white lunules on the borders. "To catch a Morpho" was one of the *desiderata* jotted down in my pocket-book before starting for the West. I did not, though I saw a good many. J. C. caught two or three injured ones; and most of those we saw were probably hibernating specimens. As for the Morpho of the Ceiba, it was certainly a great beauty, but in a moment it had mounted over one of the buttresses, and I saw it no more.

On the approach of evening in the high woods, flocks of gaudy parrots assemble to disport themselves amongst the tree-tops in the golden gleam cast by the last rays of the sun, and a thin streak of blue mist gathers over the herbage in the clearing. As I rested on a log watching the signs of hastening night in the solitude of these mighty woods, it was easy to fancy myself a spectator of a scene long before the first appearance of man on the earth. Whilst indulging in


SILK COTTON TREE.

this conception, other thoughts rose out of it. The climbing herb that dangled from a leaning stem close by had shut its purple blossoms for the night, and would open them again when daylight returned. It was a beautiful object in the midst of a lovely scene; but the flower knew nothing of the dark, graceful fronds of the Cocorite Palm which sustained it. No tree was enjoying the beauty of another tree. The moth that flitted by was not thinking of the exquisite fading of the gloaming into the deeper greys of night. And if the silence was broken by the crack of a distant bough, broken by a fruit-loving monkey, one knew that his enjoyment was unconscious; he did not reflect how or why he enjoyed. And this then was all, man being absent. The scene was like a great cathedral tenanted only by flies wheeling and chasing one another in their mazy dance below the great *corona lucis* suspended from the roof. It is no disparagement to the flies to assert that the cathedral itself bears evidence that it was not built for them.

Admitting, with reverence, the presence and appreciation of the All-seeing One, you take the eye out of nature when you banish man, or regard him only as a higher animal. Granted that development has given the parrot its plumage, and the palm the graceful sweep of its fronds; granted that development has wondrously co-ordinated the moth and the flower—Whence is *that* which enjoys the whole? Has any process of natural selection produced that inner some-

thing which is thrilled with the touching harmonies of the forest resting in the evening shade?

I do not affirm this to be inconceivable; but the difficulty is great, because there is apparently no ascent in this direction in the animal world. The very highest animal, in the perception of nature beyond its own individual requirements, seems to have made *no* advance on the monad. It may be replied—neither has man in a savage state. This is perhaps true; but neither has an infant. The great difference is in this—that in the infant and in the savage man there is a capacity which only needs to be cultivated. The monkey cub may know as much of nature as a young child; but the adult monkey knows no more. Conceive a forest peopled as are these high woods—so far as the recognition of nature is concerned, without man, the glorious scene is as much a blank as would be a world peopled only by animalculæ.

It was with regret that I left my kind host and the forest wilds in which he was so admirable a guide. As a collecting ground, at the time of my visit, it was by no means productive. On the muddy banks of the water-courses occurred great numbers of apple-snails, *Ampullaria;* and on decaying logs I found some interesting Fungi, including a bright scarlet *Polyporus.* Why should scarlet be so rare? As a predominant colour it is not found except in a few beetles, a few *Hemiptera,* and a very few spiders and crabs. There is, I think, no truly scarlet shell; and scarlet flowers

are not abundant. Perhaps in organic structures the scarlet rays are too useful to be reflected or dispersed, except when, as in opaque white bodies, all the rays are equally dispersed. A very curious Fungus in one spot covered the dry stems of grasses, giving them the appearance of slender branches of coral. Not being able to detect spores, I sent this on my return to Mr. M. C. Cooke, who kindly identified it as a *Himantia* form affording no fruit. An exquisite little sea-green Lichen, also a great puzzle, was kindly identified for me by Dr. Oliver at Kew, as *Cœnogonium Linkii*, Ehr.

*Tuesday, March 7th*, was devoted to leave-taking. The more cultivated Creoles, a term applied to Europeans born in the Antilles, and residents, are certainly kind and hospitable to visitors to an extent that is very remarkable. They really put themselves out of the way to be polite and to do one a service at a cost of trouble and inconvenience, the like of which is neither to be seen nor expected in England. The negroes are much less civilized here than in Grenada, and are, in fact, decidedly objectionable. The coolies and Chinese I liked very well; but domestic life is so much mixed up with black servants, shop-keepers, car-drivers, and black people generally, that, whatever may be the perfection of the climate, the great preponderance of the black element must be a serious drawback. Combine with this the disintegration which prevails amongst the white part of the community, and you will not think it improbable that there are some to

whom life in Port of Spain is all but insupportably depressing. Strong motives may sustain a man—a high sense of duty, the desire of wealth, love of a profession and of its benefits to others, keep up the lives and spirits of many; but not all the members of a household can be thus stimulated; and it is perhaps too true that without more than ordinary energy, and that moreover well directed, life in this fine island is not a thing to be desired.

*March 8th*, La Guayra.—Mountains rising almost from the beach to the height of 9000 feet, form a noble back-ground to this small but busy sea-port town; the wonder being that commerce of any kind should flourish where the accommodation for vessels is so very primitive. The day before we arrived, a passenger by a French steamer was drowned in attempting to land; a fact which did not surprise us when we saw the surf boats waiting to be lifted bodily on shore by the crest of a wave. My own first step on the firm ground of South America was such as almost induced me, like Columbus, to embrace the soil. None of our party suffered anything worse than a wetting, though one of the boats of the "Argo" with several of the crew on board, being unskilfully handled, was capsized.

We were going to Caracas, the metropolis of Venezuela, distant on the map seven miles, but by the carriage road 23 miles. The mule path preferred by myself and three other members of our party, was much shorter, but was in some parts so steep as to produce

an impression that the animal under one was hanging on to the mountain. The features of the scene were simply grand. The broad sea lay outspread behind and below us, a wide expanse of water and sun-beams bounded by an horizon which seemed to rise as we rose, till, as we looked down from a height of five or six thousand feet and saw the ships lying at anchor immediately beneath us, the ocean appeared to tower like an immense wall to a height equalling our own.

The way led us through rocks and brushwood, a few large trees shewing themselves occasionally as we approached the borders of a ravine. The ferns and herbaceous plants, however, were such as might well rejoice the heart of a botanist. This is fresh! This is new! We have not seen this before! were constant exclamations; my companions, though not professedly collectors, entering into the delight afforded by the profusion of floral treasures as keenly as myself.

A few slight showers fell, and soon after we had gained an elevation of 5000 feet, a change of temperature, and the greater prevalence of Mosses and Club-mosses, announced our approach to a more decidedly alpine region. The heat had been intense below, but now the air was moist and chill. We met scores of mules carrying coffee, cocoa, and other productions of the interior, to the port; and as they were coming down the same stony ladder that we were climbing up, the passage was not effected without difficulty, especially when on nearing the summit we entered into a thick

cloud and could see nothing at a distance of a few yards from us. No doubt the monotony and disappointment of riding some miles in a thick fog greatly enhanced the surprise that was in store for us on reaching the crest of the pass. The mist disappeared almost suddenly, and there before us, but 3000 feet below us, lay the Great Savanna, an inland plain stretching more than 40 miles from east to west. The western portion of the plain was hidden as by a screen. Above it, though still about 1000 feet below our station, lay a dense fleecy cloud of indescribable beauty, with the rays of the declining sun falling aslant on its upper surface, which was almost too bright to gaze upon.

The western part of the plain therefore was unseen, but nearly opposite our position, the cloud ceased with a clear sharp edge, discovering the whole of the eastern portion of the Savanna; and there in full sunshine we saw Caracas with its avenues of palms, its towers and squares and public buildings, as distinctly as if we were looking upon a brightly illuminated model. It was hard to decide which was more to be admired, the silver cloud or the stately city; but as soon as a moment could be spared for a more extended survey, I recognised in the prospect an almost equally wondrous feature of which I had previously been told. On the further side of the plain a long series of parallel mountain spurs descended into the valley like a row of high-pitched roofs, their western sides all aglow with

fiery red, alternating with the cold bluish black slopes of their deeply shaded eastern sides.

Few I think have seen this magnificent prospect under more striking circumstances: though at any time the first view of Caracas from the mountain must be a spectacle not easily to be forgotten. I know not any prospect with which I may so well compare it as with the equally sudden and unexpected view of Damascus from the eminence of the Santon's tomb. Yet the two suggest a contrast rather than a resemblance, for the Venezuelan capital is mainly a creation of our own times, whilst Damascus is perhaps the oldest city in the world.

How we got down, and dinner, and subsequently talked over the adventures of the day with our companions who had arrived by the carriage road, need not be recorded.

*March 10th*, CARACAS.—All I saw of the city during a visit of four days left a very favourable impression. Deputies from the various provinces of the state were assembled for their annual session, some of them from wild regions so remote that the journey had occupied ten days or a fortnight; hardy mountaineers they appeared to be, with handsome features, and a look of determination as if they felt themselves equal to any emergency. The population of the city, about 60,000, everywhere shewed signs of activity and industry. As in many other towns in what was formerly Spanish America, the churches and convents had been far in

excess of any possible requirements of the people; but some of the largest churches had been closed, and an enormous conventual establishment occupying the whole centre of the town had been erased, and its site was being laid out for public gardens, edifices, and institutions. Active labourers could earn a dollar per day at the public works; and full employment had already established a term of peace longer than had been known for several generations past. Ladies with their children were walking about as freely as in any European town; and on band evenings in the great square, parties consisting of whole families and their friends promenaded, or rested on benches under the trees, with an air of easy enjoyment which reminded me of similar scenes not, I regret to say, in England but in Brussels. I attended service twice on the Sunday, at the Cathedral and at the Church of St. John. Very few were present except ladies.

Amongst the institutions recently established in Caracas is a University chartered to grant degrees in Literature, Science, Law, and Medicine. It has for its home a college consisting of two handsomely built quadrangles. In one of these I was wandering along a corridor on the upper floor when through a door partially open, I saw suspended on the wall a black board, and on the board sketched in chalk, diagrams of a *thread cell* of a polype, and of the frame-work of a sea-anemone. I know nothing of the freemason's grip, but these few strokes instantly laid very tight

hold of my curiosity, which I proceeded to gratify by introducing my head, as far as my eyes, through the opening of the door. At the further end of the room was a professor, and before him a gathering of about thirty young students forming a class in Biology. I withdrew instantly, but not before the eye of the teacher had noticed the intrusion, and I heard his steps as he came toward the door.

Such was my introduction to Dr. Adolphus Ernst, Professor in the University of Caracas. A botanist of high European reputation, genial, enthusiastic in his love of nature, speaking English like a born Englishman; some of my happiest hours in the West were spent in his company. He was forming a museum, but was much in want of books suitable to interest a class of young students who had yet to learn that there could be any delight or interest in the study of natural history. He had, he said, plenty of works on physiology, histology and classification, but he needed books by out-of-door naturalists, somewhat on the model of George Johnston's "Introduction to Conchology." I told him of as many as I could recollect. Amongst the works he had not seen was Belt's "Nicaragua," which will be a treat to him. The Professor is a true lover, not of nature for the sake of science, but, of science for the sake of nature. He gave me a half promise to return my visit, and dearly should I like to greet his happy looks, and hear his cheery ringing voice in England. Professor Ernst was

in the habit of conducting a botanical class of about forty pupils during a weekly ramble on the hills; and hoped that about ten of them would become permanently students of science.

The environs of Caracas are too much like huge fortifications to be beautiful. Even the river side, along which I and J. C. made an excursion for the greater part of a day, affords little variety. The most striking plant seen was a giant reed, *Gynerium saccharoides*, 20 feet in height, with a flower plume like the tail of the Great Ant-eater. One of the Cocoa plantations, which had evidently been inundated by the river, swarmed with gauze-winged butterflies, *Ithomia*, and Skippers, *Hesperidæ*. The latter as usual, were difficult to catch. Nevertheless we made up a good miscellaneous box, at the cost of being mercilessly tormented by sand-flies and mosquitoes. On a bank of moist clay grew a moss of more than ordinary interest, *Funaria calvescens*, a species frequently recorded from elevations of 10,000 feet. Possibly its spores may have been brought down by the river from far distant heights.

Hitherto very little success had attended the efforts made by Mr. C. to obtain living birds and animals. In Caracas the bird market was well supplied, and some valuable presents were received of birds which had been household pets. Our company was now pleasantly augmented by the presence of a young Spaniard who joined us at Trinidad and came

on with us to England. He was of a highly respected Venezuelan family and, in addition to the valuable aid rendered by his thorough acquaintance with Spanish and English, proved to be a very agreeable addition to our party in the "Argo."

Visits of ceremony received from, and returned to, great people were often kindly excused me in consideration of my constant occupations. Nevertheless it was my good fortune on more than one occasion to share in their extremely gratifying results.

The President of Venezuela, Don Guzman Blanco, to whose energetic and successful measures in behalf of Caracas I have already referred, received Mr. C. and our party very kindly, and insisted strongly on his wish that we should see as much of Venezuela as the time at our disposal permitted. Accordingly, under the special patronage of the President, who had given orders that every possible accommodation should be provided for us at his own cost, we left Caracas on the 13th March in three carriages, accompanied in a fourth carriage by a General Officer and three Commissioners. We had before us a journey of 200 miles through the interior of the country, terminating at Puerto Caballo, where the "Argo" would await us.

During this journey I had an opportunity of becoming acquainted with the peculiar features of a tropical winter—a winter not of cold, but of extreme dryness. For many miles the woods were as leafless as our English woods in January. At first I attributed their

whiteness to a coating of dust on the bare branches, but afterwards it seemed to be only the result of excessive aridity. Even the wayside herbs had retired for a season of rest, leaving only sere and withered stems such as we see on hedge-banks during a mid-winter frost. Not a butterfly, not a fire-fly, not an insect visible anywhere. We were there just at the conclusion of the dry season. In a couple of months the whole scene would be changed. The road was a noted one for gorgeous flowers, luxuriant foliage, and glittering winged creatures of all kinds. So I was told; and I can well believe it, for no sooner was the neighbourhood of water reached than the change in the vegetation seemed almost magical.

The early cup of coffee and the drive before breakfast were charming. On the first morning we started from Los Teques quite in the dark, at 3 A.M., in order to be in time for a large deer-shooting party arranged for us at Guaya by General Alcantara. The meet was picturesque in the extreme. First, the General himself, who is certainly one of the most striking-looking men I ever saw anywhere. Then, the dogs! Where *could* they have come from? Was it possible that such animals had ever been seen sleeping before a fire? And the guns! Having natural history matters to attend to in a different direction, I took leave of my friends, wishing them good sport, and a safe return.

Leaving the town of Victoria very early, we breakfasted at the residence of General Vollmer, whose

mansion may be regarded as an excellent specimen of a Venezuelan country house of the higher class. The rooms on the ground floor are made useful in various ways in connection with the produce of the estate, whether coffee, cotton, maize, sugar, or cocoa. The upper story consists externally of a very broad projecting balcony supported on pillars. Here tables are spread and guests received during the day, and hammocks are frequently slung for the night. Within the balcony are rooms varying in number, but always constructed so as to admit the freest circulation of air. An ingenious machine for the production of ice by evaporation was shewn us in full operation, not as a philosphical toy, but as a useful household appliance. It was perfectly successful. The coffee, grown on the estate, was finer than any I had ever tasted elsewhere. We visited in the course of the day a magnificent coffee plantation just purchased by the President at Guayabita. It would seem from such an investment that the President anticipates a prolonged continuance of tranquility and industry.

We halted for the night at the small town of Maracay, where, from a conical eminence about 500 feet above the town, we obtained a noble view of the great valley of Aragua and the lake of Valentia, called by the Indians Tacarigua. The Lake is 30 miles in length, and about one-third as much in breadth; but at no very distant period it must have been much broader, for the road, which is in some places more

than a league from the water, crosses a level plain which has evidently been entirely submerged. The eminence was crowned by a small chapel, now in ruins, which I visited shortly before sunset. It was easy to account for its present condition, for the country is passing through a stage of extreme reaction in matters of faith. But who were they who built the shrine? Who were the few that toiled and gave their money and persuaded others to contribute because they wished to worship on a spot like this? There must have been some who cared for such an association. From that doorway, then unbroken, after the plaintive notes of evensong had ceased, some had come forth to look on forest and lake and distant mountain, and had been soothed and gratified, as well they might be, by the very prospect that was now before me fading in the twilight. I waited looking at the ruins, and their dim yet still beautiful surroundings, till the stars were out, and came down fully persuaded that in the good time coming the kindred influences of nature and of worship will be more frequently and more closely associated. That desolate chapel, if it had been consecrated only to the promotion of "Glory to God in the highest, and on earth peace, good-will toward men," would, perhaps, never have been laid waste.

On leaving Maracay, we had a delightful drive at sun-rise through the woods near the lake of Valentia. Various kinds of birds had just left their roosting perches, and on the topmost boughs were drying their plumage

moistened with the heavy dew in the first rays of the sun. Again and again was our driver made to stop, whilst our young companion from Rugby stole under the trees to get a shot. He was generally successful, and, as we were in the front carriage, we speedily made quite a collection, chiefly of Birds of Prey. The dead ones were nice enough; but some of them were only stunned. One large and very handsome fellow a Falcon, I think, with a beak like the mandibles of a cuttle-fish, and claws like grapnels but sharper, was tenderly placed in security amongst our knees, as it was touchingly remarked, to give him a chance of recovery—an opportunity of which he unmistakeably availed himself, to the great delight of Mr. C., who would, I fancy, put a live eagle into his pocket sooner than leave it behind; that is, if the bird were wanted.

It was mortifying to lose the flowers and the butterflies; but perhaps we saw the birds and their habits better than if the woods had been in full leaf. On more than one tall tree were numbers of the nests of a fine black and yellow bird, about the size of a magpie, called the Hang-nest, identified by Mr. Moore as *Cucicus citrius* of Müller. The nest is shaped like a retort, with its long neck or spout hanging freely downwards; —a plan adopted to protect the young against the invasion of climbing snakes. We obtained several of these nests through the good practice made by A. Wade, who was successful with his rifle in cutting off the

boughs on which the nests were suspended. It would be pleasant to observe the mode of operation when a young Hang-nest, just fledged, is first introduced down the spout into the outer world, of which it cannot previously have learned much by the use of its eyes.

Not far from Maracay the road passed a tree scarcely less remarkable than the giant Ceiba of Trinidad. It is known as Humboldt's tree, and I may quote the description of it given in the "Personal Narrative" of that prince of travellers. "Upon quitting the village of Turmero we discover, at a league distance, an object which appears at the horizon like a round hillock, or *tumulus*, covered with vegetation. It is neither a hill, nor a group of trees close to each other, but one single tree, the famous *Zamang del Guayre*; known throughout the province for the enormous extent of its branches, which form a hemispheric head 576 feet in circumference. The *Zamang* is a species of *Mimosa*, the tortuous branches of which are repeatedly divided by bifurcation. Its delicate and tender foliage displayed itself agreeably on the azure of the sky. We stopped a long time under this vegetable roof. The trunk is only 60 feet high, and 9 feet thick; but its real beauty consists in the form of its head, the branches of which extend like an immense umbrella."

The lower boughs descend to within about 15 feet of the ground, and then shoot out horizontally for

40 or 50 feet. The extremities of a branch, after a shower, must weigh some pounds, and the strain caused by even such a weight, acting at a horizontal distance of 80 feet, must exert a rending power on the trunk not to be thought of without surprise. Yet so beautifully is this enormous strain distributed by the graceful curve, and the elasticity, and the gradual tapering of the branches, that the tree does not seem distressed. My own measurements of 185-190 feet, from the tip of one branch to the tip of a branch on the opposite side, differ scarcely at all from those made at the beginning of the present century by Humboldt, who states that the first conquerors of the Indians found the tree almost in the same state as when he saw it. The Banyan Tree of the East covers much more ground, but its branches throw out descending roots which serve as props, and also as separate channels for the ascending sap; the whole constituting a grove rather than a single plant. The head of this wondrous Mimosa formed an äerial garden, well-stocked with various species of the Wild Pine-apple, *Tillandsia*, and other parasitic plants.

We arrived at Valentia an hour after dark; and, as we were to leave at day-break, the authorities of the place with much ceremony conducted us to form such impressions of the chief squares and public buildings, as we might receive from seeing them when lighted up. Many extensive and substantial improvements were in course of completion; but our appreciation

of these was, I fear, somewhat weakened by the long day of travel we had previously spent. Morning arrived long before our carriages, and we soon found that our kind entertainers were not disposed to dismiss us with only a night-view of the "City of the King." Noon, accordingly, was fast approaching before we were well on the road to La Trinchera, where we had purposed to breakfast.

On arriving at La Trinchera we were escorted by our hosts of Valentia to see the celebrated boiling springs, said to be the hottest in the world after the springs of Urijino in Japan. This statement is made by Humboldt, who remarks that eggs plunged into the thermal waters of La Trinchera were boiled in less than four minutes. It seems to me doubtful if water anywhere could effect the operation much more expeditiously. But the greatest wonder, in the estimation of the natives, consists in the issuing of a cold spring from the ground, only a few feet from the hot one. Something altogether supernatural was supposed to be the cause of so strange an association. I suggested that perhaps the hot spring in some part of its underground channel reached a depth where the temperature of the interior of the earth equals or exceeds that of boiling water; whilst the cold fountain might simply be an ordinary spring fed by surface water. This explanation was regarded as a needless disparagement of one of the greatest wonders of the country, and as very detrimental to any claim I might advance to be

regarded as a philosopher. Humboldt speaks of the contiguity of the springs as singular, but offers no explanation. Possibly he was not in possession of knowledge now familiar to every child that reads a primer of Physical Geography.

In order to give the mules longer time for resting, most of our party started on foot for Puerto Caballo, distant 14 miles. We were warned that the road was very bad, and so it turned out to be; but it was also highly picturesque, following, as it did, the windings of the ravine by which the waters of La Trinchera descend to the ocean. After walking nine miles, of which the last three were in darkness, we halted at a posada, the lights of which were seen at a little distance from the road. Scores of mules were here, resting for the night, and their drivers were cooking their suppers or reclining in groups on the ground; people, costumes, and torch-light reflections, forming a notturno scene worthy of the pencil of a Velasquez. At length the welcome sound of the approaching carriages made us hasten to take our places for the last stage of our journey. Well for us it was that we had waited. Three of the remaining miles led through a mangrove swamp, where the road was knee-deep in water, and the mosquitoes, from personal observations I was compelled to make, must I think have included most of the species named by Dr. Gray and others, as may be seen in the catalogue of the Dipterous Insects in the British Museum, *Culex impatiens; C.*

*iracundus; C. punctor; C. titillans; C. vexans; C. stimulans; C. provocans; C. excitans; C. implacabilis; C. inexorabilis!* But the end was before us, and that night we slept on board the "Argo."

Puerto Caballo is apparently a thriving sea-port town, having monthly communication by steam with Liverpool. It is at certain seasons very unhealthy, but enjoys—for the benefit only of its wealthier merchants—the most lovely suburban retreat I have ever seen in any part of the world. The village of San Esteban, consisting almost entirely of detached villa residences, with one small hotel built like a Swiss chalet and kept by a French lady, differs only in degree from other localities chosen for the beauty of their scenery. It is probably subject to disadvantages not discernible on a mere visit; otherwise it is indeed a paradise.

I engaged a guide in Puerto Caballo, for a dollar per day, to serve as an interpreter and to assist generally in shopping for curiosities. Through him I enquired the fare of a car to San Esteban, a distance of four miles,—"Thirty shillings, sir, if you remain there less than one hour; if over that time, fifty shillings." I preferred to walk, and found the road, after the first mile, altogether charming. A dealer in objects of Natural History resides in San Esteban, but he was absent from home,—collecting. What a home for a Naturalist! Genuine forest lianas, and trees with gorgeous flowers at his very door; a river

with no stinted stream below, and glimpses, through the trees, of peaks 10,000 feet in height. The villas are mostly tenanted by Germans and French. In the village I met a young lady with a countenance so unmistakeably British that I ventured to ask her how far it was to the Hotel. She was Scotch; her friends had left San Esteban intending to reside in Scotland; but the charms of a tropical life proved too strongly attractive, and they had returned to pass the rest of their days in San Esteban.

A farewell banquet was gived to us in a pavilion constructed in a very extensive plantation of Cocoa-nut Palms. Every European luxury, as well as the peculiar dainties of the country, graced the hospitable board; and for all this, as well as for our journey, we could not but feel ourselves indebted to a desire on the part of the President of Venezuela and his friends, that kindness and unsparing liberality should be shown to a company of English travellers.

In the way of collecting Natural History specimens, our journey overland was to myself little better than a failure; but in other respects it was deeply interesting. The history of Venezuela, from the time of Humboldt's visit to a period within the last few years, contains little more than records of revolts, insurrections, and petty wars. Each village through which we passed had its own sad tale of slaughter. Industry is now making rapid progress. The chief inconvenience of our journey was the dust, stirred up by the incessant

meeting or passing of long trains of mules or oxen, laden with the productions of the soil. I did not see throughout the journey a single case of intoxication. The really dangerous portions of the population, the malcontents residing in towns, were kept quiet by the liberal wages offered by Government to all who would labour at public works, roads, aqueducts, drainage, squares, and municipal buildings. A dollar per day is more than a man can expect to gain by fighting; and I am inclined to think that the removal of a fearful ecclesiastical incubus and centre of intrigue has left the people free to wish and to struggle for a better state of things. Years must elapse before Venezuela can be delivered from the results of hereditary disease; but self-respect, temperance, and industry combined, are symptoms which promise well for convalesence.

*March 20th.*—TUCACAS. A prospect of excellent shooting was held out as an inducement for our party to visit Tucacas, a small recently established settlement about 30 miles west of Puerto Caballo, near the mouth of the Aroa. The coast for many miles inland is little more than a region of marine lagoons. They are divided into areas of very irregular size and shape by belts of mangrove trees growing partially in the water, and forming a dense border on each side of the winding channels by which the lagoons are connected. The features of the scene would be uninteresting were they not displayed on the large scale befitting the shores of a great continent.

J. E. WORRALL, DEL.

WILD BRAKE.

TUCACAS.

*March 21st.*—Dredging in the harbour. During some portion of each of the five days we remained at Tucacas, the dredge was in operation; but without more hands than were available from the "Argo" the work was very laborious. Whether in the harbour or in the lagoon the dredge generally came up full to the brim of sandy mud. It was a fatiguing task, leaning over the side of the boat, to wash this tenacious material through the close meshes of the dredge; and when at length the water ran through without being discoloured, frequently all that was left for examination at the bottom of the dredge might have been put into a tea-cup. Nevertheless, there was always something worth having; so we persevered; and the list of shells collected at Tucacas, as published in the Report of the Liverpool Museum, includes 73 species, of which four are supposed to have been now collected for the first time on shores west of the Atlantic.

*March 22nd.*—Two beautiful and somewhat rare marine forms were obtained to-day in abundance by the dredge. The first, *Renilla reniformis*, might be termed a soft-bodied coral. It belongs to the interesting group of sea-pens. The portion of the animal answering to the quill of a pen is inserted in the sandy mud, whilst the plume, resembling the feather part of a pen, waves to and fro on its soft stem at the bottom of moderately deep water. In the Renilla the plume is composed of a double lobe, shaped like the leaf of the Frogbit, and thickly studded with delicately

coloured polypes. Several specimens lived for some time in our aquaria and were greatly admired. The second was an Echinoderm, *Mellita Pentapora*, belonging to a group often called Cake-Urchins from their wafer-like flatness. Any one who has noticed the internal apparatus of the common globose sea-urchin, must regard with interest the modification of the same appliances needful to adapt them to fulfil their functions in a space scarcely deeper than the thickness of a few sheets of paper. The contrast reminded me of the difference between the old turnip watches worn by our ancestors, and the watches, not much thicker than a half-crown, more frequently exhibited than worn, in the present day.

*March 23rd.*—As we approached Tucacas, several small islands were observed in the offing about six miles from the anchorage. One of these, at a distance, had very much the appearance of an Atoll. This of itself, besides the probability that it might prove a good locality for collecting, made a visit of exploration very desirable. Accordingly, Mr. C. with myself and J. C. took our places in the pinnace and were towed by the steam-launch to the island. We landed in safety and spent about three hours in very agreeable explorations. The island may be thirty acres in extent and is surrounded by a belt of mangroves, except on the N.E., which is the windward quarter. On that side a natural breakwater of loose blocks and rock, through which there is no channel, is exposed to the

perpetual lashing of the waves. Within the breakwater is a bright and sparkling, but very shallow, lagoon, to the west of which is a former breakwater dividing the lagoon from a swamp covered with a rank vegetation of sedges, *Scirpus*. To the south, within the encircling mangrove belt, is a swamp with shrubs, principally mangrove bushes, but not so high as those on the margin.

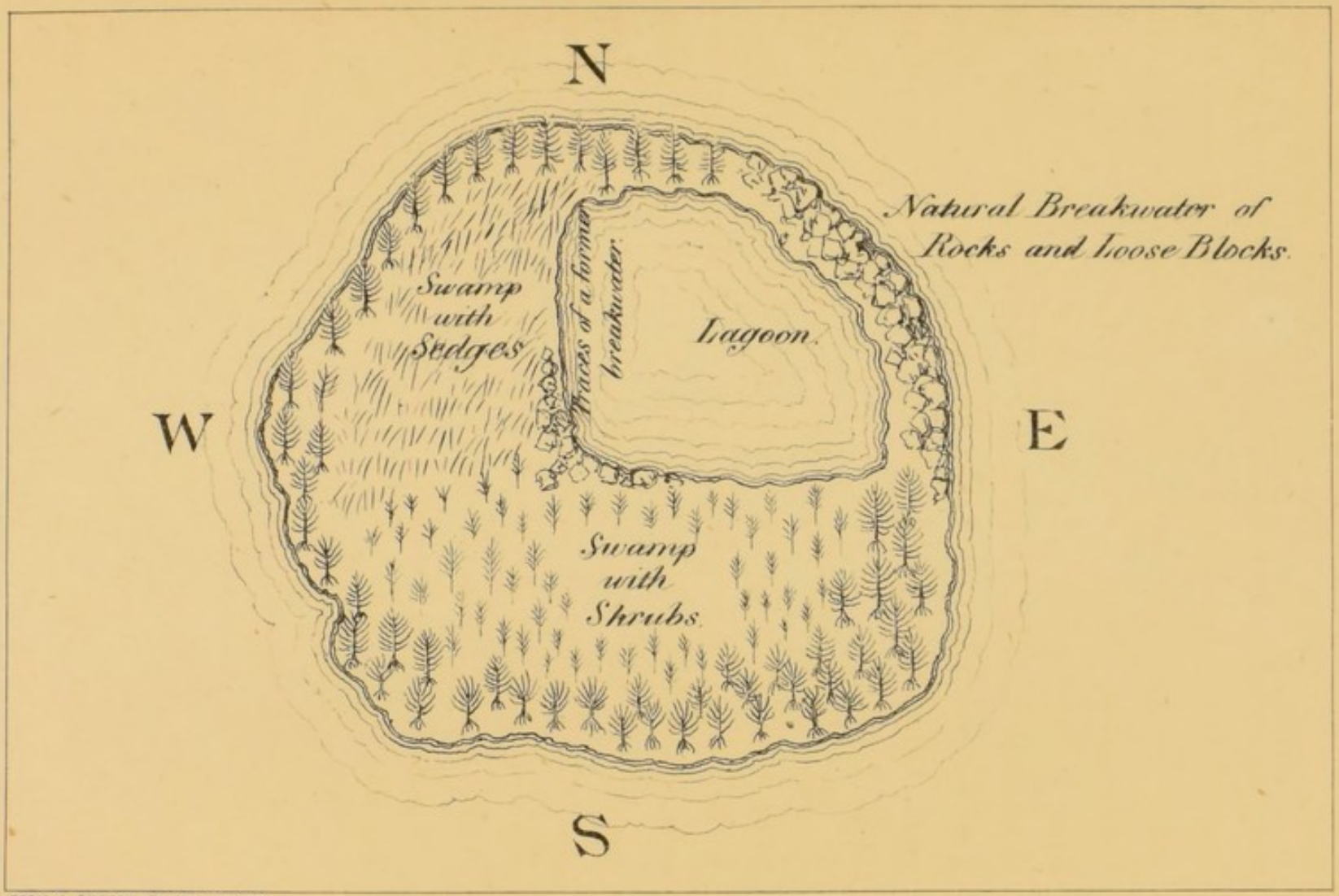
From all this it seemed plain that the island was undergoing elevation and not depression; the latter process being always concerned in the production of an Atoll. There may have been here, in very remote ages, elevations and subsequent depressions; but in the last process of elevation the oldest or first elevated part of the island was the annular reef enclosing the whole of the interior as a lagoon. Then arose the older swamp limiting the lagoon to the northern half of the island; and lastly the swamp with sedges, leaving only the N.E. corner for the lagoon, the bottom of which will probably in its turn rise and become a swamp covered by sedges; and eventually the whole island, with the exception of the breakwater, will become a mangrove clump.

The breakwater was thickly strewn with littoral Molluscs, Top-shells, Coat-of-mail shells, and Nerites; the varieties of the N. *versicolor* being countless, and very gay and beautiful. I saw no living coral except on the sheltered side of the island, where masses of the palmate madrepore added considerably to our diffi-

culties in landing. The shade of the mangroves was very acceptable, but the clumps were tenanted by wild insects which speedily forced the intruder to seek for safety in the gloriously fresh breezes blowing on the breakwater. Mr. C. seemed to enjoy his visit to the island very much. As for myself I came away very thankful to Mr. Darwin for instructions which had greatly contributed to the interest of what I saw in a spot which cannot, I think, be a place frequently visited.

Mr. Darwin's name has become associated with questions of such immeasurable importance that the world is apt to forget his renown as the interpreter of coral reefs. Mr. Darwin's theory of "natural selection," confirmed as it has been to a considerable extent, has not, at all events hitherto, attained the completeness of his explanation of the Barrier, the Fringing, and the Atoll coral reefs; a magnificent achievement, quite enough for one man to accomplish in science during his life.

*March 24th.*—Our whole party, with the exception of myself, started on a shooting excursion to the interior. A journey of 25 miles was before them by a tramway connecting Tucacas with a copper mine. They were to remain at the miner's camp for the night and return the next day. The programme was a tempting one; but so much had been said about the corals in the great lagoon that I thought it better to accept the kind offer of Mr. Warmington, financial




FROM A SKETCH BY THE AUTHOR.

MIDDLE ISLAND,

SALT KEY, TUCACAS.

agent at Tucacas, to accompany me to the coral banks which were, he thought, about nine miles off. The distance was too great for oars, so Mr. C. gave orders for the steam-launch to be in readiness. The route was very circuitous, and no corals were found till we reached a point where the lagoon opened on the sea. Here a heavy swell from the outside broke upon the reef, and the launch, driven on a shallow part, bumped so alarmingly that the men had to jump out and lift her off. I saw *Madrepora palmata, Millepora, Meandrina*, and some *Astrææ;* they were very beautiful, but all I could obtain of them was a mere glimpse. On our return we passed the extremity of a narrow spit of mangroves jutting out for a mile or more into the great lagoon. Near the end all the trees seemed to be dead, their branches being bare and stark like the tops of aged oaks. Mr. W. attributed this appearance to the constant perching of a colony of Frigate birds compelled by the absence of tall cliffs to build their nests elsewhere, in the least accessible quarters they could find. The birds were away, but we had, on several occasions, seen and admired their matchless grace and power of motion whilst on the wing. The boughs of the mangroves dipping into the water were thickly encrusted, for a considerable height above the surface, with the shells of a small species of oyster. Some form of tree-oyster may be found in all the seas of low latitudes.

*March 25th.*—The shooting party returned well

satisfied, having made up a very miscellaneous bag. The chief prize was a large bird, resembling a turkey, with a flexible horn rising from the crown of its head. It fell to a shot from the rifle of Colonel C., at a distance of ninety yards.

It was at Tucacas that we saw the greatest abundance of a production popularly known as sea sawdust, *Trichodesmium*. It was floating on the surface, and for a foot or two below the surface, so copiously that a glass holding half-a-pint dipped at hazard into the sea would bring up a hundred specimens. In long lines, into which they had been swept by the current, the specimens were much closer. The constituents of sea-sawdust are small plants, *Algæ*, each about the size and shape of a printer's accent (′) used with brevier type. It is composed of many filaments. Several species have been described by Ehrenberg and others; but those I saw at Tucacas, Vera Cruz, Havana and other localities appeared to be indistinguishable. After a microscopic examination of many specimens at Tucacas I made the following entry in my notes. *Trichodesmium*.—Colour, pale drab; sheaves, generally quiver-formed; ends of filaments distinctly rounded; internodes, rather broader than long. I am inclined to think that as seen floating in the sea, it is not at all in its original form. A group of five or six seen adhering together in a cone-like bundle, the small ends all turned in one direction, made me think that it is produced by a much larger Alga in the form of a

spherical shell, somewhat like the fruit of *Sparganum;* and that it is only on the breaking up of the globular shell that the little sheaves are set free to float on the ocean. I made a rough computation that in the Gulf of Mexico at a given time there might be a sufficient number of these tiny Algæ to form more than one conical heap a thousand feet in height. Allowing the lapse of one year for a second crop, in a century, if collected and preserved, the mass might be very large, amounting to a stratum recognisable by geologists.

*March 27th.*—At 10 A.M. we came in sight of the Sierra Nevada of Santa Marta, then distant 80 miles. In the evening we passed the loftiest peak in the ridge, Horqueta, said to be 19,000 feet in height. Although inferior in elevation to many other mountains, it is probably the highest peak in the world that can be viewed from the sea at so short a distance. It certainly did not appear to be more distant from us than the summit of Snowdon is from the Menai Bridge. Those who know the view of Snowdon from Anglesea may easily imagine that a second Snowdon of equal height piled on the top of the first, would have an imposing appearance. Add a third Snowdon on the second, a fourth on the third, and a fifth on the fourth, and you would have a peak still 1,000 feet lower than Horqueta. The snowy crest seemed to have nothing to do with the clouds which floated dreamily about its lower ranges, and concealed the ridge by which the peak was connected with other mountains; the lowest

visible portion of which was probably about the height of Mont Blanc. The evening haze set in only too soon; but we could see that the last rays of the sun were lighting up the snowy pinnacles aloft long after sunset on the sea.

Soon after sunrise on the following morning we were on shore at Santa Marta. The harbour is fine, with several bold rocks standing out as islets at its entrance. The snowy ridge presents only its end to the town. Some part of it may be seen from the bay, but whilst we were there the distant view was obscured by clouds. The great Cathedral with its dome and Moorish-looking campanile was conspicuous; the French, German, and Spanish consulates were spacious quadrangular buildings, and the custom-house had an imposing external appearance; but no ship, nor any vessel larger than a boat, except the "Argo," was in the bay; and I saw no signs of business going on. A small motley company of soldiers were going through a kind of exercise; but it was not easy to distinguish between the soldiers and the crowd of loungers, who were merely looking on.

The bay was full of fish. I did not see any nets used, but men and boys in dug-out canoes caught a large number of fine fish. The best were obtained by spinning a small fish on a long line trailing from a canoe. Fruits, too, of various sorts, were offered for sale, and as soon as it was known that we were willing to make purchases, there was quite an animated scene

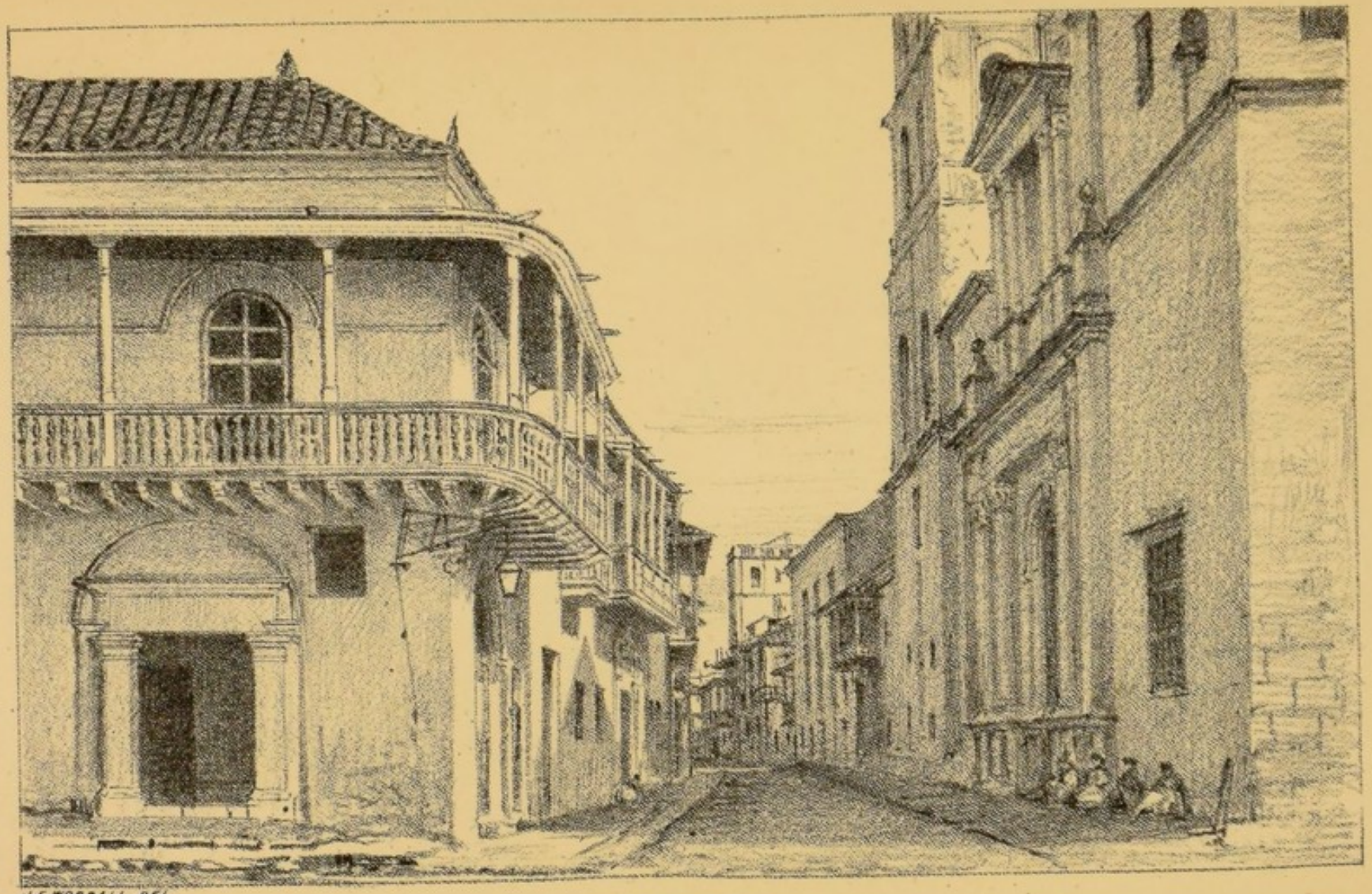
amongst the fortunate possessors of curiosities of all kinds. The beach and the bay were delightful for bathing, and a good many natives were making themselves at home on the shore. One little fellow with long eyelashes and a splendid dark skin, in colour something between an olive and a copper, was buffeting the waters valiantly. He might, I should think, be about six years old, and could swim, but not very well. When he came out of the water he shook himself and ran to his shirt, his only garment. It was a very little one, but it had been made quite smart with blue trimmings, and he wore it slantingly across his body, leaving one arm free. Somewhere from its folds he produced a full-sized cheroot, for which he got a light from two men who were sitting on the side of a boat. They gave him a light without smiling at his request, and then, having had his bath and made his toilet, he walked backwards and forwards along the beach, not playing with his cheroot but puffing vigorously, as if he enjoyed his morning smoke. Presently there was a voice close beside me: his mother was calling him to bring her a light for her own cheroot, which had gone out. Up came the little fellow, who gave to his maternal parent the required "succour" of a light, in the most approved fashion, and then returned to finish his smoke by the borders of the waves.

Santa Marta has long been noted for its shells. I saw one magnificent specimen taken in a singular way.

A tall fisherman waded in the water nearly up to his chin, and felt for shells with his feet. I watched him for some time, and inferred from his motions that he frequently came across shells which were not of the kind he wanted. At last I lost sight of him for nearly a minute, during which time he was under water. On rising again, he came on shore bringing a fine specimen of *Mazza scolymus*. It was a shell about a foot in length covered externally with a brown cloth-like epidermis. Its mouth, which was of the colour of an orange-fleshed melon, glowed with indescribable beauty, as if the light came from within the substance of the shell.

A dear friend who in his old age was a near neighbour of mine, Professor Nuttal, whom I heard spoken of in Philadelphia as the "Father of American Botany," used to describe with enthusiasm this living bloom seen in some shells when first captured. He said that from specimens brought to this country no one could form an idea of the beauty of the shell of the common Tiger Cowry whilst the animal is alive. Notwithstanding the statements of high authorities, I have never been quite convinced of the purely mineralogical character of shells. There is a something, not, as I believe, wholly superficial, which they lose rapidly after the death of the animal.

*March 30th.*—Carthagena, as it first came in sight about two miles off, whilst the "Argo" was crossing the entrance to the bay which bears its name, seemed to be nothing less than the very Queen of cities on the



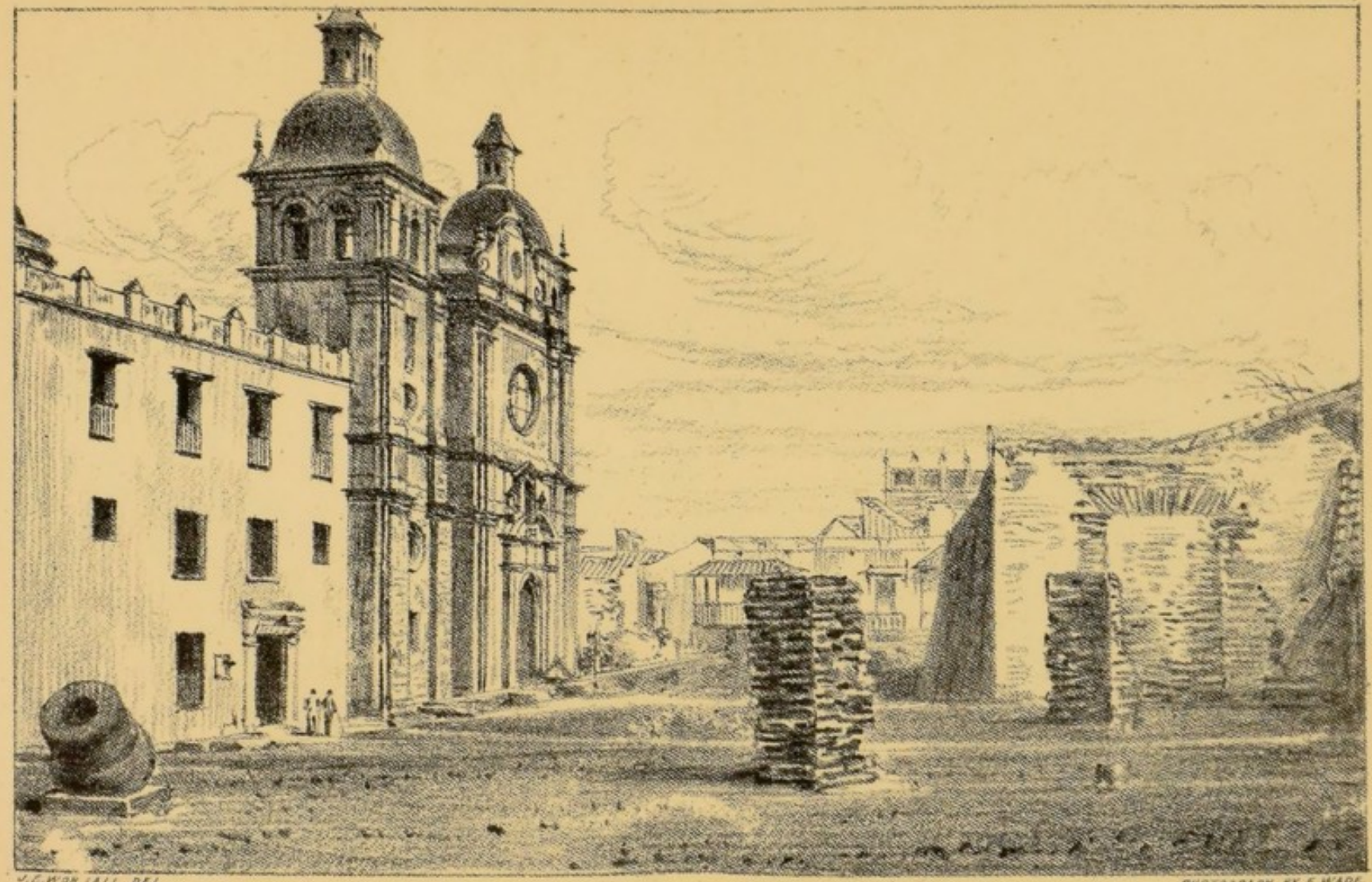

CARTHAGENA.

Spanish main. Its buildings, white and lustrous, each with a character of its own, stood out in fine relief, reminding me of Genoa, though deficient of the elevated back-ground which crowns the birthplace of Columbus.

From the "Argo" nothing could appear easier than to reach Carthagena in less than half-an-hour by the natural approach straight up the middle of its fine bay; but woe betide the vessel that should make the attempt. The passage long ago was rendered impracticable for the sake of security against unwelcome visitors. We had to proceed nearly three leagues before reaching the entrance to the long and winding channel by which alone ships can approach the city. The course lies through a succession of broad lagoons and narrow straits, the salient positions being guarded by forts that once were formidable. The shores are low and undulating, and a number of Indian villages are picturesquely situated on the beaches of the little bays. Then follow more forts, more towers, more windings and more expansions, the last being a fine sheet of water nearly three miles in width. Carthagena exhibits in a single feature the marks of its former celebrity and the source of its present decay. It is positively crowded with monasteries, churches, convents, and ecclesiastical establishments, all now defaced by time and utter neglect. These institutions once exercised an almost unlimited power over every commercial transaction, and, as a natural consequence, a conflict followed, to which there could be but one issue.

The principal centre of commercial activity for hundreds of miles of coast in this part of the world seems now to be where Savonilla, formerly a fine old Spanish town, gives its name to a railway station on the sea forming the port of Barranquilla. We visited the place on our way to Carthegena, but the "Argo" had to cast anchor near a Royal West India mail ship about five miles at sea, in a kind of road. The inconvenience of such a distance for the delivery of imports or the shipment of exports may easily be understood; and in my notes I find the place spoken of as the ugliest spot visited by the "Argo;" yet trade appeared to flourish, and will probably increase, for it is comparatively unfettered.

Still, as a place to visit, Carthagena is in some respects the most interesting town I saw in the West Indies. The streets are intensely Spanish, or rather Moorish, narrow and irregular, with overhanging balconies, from which the inmates of the houses on opposite sides might shake hands. During our wanderings, a military band was playing with a fair amount of ability and good taste. Again and again I was tempted to stop that I might listen to music familiar in its style, yet unknown to me. It was evidently old vocal German, or more probably Italian music of a very high character—equal to Alberti, or Scarlatti, or Palestrina. The sounds proceeded from an upper floor not easy of access; but at length I found my way to the room, and was politely received by the conductor of the band. He was an old man with long



J. E. WORTHALL, DEL. PHOTOGRAPH BY F. WADE.

CATHEDRAL, CARTHAGENA

and thin grey hair, and his musicians were of all ages and shades of colour. I asked Sen. Padron, who also had been attracted by the music, to enquire who was the composer, but could only obtain the reply that the band was rehearsing for the holy week, and that the music was for use during solemn processions. Strange, that such music, banished from Italian churches, should find a home in Carthagena.

The Cathedral is spacious, and the interior is almost entirely lined with tarnished gilding. There is an organ, which may have been a fine instrument, though not a large one, but I could not get access to it; and, so far as I could understand, the whole organ gallery would be in danger of coming down if anyone went up. The old organ case was extremely good in form. In days gone by, the scene within the cathedral must have been gorgeous; and those were days when cheap gilding had not come into use.

We went shopping, and the streets are certainly well worth seeing, but the shops contain very little that is peculiar. The place exhibits more activity than is to be found at Santa Marta, but business seems to be done only in a small way. What a contrast between the city as it is, and as it was during the last century and at the beginning of the present. Immense conventual buildings occupied both sides of the wharf. Cowls and veils must literally have been seen in swarms. I saw but one ecclesiastic, man or woman, in Carthagena and he was very young. I heard no service in the Cathedral,

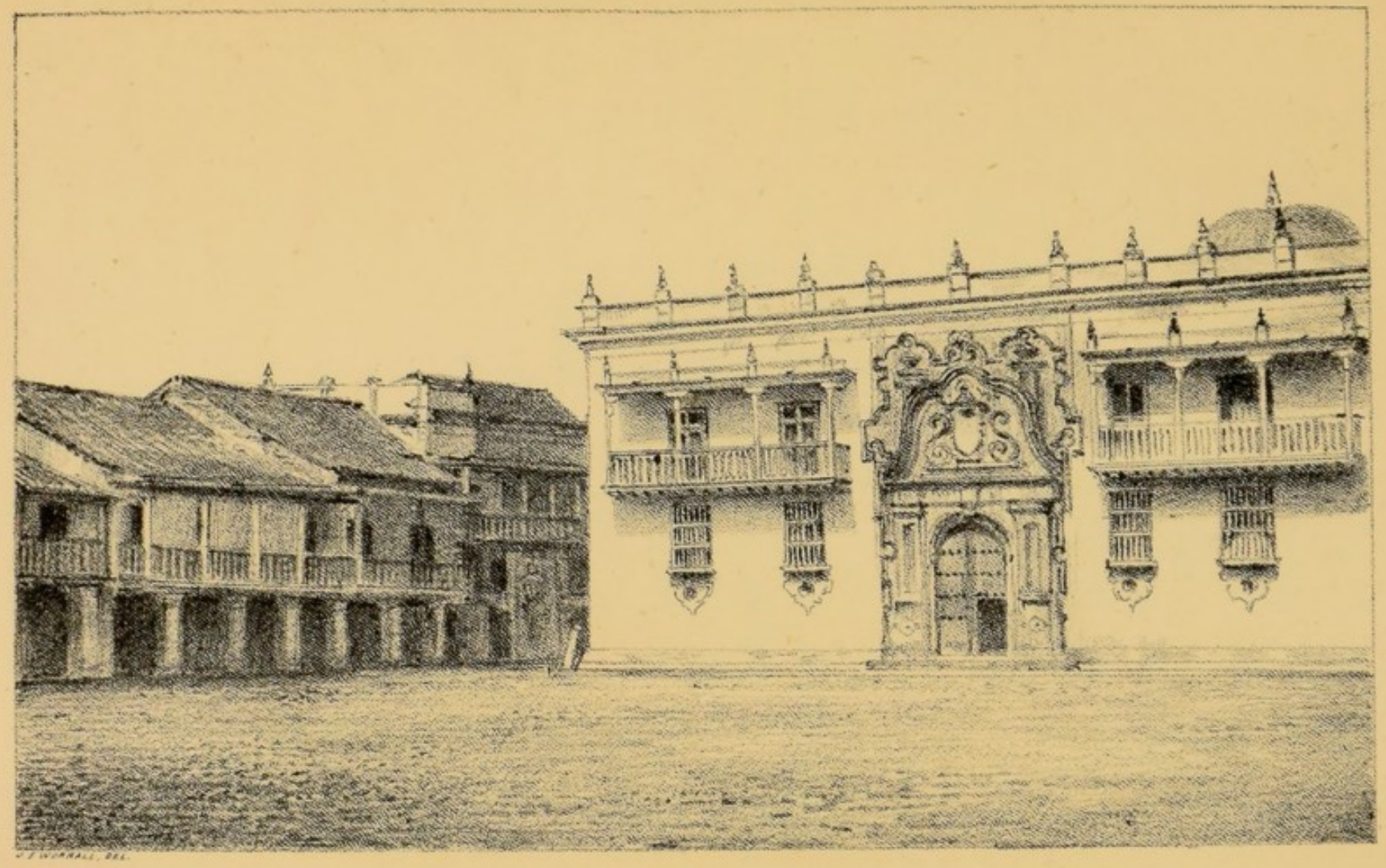
though I was there in the early morning; and all the worshippers I saw were two women.

Carthagena was one of the last strongholds of the so called, "Holy Inquisition." We were shown the plaza where occurred the last *auto da fe.* One side of the plaza was occupied by a building which had evidently been dismantled of all its distinguishing characters, except a lofty arched doorway of a very peculiar construction. Our guide could only tell us that a dreadful slaughter had taken place within its walls. It may have been one of the halls of the Inquisition; possibly where the Inquisitors sat to witness the procession of the condemned wearing the *san benito,* and subsequently the executions by fire.

"And at his word the choral hymns awake,
And many a hand the silver censer sways,
But with the incense-breath these censers raise,
Mix steams from corpses smouldering in the fire;
The groans of prison'd victims mar the lays,
And shrieks of agony confound the quire;
While 'mid the mingled sounds the darkened scenes expire."

*Walter Scott's "Vision of Don Roderick."*

We had no difficulty in obtaining admission within the building. It is now a warehouse, and was quite empty except that on the floor rested four or five large boxes without lids. They were full of something, and I had the curiosity to examine what it was. Each box contained a large quantity of loose printer's type of various founts. The coincidence was curious. The velvet robes, the jewelled mitres, the illuminated



HALL OF THE INQUISITION

CARTHAGENA

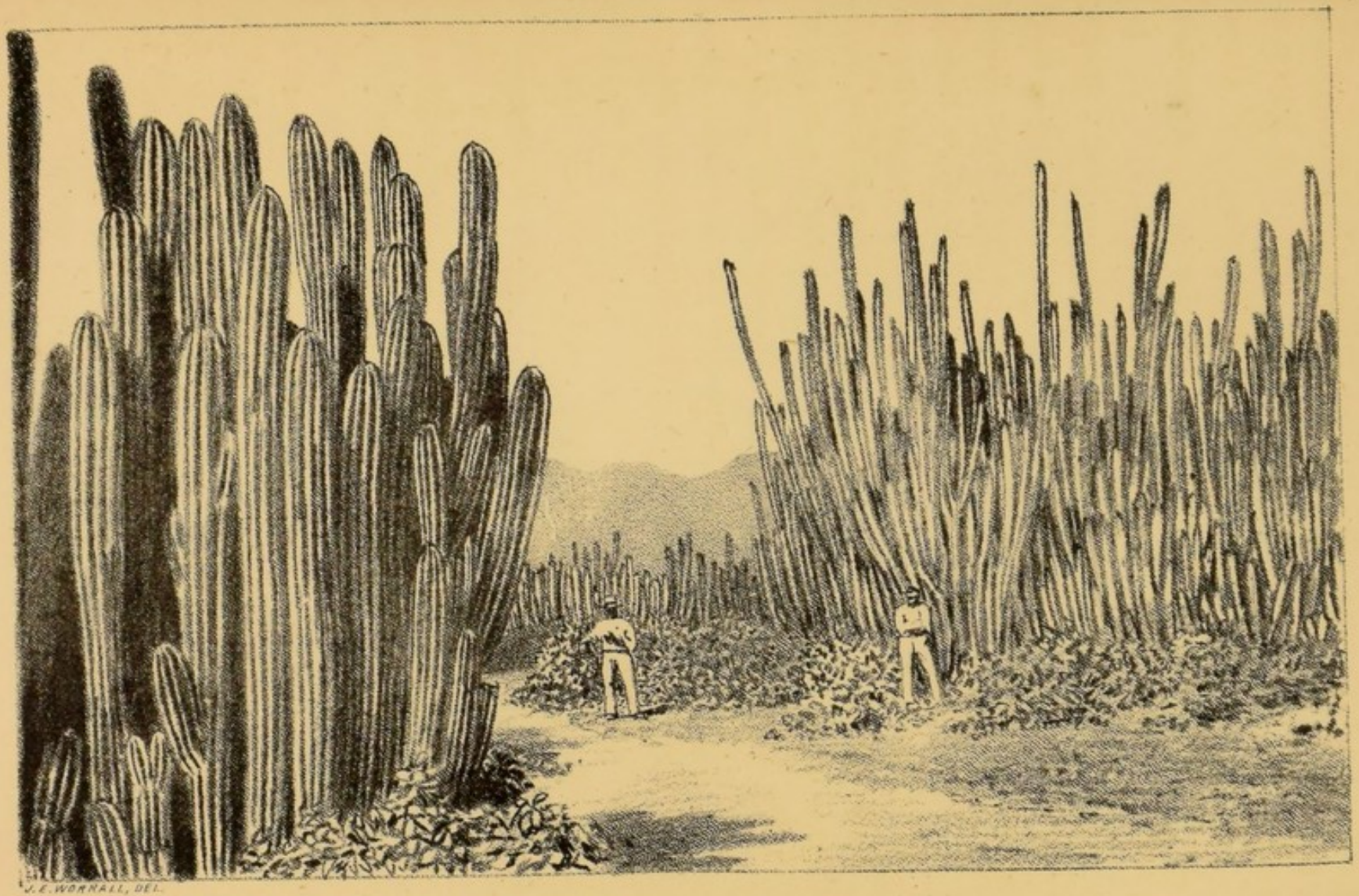
missals, and the croziers richly chased with gold and silver from tributary mines—all were gone; so were the wheel and the thumb-screw, and the rack and the chamber of torture; whilst on the floor of the detested Inquisition rested the little implements by which its destruction had been accomplished—the weapons by which Guttenberg and Fischer and Caxton and their followers wrought the overthrow of the bloody tribunal in Carthagena and through all the world.

At Carthagena we bade farewell to the mainland of South America and shaped our course for Jamaica, encountering on our way the worst sea of the whole voyage. The "Argo" had now a favourable opportunity for exhibiting her peculiar qualities, and rolled, or rather flung, herself from side to side with an *elan* that was irresistible. My scanty consolation under the pain of some severe bruises was the sight of a thoroughly seasoned "old salt" making his way on deck on his hands and knees. My berth was near the screw, and at night the noise of the racing was fearful, but not a stick nor a rivet parted, and we were soon through the worst of it, for the "Argo" was A.1. at her knots per hour, rough or smooth.

*April 3rd,* HARBOUR OF KINGSTON, JAMAICA. The morning was spent in receiving welcome letters from home, and in making arrangements by which Mr. C. and myself were to find accommodation for a few days in the interior of the island. His Excellency the Governor kindly undertook to send a special messenger

before us to ensure that pleasant quarters should be in readiness for us when we reached them. At 3.30 P.M. we started in a light carriage for a journey of about nine miles to the foot of the mountains on the other side of the torrid plain on which Kingston stands.

Travellers in Jamaica must not expect to find much that has not been frequently described, so I need only very briefly refer to a few first impressions. Three things struck me particularly as we crossed the level region. 1st—The flowers of the Aloe, *Agave Americana* 20-30 feet in height. Dried stems of last year's growth had been seen in most of the islands, but it was now the season of early spring, which means that the hot and dry season was over, and that showers might be expected. The flowers of the Aloe, when they are in perfection, present large masses of bloom coloured like the inside of a yellow crocus. A single plant on a hill side may be conspicuously seen at a distance of more than a mile. Scores of them were near the road, and on each of these we could see from one to half-a-dozen humming birds, their glossy plumage gleaming like *Labrador-felspar*, as they fed with avidity on the sweets afforded by the freshly opened blossoms. 2nd—Trees with showers of catkins, like those of the hazel or the alder. It aroused a peculiar sensation as if something must be wrong, to see these whilst one was being baked by the scorching beams of the sun. 3rd—The Cactus hedges; not of the broad-leaved prickly pear, but of the upright Cactus, *Opuntia*, in spiny many-angled columns from 6 to 20



J. E. WORNALL, DEL.

GIGANTIC CACTI,

JAMAICA.

feet in height. What would happen if one *had* to get through such a horrible stockade is a question too uncomfortable to be entertained.

Some slight delay occurred at the posting house where the carriage road ends, and travellers have to proceed on horseback or on foot. Our ride commenced about an hour before sun-set, and we had no idea how far we were going, but thought that we should find a reception in some cottage six or seven hundred feet above the plain with a nice view in front and the mountains towering behind. The event, as we shall see, did not correspond with our expectations.

A rather steep ascent began before we had ridden half a mile, and the scene was so lovely that we had no wish by quickening our pace to shorten our enjoyment of a road which, rugged as it was, at every few yards disclosed fresh beauties: now a glimpse of the rushing stream at the bottom of the valley; at the next turn a rock richly covered with trailing plants; or the dark shade of trees with branches intertwining far above our heads. At length the track became very narrow and very steep. We had for more than an hour ridden up and up, whilst as yet we saw no signs of a lodging. The Bananas and Mangoes had ceased, and the Club-mosses began to shew their graceful forms. The ferns too were different and more beautiful. One which I thought more graceful than any fern I had ever seen, and which I afterwards found in abundance, could be reached only by climbing a steep bank; I clutched the prize boldly and at the

moment thought I had been stung by insects, for the undersides of the fronds were as prickly as the stems of brambles, and my hand was bleeding from the thorns of a fern! *Odontosoria aculeata.* It was a botanical lesson, or rather a lesson on the want of botanical knowledge.

When were we to arrive at our destination? Still up and up we went till the clouds filled the ravines below us, and though the moon shone as only a tropical moon can shine, yet the path was not one to be selected for a night journey. We had two little negro lads with us for guides, and to these, not without some misgivings, I put the question, "Youngsters, is it far now?" "Yes Mas'r, much far!" I began a computation about the heights of mountains, but did not arrive at any very definite comfort. Out came the fire-flies; some of them like sparks from induction coils, but except in the deep shade they were rather disparaged by the moon.

At last a gate! A gate across the road, and in another half mile we were at the house. It seemed very silent and shut up; but with perseverance we found a negro woman with whom I had the following colloquy:—

"Is Mr.——at home?"

"No Sir."

"Is Mrs.——at home?"

"No Sir."

"Any of the family at home?"

"No Sir."

"Can you let us in?"

"No Sir."

"Can you give us anything to eat?"

"No Sir."

"Well, but we have come all the way from Kingston and have letters from the Governor. Surely you wouldn't send us back to night? We should break our necks to a certainty."

"Mas'r know best about that."

"Patience woman, down that road to night! Come, now, Mrs. Housekeeper, put us somewhere, give us shelter and a mouthful and a floor to sleep on."

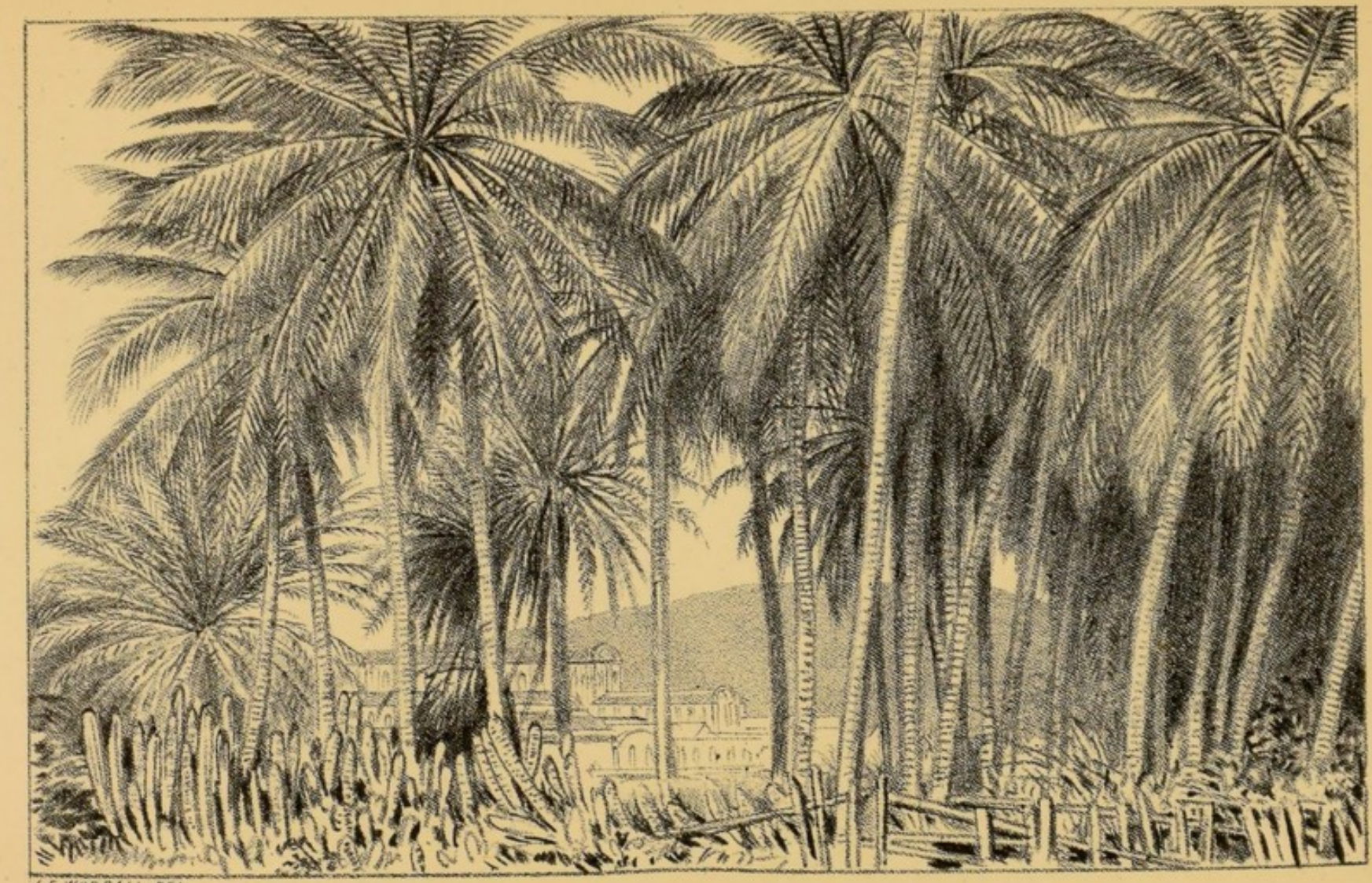
"I no open door. I can't open the door. You don't know at all—Mrs.—very top lady!"

This last blow fairly stunned us. What was to be done? Returning was out of the question. What would we not have given for a soft plank under a roof of any kind! Voices now were heard, and we were told of the house of a gentleman about half-a-mile off. Mr. C., who though happily convalescent was not strong, sat down in the porch whilst I proceeded to tell our tale of difficulty to Mr. and Mrs. S. "Oh!" said they, "don't feel in any trouble; come to us and we will make you as comfortable as we can." We went and found charming people, as kind as kindness itself—Mrs. S., a highly educated English lady, and Mr. S., rather an invalid, but courteous and companionable as a host could be. We enjoyed their hospitality for two nights and part of three days.

Sunrise found me on a knoll not far from the house, eager to survey the scene on which we had entered

during the absence of daylight, and under circumstances not altogether favourable to the appreciation of the picturesque. What a situation! We had reached the respectable height of 3700 feet, and were on the top of an outlying ridge with the Blue Mountains along side of and above us. After all we had seen during our voyage, the panorama struck both Mr C. and myself as very fine, *very grand indeed.* A piece of paper close crumpled in the hand and then partially spread out, was Sir Walter Raleigh's illustration designed to convey to Queen Elizabeth some idea of the configuration of the mountainous parts of Jamaica; a happy thought which might well have been suggested to the gallant voyager on the spot where I stood.

All the heights, except the very loftiest, were covered with forest growth, which on the steeper slopes seemed never to have been disturbed by cultivation. Lower down might be seen provision grounds and coffee plantations; but in every direction the eye rested chiefly on rocky bluffs and ridges clothed with luxuriant foliage. The deciduous trees were just expanding their tenderest leaves, for already the first few showers had fallen, and spring had set in. The temperature was simply delicious, and, as Mr. C. said, there was such a silkiness in the air that it was a treat to breathe. The effects were marvellously exhilarating. Fourteen hours' collecting on that day, with three very brief intervals, left me fully ready for a ten miles' walk before breakfast next morning. Perhaps, however, the interest and excite-



J. E. WORRALL, DEL.

PALM GROVE,

JAMAICA

ment of successful collecting had as much to do with this result as the *silkiness* of the atmosphere.

There are about 400 species of Ferns in Jamaica, whilst in this country we have less than 50. But a statement of this kind can afford no conception of the many exquisite forms which may be seen during a walk in the vicinity of the Blue Mountains. In the course of my first long walk, for the sake of comparison, I gathered a bundle of fern-fronds, all of one type. Having spread them out on a bank, I seated myself in front of them to admire them and to con the various details in which a single pattern had been modified into so many graceful shapes. The fronds reminded me of nothing else so much as of the treatment of a musical phrase by one of the grand old composers. The source of gratification may be regarded as the same in both cases—namely, the perception of a fundamental unity underlying diversity of feature.

The collection contained, as near as I could guess, 25 species; all closely allied to the subject of one of my rhyming botanical riddles proposed to the members of the L. N. F. C. at their excursions, and here repeated for the benefit of my younger readers:—

"Cresting the rocks by many a woodland way;
Green, when the hedge-row plants are sere and grey;
Perched on a tree, or clinging to a wall;
Amongst thy kindred commonest of all;
Still dear to me, for thou dost years renew
When first thy lifted fronds disclosed to view
Their veinlets delicate, profusely fraught
With coupled cluster-buds so fair, in golden spangles wrought."

Twenty-five species may not seem to be a large number; but why were there even so many? Why should there be found more than one species, and that the strongest? That graceful Fern has come to be what it is by victories over other Ferns most resembling itself. The slender rachis, the arched pinnule, the denser sori, and all its other peculiarities are arms of precision by which it has exterminated its next of kin. So it is affirmed according to the rigid theory of natural selection. But, How is it that in the battle in which each species has outlived its nearest relatives, each species has been powerless to reduce the number of weaker species less allied to itself? Whatever may be said in support of the fact that a plant may exhaust the resources of its locality in respect of its own species sooner than in respect of another species, still, if war to the knife be nature's sole, inexorable rule, I wonder much at the sodalities of many kinds of weak plants with many kinds of strong plants which may be seen growing within the compass of a few square yards. The theory of natural selection has been an important revelation; but nature has not yet told science all the truth.

My morning walk of four hours had a tendency to give an interest to other considerations besides those of botanical science; and although a distance of three miles rendered the breakfast bell inaudible, its warning sound was needless. A sharp walk home was necessary, and the way was all up hill. Indeed it mattered not

in what direction one's walk might lead, the return was sure to be a pretty stiff climb. On this occasion I must admit that a feeling of exhaustion under the scorching rays of the sun almost overcame me; and welcome indeed was the sight of Norah's blue frock at the garden gate, and the sound of Mr. C.'s cheery voice, and the shade, and the cool refreshing draught in the verandah, brought me by a pair of small hands, belonging to the aforesaid Norah S., a dear little mountain maid not yet in her teens, howbeit deftly skilful in many consolatory arrangements pertaining to the household.

A fresh start was soon achieved. The fern-fronds had been reluctantly left behind, for I was not collecting flowering plants or Ferns, but only Mosses, Scale-worts, Lichens, and Fungi. My plan, at the commencement of each walk, was to find an eminence commanding a section of the panorama, and having taken the bearings of a likely nook, generally some shady gorge or water-course, to plunge down the woody steep and try to reach the spot as best I might. Sometimes the desired place turned out to be too dry; sometimes it refused to be found, or proved to be altogether unlike what it appeared to be at a distance. Still the ramble was all in the day's work, and was sure to be productive of gratification in one way or another.

Insects of all kinds were very scarce; indeed I saw hardly a butterfly in the island, and could not but envy the good fortune of my friend, P. H. Gosse, F.R.S.,

who had collected a great number of beautiful species. Then the well-known and exquisite land-shells of Jamaica, where were they? I turned up stones in the water-courses; scrutinised the under sides of fallen trunks and branches; lighted up dark crannies in rocks with lucifer matches; dug at the roots of trees, and performed many other such like operations, with scanty success, for the dry season was only just over, and animal life had not yet had time to re-assert itself in any abundance.

Happily for me Lichens and Mosses were to be found, if not in abundance, yet in sufficient numbers to afford the amount of employment requisite for the complete appreciation of beautiful scenery. If you want fully to enjoy the rivers, woods, mountains, lakes, and other picturesque attractions of a country, you must geologize, or sketch, or botanise, or shoot, or fish, or at any rate have some object to detain you in the midst of them. Nature is coy to mere sight seers, and cannot brook being looked at in a patronising kind of way.

Of Lichens, in Jamaica, I found 32 species, including four varieties of the Bearded Lichen, *Usnea barbata.* Amongst them was the beautiful and rather uncommon form, which has been called *Usnea rubiginea*, from its assuming the colour of cinnabar, or more nearly that of red hæmatite. The redness seems to be merely a condition of more than one form, and only very slightly tinges the spore-bearing shields, *Apothecia.* The red

specimens grew amongst others and were, if at all different, rather finer and stronger than their neighbours, which shewed no tendency to redness. Neither did the bark or wood, at the exact spot where the red frond grew, exhibit anything peculiar. I have no explanation to offer. The phenomena of colour are, I think, destined to fill an important place in the biology of the future.

It was a pleasant surprise to meet with a Lichen I had often vainly sought for at home, *Physcia Leucomela*, resembling a loosely-fibred sponge, charred quite black, but bearing lavender-coloured shields, fringed with white leaflets. It was growing loosely on a way-side stone amongst grass, and looked so washed-out that it had nearly been passed by. My list of Lichens may seem a small one, but it represents the work of little more than a single day; and I did not attempt to collect amongst the swarms of tiny *Lecanora* and *Lecidea*, which indeed I have given up since the publication of "Lichen Flora."

Mosses and *Hepaticae* were even less numerous; but amongst the former was one glorious plant peculiar, I believe, to Jamaica, and named by Swartz *Phyllogonium fulgens*. It was growing on a rocky ledge and had the appearance of a number of long tassels of narrow silk ribbons of a golden green hue. Barring the green tint, the fronds resembled golden chains of the curb pattern, such as used to be worn as watch-guards. It has not lost its beauty or its brightness yet.

On the next morning *April 5th*, I was under engagement to appear by six A.M. two miles away at the residence of Dr. S. who would kindly be my guide for a walk of three miles to a rocky height which, he thought, afforded one of the finest views in Jamaica. Rocky peaks are rare in the island—all the prominences being more or less rounded; but this was a real projecting point, covered with brush wood and climbers to the very apex. On the right and left were two immense mountain *cums*, themselves divided and subdivided by the sharp ridges of several chains of elevation, and leading to savannas bounded by the sea. The foreground was so luxuriantly green that the dryness of the distant plains had no effect injurious to the landscape, but rather supplied a dreamy indistinctness, where the far-off waters met the shore; permitting fancy to transform sugar mills, fishing boats and fields of Guinea-grass into objects more rich and rare. Since crossing the desert of Arabia I had not seen a prospect conveying more vividly the impression not of a mere landscape but of a portion of the world's surface.

The road which led to the pass was simply a narrow terrace cut round the sloping shoulder of a mountain, with no protection on the downward side, which was just about as steep as it could possibly be to admit of trees growing on it. Dr. S. pointed out to me the spot where, on one intensely dark night, a carriage containing several ladies and gentlemen with their driver and his

horse, went clean over the side and were only stopped in their fall by the trunks of trees at a considerable distance below the road. No very serious damage was done except to the carriage; but the situation must have been a perplexing one. The horse could not be got up again, and had to finish its course to the bottom of the valley, trees being cut down to admit of its descent.

Many of our garden flowers are common weeds in Jamaica, particularly the dwarf Fuschia with slender orange flowers tipped with chocolate; the Purple Mimulus; the White Everlasting, and the Leonurus. The flower which pleased me most was a wild Hedge-Rose very much like our Dog-Rose, with pure white blossoms three inches across, and with glossy leaves as thick as those of a laurel; the hips were elegantly shaped, and covered with long prickles. The residence of Dr. S. was in a wilder and finer locality even than that of our host; but it was very solitary. It spoke well for the security of life and property in the island to find in such spots all the elegances of English drawing rooms and lawns, not even omitting the brightest, best, and most cheering of all adornments. I returned to breakfast at 10.30, and soon after, with great reluctance, we quitted our most kind and hospitable entertainers, and their charming home, for the burning dusty plains surrounding Kingston.

About two miles from the landing-place, close to the shore of a lovely bay and shaded by a fine grove of

Cocoa-nut Palms, stands a spacious building, which is the Lunatic Asylum of Jamaica. I had previously known something of Dr. Allen, the medical superintendent, and went under his guidance over the institution. In some respects the observed regulations were unlike those of the Asylums I had known in England. The attendants and nurses are on duty only for the day, returning to their homes at night. Great stress is laid on a system of military exercises designed to develop habits of order and self-control by prompt obedience to the word of command. The results, so far as I could judge, were very satisfactory. The patients seemed to be wide awake and cheerful, and there was amongst them a remarkable freedom from the cowed, dejected look which is frequently a distressing feature in assemblages of the insane. The industrial occupations of the patients are various, the principal work of the convalescents being that of fishing in the beautiful bay which almost washes the base of the Asylum walls. Fish of many kinds form a principal part of the ordinary diet. Cleanliness is scrupulously required, and even in the sheds where fish was being prepared for the dinner of 300 patients I did not detect the least bad smell. The whole charge for each patient amounts to one shilling per day.

But it was as a working Naturalist and Microscopist that Dr. Allen had become known to me; and in his private study were abundant proofs of his scientific diligence. Not, however, in the form of collections; for

the Doctor has a way of bestowing on his naturalist visitors whatever amongst his treasures they may wish to possess in furtherance of science—a peculiarity of which I availed myself, I hope in a modest measure, thus obtaining some materials for microscopic work, soundings, &c., together with a few beautiful Lepidoptera and an Annelide, with its tube formed in a coral rock. The mouth of the tube is furnished with a curved horn. This Annelide was obtained during operations on the wreck of the Vanguard at St. Paul's Rocks.

Blue Peter flying on the "Argo" recalled me on board; but there was still time before starting to get a few hauls of the dredge; and as I had engaged my boat and men for the day, we put off and went to work. We were near the spot where poor young Barratt lost his valuable life a few years ago. He had adopted a diving dress of a peculiar construction, in which he hoped to be able to explore the bottom of the sea in moderately deep water; and was engaged in carrying out his intentions in the neighbourhood of Port Royal when he met with his deeply-deplored end. Dr. Allen's account of the circumstances of his death was mournful in the extreme. He had only coloured assistants with him in his boat, and they seem to have utterly lost their senses when he disappeared under the water. He was a young enthusiast in natural science, and had given high promise of distinction in his profession.

Our next destination had been fixed for Mexico;

but British commercial relations with the Mexicans had been interrupted, and it was therefore thought desirable to see the Mexican Consul at Havana before proceeding to Vera Cruz.

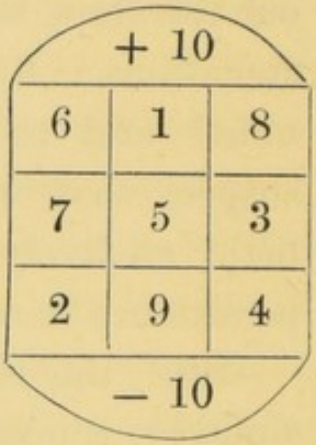
Our passage from Jamaica to Havana, which occupied from the evening of April the 6th to the evening of April the 10th, was over seas disturbed only by the gentlest of ripples, and so intensely blue that it seemed as if a bucketful must needs appear blue, though, of course, in so small a quantity the tinge was imperceptible. The blue of the sky is said to be due to the reflection of sun-light from innumerable minute particles (of water?) suspended in the atmosphere. The blue of the sea, though never seen to perfection on a cloudy day, is not, I think, fully accounted for by assigning it to the reflection of the sky. Under certain circumstances, as on the sandy shores of the Gulf of Akaba, I have seen very shallow water appear intensely azure; and this would seem to favour the hypothesis that the blue of the sea is entirely dependent on that of the sky. Yet we in the "Argo" had often noticed both sky and sea as clear as in this part of our voyage, but had never before seen the water so like molten lapis-lazuli.

For a while Jamaica lay to windward of us, and when at length we had passed the most western point of the island, its place was taken by the coast of Cuba—long, low, arid, and stretching, as it seems to do, almost interminably towards the setting sun. So smooth was the ocean that the light shimmered on its surface as

on a lake. Stately as a swan the "Argo" breasted her way uniformly all the day; and when night brought out the stars, her vane wandered not amongst the constellations. Most imposing it was to behold how dignified and reassuring was her deportment; but I suspect that with some of us all this went for very little, so lively was the recollection of her frequent persistence in a very different mood.

Still the repose was most enjoyable, and I may suitably commemorate the occasion by describing a few of the characteristics of tranquil life on board the "Argo." My first associations with the return of day bring before me the spectacle of a procession of lightly-clad Argonauts wending their way from the cabin to the waist of the ship, there to luxuriate in the delights of the douche. This was administered in the form of a torrent propelled by the ship's engines through a three-inch pipe. I was unable to summon sufficient courage to participate in this mode of ablution which all who tried it declared to be unparalleled. To myself the behaviour of the water seemed to be obstreperous, and liable to the charge of ruthless indiscrimination. Chest, arms, legs, eyes, ears, and mouth were all assailed with the same impetuosity; and I felt certain that if the stream were left too long playing on the same spot the result would be no other than a hole. Mr. C. kindly granted me a dispensation, and I contented myself each morning with the gentler solace of an ordinary cold and shower bath.

Our circumstances were now peculiarly favourable for the appetising recreation of deck quoits. The quoits, seven inches in diameter, are rings of rope distinguished by tassels of worsted. A diagram, three feet square, with segmental spaces fore and aft, is drawn with chalk at each end of the quoiting ground, and resembles the accompanying figure. For scoring any number the quoit must be delivered so as to lie wholly within the square for which it claims to count. All quoits cutting the lines go for nothing. Knocking out is allowed, as at bowls. Game 100 up. For quiet exercise on a wet day, where a barn floor is accessible, the game might be found serviceable on land.




As might well be the case, a great source of interest and amusement was found amongst our furred and feathered passengers, of whom we had not far short of two hundred now on board, including eight very lively examples of the Quadrumana. Certainly there are monkeys and monkeys. As a rule I dislike them; but there was one little fellow, (a Capucin monkey closely allied to *Cebus barbatus*, Geoff., figured in the Edinburgh Journal of Natural History, PL. IV. D. fig. 5.,) obtained from the United States of Columbia, whose presence and ways were more than endurable. Joco was the least selfish of his tribe; his tricks were the funniest imaginable, and of their variety there was no end. In fact he seemed to invent out of his own

head fresh pranks every day for the gratification of his patrons.

But it was in his more sedate moods that I liked to stand near him as he sat upon the bulwarks, and to watch his little wrinkled countenance and occasionally tearful eyes; and then he would compose himself, putting out his paw gently like a dog and looking me full in the face with the expression, Well, now, don't you pity me for being a monkey? Certainly not, Joco, for being a monkey: better to be a monkey than a mole. As for having been caught, and tied up, and that sort of thing, why it is another matter. Though I cannot but think that your capacities for enjoyment have been greatly increased by coming into contact with your betters. Look at Fan, the Colonel's dog, Joco,—why Fan, when she is not indisposed by the rolling of the "Argo," gets continually pleased in many ways. If Fan had been a Pariah dog, wild and free, would liberty have bestowed on her an equivalent for the pleasure she gives, and receives from, her master every day? Pooh-pooh! Joco, don't cry and look so miserable. But Joco is off, and evidently does not like being sermonised. Perhaps in this Joco is not singular.

One of our notables, a present to Mr. C. from General Vollmer in Venezuela, was a Three-toed Sloth, *Bradypus tridactylus*. Of this animal Mr. Waterton writes:—"The Sloth spends its whole life in the trees, and never leaves them but through force or accident; and, what is more extraordinary, not upon the

branches, like the squirrel and monkey, but under them. He moves suspended from the branch, and he sleeps suspended from the branch." Perhaps this may be a little overdrawn. Its grip is so perfect that it seems to rest equally well, and without sliding down, on a vertical branch, or even on an upright bar of iron. Indeed, I think it seemed to prefer a support more or less upright. Its tardy motion is not in consequence of any defect. Being a vegetable feeder, and living in the midst of an abundance of food, it has no need of moving with celerity; though on windy days, which the animal prefers for travelling, it is said to move from tree to tree at a "good round pace."

At the foot of the mast lived a young Ocelot or Tiger-cat, *Felis pardalis*, about half grown, from Santa Marta. This animal has a claim to be regarded as the most beautiful of all the cat tribe, and when at play on deck, after the manner of a kitten with a ball and string, its motions were exquisitely graceful.

Besides Parrots, too numerous to mention, there were at this time on board about 19 Macaws of various kinds: the Green Macaw, *Psittacus militaris;* the Red and blue Macaw, *Macrocercus Aracanga;* the Blue and yellow Macaw, *Macrocercus Ararauna*, and others. The tamest of these were left at liberty to go where they pleased, and a row of four or five grand Red Macaws perched on the top of the bird-house afforded a rare relief in colour to the miscellaneous

assemblage of contrivances for making all kinds of living things comfortable, under the spacious awning which shaded our whole deck.

The Red Macaws were very sociable, and, if addressed properly, would generally come on one's finger with a friendly air of condescension. "Give me your claw, Polly," would be answered only by a stare of surprise at your ignorance of the customs of good society; but "*Dona la patte*" was recognised as the correct mode of address in accordance with Macaw etiquette.

It was, however, irresistibly ludicrous to see these proud birds attempt to walk on deck, crossing their legs in front, like a bad skater, turning in their toes extravagantly, and waddling in the most absurd manner. It may be unreasonable, but I think I could never really like a bird that walked in such a preposterous fashion. It so happened that we had on board several specimens of the Thick-knee Plover, *Œdicnemus bistriatus*, a gentle, plain-looking bird, but a most graceful walker. It was a treat to see these birds stepping so neatly and unaffectedly from end to end of the deck. After all, there is nothing like pretty walking; no, not the most sylph-like dance-step ever seen on the boards of Her Majesty's theatre. Alas, that it should be so rare to see pretty walking in England! unless indeed here and there, when one meets a bare-footed child.

*April 9th.*—A beautiful and rare green Macaw

fled overboard. We all saw it, but so long a time elapsed before the vessel could be stopped and a boat got into the water, that it was considered useless to go in search for it. This was the first time a bird had gone overboard. Strange to say, before the boat was hoisted up, a fine Curassow went over the bulwarks. We saw him floating a good way astern; but this time more prompt measures were taken, and the bird was recovered. The loss of the Macaw suggested other possible misadventures, and their probable consequences.

*April 10th.*—The appearance of Cuba, as we turned the western point and steamed to the eastward, continued to be altogether low and uninteresting. Nothing broke the monotony of the coast, till, as the evening came on, a fire of great extent was seen burning up the dry brushwood about two miles to the west of us. The weather was perfectly calm and bright, and we little expected the mishap which befel us as we were passing through the narrow entrance leading to the harbour of Havana. On one side are fine bold rocks, crowned by a fort and a lighthouse. On the other, a shelving point occupied by warehouses projects so far as to cause the channel to form an angle. On this point the "Argo" went aground. She struck twice; the first time seemed to be under the saloon, the second about midship. The shocks were by no means heavy, for the vessel was moving slowly; but the bottom was hard, and there was an ugly grating noise as if the keel was on the bottom

for a considerable length. The engines were immediately reversed and set at full speed, but without effect. A kedge was sent out astern, and all hands called to warp the vessel back; but she did not move. The bilge water was pumped out and a quantity of coal shifted, but the "Argo" remained fast through one of the most uncomfortable nights I ever spent on board ship. Bumpings, not severe, but sufficient to be very distressing, occurred at intervals all night, till in the morning a steam-tug came to our relief, and pulled us off astern with very little difficulty. For this service I heard that no less a sum than £600 was *asked*.

As far as I remember, the "Argo" struck at about 7-15 P.M. It was not dark, but there was, for a few minutes only, a slight mist on the surface of the water. Soon after eight it was almost as bright as day, the sky being clear and the moon two days past the full. We were told afterwards in Havana that many vessels had been aground where we struck, and that very few of them had been got off without serious damage.

Havana is by far the busiest and most populous sea-port town we have visited. It has about 200,000 inhabitants, chiefly of Spanish extraction. Negroes are comparatively scarce; and the people generally are of the fairest West Indian shade. The harbour has only one narrow entrance, but is very spacious, its area being, I should think, considerably over a square mile. Ships of all nations, chiefly however Spanish and

American, lie stationed in every direction. The line of quays on the town side alone extends for a mile or more, and is occupied by ships so closely packed that their sides touch, while the stem of each projects over the quay. Notwithstanding the flatness of the shores, the harbour is a most lively and beautiful sight, being on all sides surrounded by houses, forts, warehouses, and railway stations, whilst the splendid sheet of water is continually being crossed by ferry-steamers and scores of small sailing boats. A fine fresh breeze prevails during the day, and the management of these small boats, dashing with their gunwales awash right up to the very bows of some leviathan steamer, and then away like swallows, is a delight and a marvel to behold.

Each boat has a tilted awning behind which, and almost on the stern-post, sits the solitary boatman steering and managing the broad white sail, while from time to time he throws the sail-rope from one side to the other over the awning, as the boat rushes on the opposite tack. All this the boatman does without interfering with the comfort of his passengers, except that they will find it expedient to shift sides as expeditiously as possible when the boat luffs or jibes as it does with scarcely any notice. Except through their own awkwardness, passengers are almost always kept perfectly dry, though the boat seems to behave more like a darting fish than a thing of wood and canvass.

Right in the middle of the harbour is a small shoal patch with less than two feet of water on it at low tide, and not very much more when the tide is high. I was much amused with watching from the "Argo" the proceedings of a family, English or American I think, apparently a father with two boys and two girls, walking about on this shoal, evidently collecting specimens of marine productions, shells, zoophytes, or such like. The water was about knee-deep, and in order to secure a prize they had to rake at the bottom with a kind of landing net, or plunge their arms in up to the shoulders. The children were well and rather prettily dressed with straw hats and washable suits. They seemed to enjoy the fun immensely, for when a treasure was found by one all the rest eagerly splashed up to examine it. With a good binocular I could see their looks of delight, and must own that I longed to join them. But it is strange that a place like Havana should leave an obstruction of this kind in the very middle of its magnificent and crowded harbour; to say nothing of tolerating the ugly spit of rock at its entrance on which we had nearly come to grief.

The public buildings in Havana are numerous and of the best class of Spanish edifices in the West. Several good squares give the traveller breathing space as he emerges from the narrow streets, perplexed with his attempts to meet, on a pavement sixteen inches wide, his fellow-pedestrians without guttering or being

guttered. One square will, when completed, merit the character of magnificent. In it is situated the Hotel de Ingleterra—an establishment in which there may probably be some one who can speak or understand English, since on the hotel card appears as a second title "England Hotel."

The shops are more specialized, and are not so much stores *de omnibus rebus et quibusdam aliis.* A gentleman who had been a resident for many years remarked to me that Havana was an excellent training school for economy. If, said he, a man can live moderately within his income here, he may be satisfied that he can live like a prince anywhere else; for dollars are reckoned here much as shillings are in England.

It would almost seem to be characteristic of many churches in the West Indies that not even the slightest attempt is made to render the exterior of the building even respectable in appearance except at the end where the principal entrance is situated. Here may often be found a façade of imposing dimensions which is after all a mere screen behind which is a comparatively small and mean building. The Cathedral of Havana is built of rough coral limestone, the colours of which, varying from a dark rich ochre to a pale grey, impart an extremely interesting and venerable appearance to the elaborate architecture, quaint and almost unique, but by no means inelegant, of the western end. In the chancel under a monu-

ment, large but executed in very questionable taste, lie the remains of Columbus. He was buried in his own country, and was subsequently removed to St. Domingo. Finally he was conveyed to Cuba and interred with much ceremony in the Cathedral of Havana. Near his monument is a bust of which many engravings are extant.

Falling in with a company of soldiers marching in the outskirts of the town, I followed them for about a mile, when they halted and were joined by an equipage resembling a triumphal car, or, in plain truth, more like a Lord Mayor's state coach, but the black and white plumes on the heads of the horses left no doubt that it was a hearse. A procession was formed consisting of about forty carriages including those of the Governor of Cuba and his chief officials. It was the funeral of a most highly respected member of the Governor's staff.

All the mourners in the carriages were gravely smoking cigars, nor was there the least indication of any consciousness that the observance of the national custom tended to detract from the solemnity of the occasion. The funeral car was followed by a band of about forty instrumentalists who played slowly and very efficiently an air from *Il Trovatore* adapted as a funeral march. On arriving at an open spot near the cemetery the soldiers fell into line, fired a volley and retired, together with most of the carriages. The body was taken into the mortuary chapel of the cemetery

where a priest, in a tone far too prominently lugubrious recited a short service and incensed the coffin. The last note of his "amen" was prolonged, without any intermission, into a harsh and most uncanonical scolding addressed to the bearers for some irregularity which I had not perceived.

The cemetery of Havana may appropriately be called a necropolis, for most of the interments take place above ground. A space more than a quarter of a mile square in extent is laid out on the model of the palace of the Escurial; the bars of the gridiron being lines or long blocks of masonry fourteen feet in height and the same in breadth. On each side of these are rows of recesses resembling pigeon-holes in four tiers. About one third of these seem to be occupied. In these the end of the recess is walled up and a tablet is affixed to the masonry. Many resting places were marked by a simple wreath of flowers, or of *immortelles*, and these were pretty enough; but few of the tablets were in good taste. The intervals between the blocks of masonry were left open for vaults and monuments. I saw one that was very pleasing; a marble pedestal, and statue of a boy, easy, and with a sweet expression in the countenance. Below was the inscription, "*A nuestro querido hijo, Tom.*"

The Prado.—At half-past five in the evening in Havana a stranger has no difficulty in finding his way to the Prado, the Rotten Row of the city which claims to be the metropolis of the West Indies. Carriages and

hired vehicles of all kinds converge thither from squares, terraces, and streets, eagerly driven to take their places in the throng which every evening distinguishes the favoured place of resort. The attraction certainly cannot be due to the place itself, for it is simply a straight road, rough and uneven, and bordered only by rows of small trees, on the outside of which are spacious waste places much resembling used up brick-fields. I did not go to the further extremity but only to the spot where the road became much narrower and where many of the carriages turned round ; so that, apparently, the custom was to drive backwards and forwards along a piece of straight road about a mile in length. This was the Prado. Some of the private carriages were built in the most recent style and were worthy of a better arena ; but the greater part of the conveyances were hired cars hooded and open before and behind, or vehicles built on the same model. I saw only one *volanté*, the real old Cuban car with two wheels drawn by a horse richly caparisoned and ridden by a postilion to match. This splendid turn-out was most expensively and beautifully got up, and was obviously much admired. As to the company, I may preface what I have to say by mentioning that, as it was Holy Week, more than an average of the best families may have been absent ; but the Prado was crowded from end to end ; in fact I was astonished at the number of the carriages. The equestrians and pedestrians were a mere handful.

I went to the Prado, anxious to be pleased and enlivened after my sombre ramble in the morning; but it must be admitted that some of the Cuban peculiarities were there exhibited in strong and most unprepossessing relief. I walked by the road-side for more than an hour, watching the throng, and saw not more than a very few instances in which both sexes were in the same carriage. Two ladies, commonest of all, three ladies, four ladies together; and similar parties of gentlemen. The ladies, often all quite young, wore fans, but usually no head-dress except the hair. The gentlemen were not respectably attired for appearance in public. I thought there was an affectation of carelessness in their dress; and I fear it must be admitted that there was something worse than carelessness in their manners. I noticed several in good private carriages lolling and smoking, with their heads low down and their heels on the back of the driver's box. It is said that the ladies of Havana paint and enamel themselves extravagantly. I do not wonder at this, if their admirers are like the men I saw in the carriages on the Prado. Scarcely ever are ladies seen enjoying the breeze on the matchless harbour or in the public walks of Havana. In all out-of-door occupations there seems to be a most artificial and complete separation of the sexes, operating, no doubt, to the great disadvantage and disparagement of both. Can this be the Havana extolled as the tropical Paradise of the West? It is not fit, I think, to be

compared with the equally Spanish city of Caracas, or with the really charming little French town of St. Pierre in Martinique.

Not without persevering enquiries, and in the end chiefly through the good offices of A. Wade, I heard of a natural history collection in Hayana. The British Consul, it was thought, could give me further information. To him I went, but he knew nothing of it. He believed there was a kind of scientific institution, and he thought it might contain some specimens of natural history objects. Our party were all together when this intelligence was brought, and the morning's programme was a visit to some principal cigar manufactory. Of course I had no hesitation in giving up the cigar-making for the possible sight of a museum. Mr. C. also warmly concurred in this; so we two set off in a car to find the museum, whilst the rest went to the factory.

This may account for my silence on the subject of cigars, whilst on a visit to the metropolis of smokedom. I saw and tried some cigars from the extensive acquisitions of our party. They were, of course, very good, but had the fatal fault of drawing hard, and I did not consider them cheap. In the shops a good cigar was as dear as it is in Paris; but bought to the best advantage at a factory, and through the benefit of an introduction, cigars would cost, when the duty was paid, about two-thirds of their price in England. So I contented myself with the small stock I had purchased

in Jamaica at 12s. per hundred. They were not large, but excellent, and drew with perfect ease. It is amusing to see, nowhere more frequently than in Havana, a smoker fancying he is enjoying a grand cigar, when he has to tug at its well-chewed end with a dogged energy which is the very antithesis to the *aura* of benignant repose induced by a really perfect weed.

To return to our visit. A gentleman from the consul's office was with us in the car, and by his direction the driver stopped at a house scarcely to be distinguished from other houses in the street. Our conductor addressed a few words to an official who came to the door, and we were invited to enter and proceed up stairs. At first we thought that some mistake had occurred, so little had the place the character of a public institution in a large town. Soon, however, a second official came to us, a young gentleman who had a slight knowledge of English, and from him I gathered rather indistinctly that the institution was a college of medical science having its *locus operandi* in a building which had been a conventual establishment. The authorities of the college gave lectures and held classes, but I could not learn that they conferred degrees.

The natural history collections were included in a room about forty feet in length, in which all the available space had been made use of cleverly and without crowding or confusion. Six table cases occupied the

centre of the room; the upper parts were of glass containing stuffed birds; the lower portions up to the height of five feet were neatly fitted up with drawers. *Every specimen in the room had been collected in Cuba.* A few of the birds were not well stuffed, but most of them were good, and some, Mr. C. said, were rare and fine. The most important collection was that of the Mollusca. The land shells of Cuba were grandly represented, and it was soon obvious that a loving hand, skilful and liberal of work, had been employed in forming and arranging the series.

No less than six drawers were filled with specimens of the Painted Helix, *Helix picta*, a shell about the size of that of our common garden snail, and celebrated, perhaps more than any other species known to collectors, for the marvellous diversity of vivid colouring exhibited in the numerous varieties of the shell. To each variety was affixed a label recording the particular locality in the island, the date of capture, and the name of the collector. The shells of this most lovely species were of themselves a sight to see; but my admiration of the care bestowed on the labelling was so warmly expressed that it drew the attention of the members of the committee, who were holding a meeting in the room. They left the table and came round me, whilst with irrepressible exclamations of surprise and pleasure I was looking over the collection. That which struck me most was the almost fastidious care bestowed on the arrangement of the specimens,

for in many little points more had been done than was absolutely needed. Clearly there had been no grudging of time and no deficiency of taste. The work could only have been done by one who loved to do it.

It was a considerable time before I found out that amongst the group standing round, much amused with my admiration, was the Curator himself, the arranger and the chief collector of the specimens—a mild-looking, pale, venerable man, who, when he was pointed out to me and I took his hand longing to be able to express my gratification to him, seemed almost to shrink from being noticed. His eyes were on his treasures, and his thoughts too, and not on himself. Through his assistant, I requested him to give me his card. Subsequently I found he had given me the names of the President and Secretary of the Institution, but not his own name, Felipe Poey, which I should immediately have recognised as that of a fellow worker with some of the great naturalists, D'Orbigny and others, who took a part in the magnificent work on the Political and Natural History of the Island of Cuba, edited by Ramon de la Sagra. For natural science long ago flourished in Cuba, and there have been geologists and botanists and many great men, besides Humboldt, who have written on its physical features and productions. The eastern or mountainous part, which is the only really fine portion of Cuba, has of late years been unsafe to visit, being in a chronic condition of insurrection. It was amongst the high-

lands of Cuba that Felipe Poey spent his earlier days—a thorough out-of-door naturalist like Thomas Edward, but with a far more glorious collecting ground.

On leaving the Museum, I enquired whether the directors would exchange specimens with the Liverpool Museum, and found them willing to do their utmost in exchange for works on natural history. The collection being purely a local one, they did not so much care to have exotic specimens. This museum interested me very much indeed, not only by its contents, but also by its singularly retired position. Who were these handful of men representing medical science, and, judging by the absence of public institutions, all other scientific intelligence in a population of 200,000? Above the museum was a room of equal size, where the meetings of the Institution were held. On the walls were some good portraits of former Presidents and distinguished members. At the back was a quadrangle with galleries, in which I saw two or three aged men in academical attire. The assistant told me that they were accustomed to have poor people to say prayers there, and that they instructed them in natural history. In all the replies of my young conductor to questions relating to the Institution, there seemed to be a subdued tone, and a reserve not wholly due to his want of familiarity with the English language. Why this obscurity and half secrecy, in a place devoted to medical and other science, should be found expedient, they who know more than

I do of the consequences of the still unbroken connexion between Cuba and the mother country perhaps could tell, if they would.

Leaving the museum I went into one of the largest churches in Havana where the service of the *tenebrae* was going on. The church was completely darkened as to light from without, and when we arrived many of the candles had already been extinguished. A solitary taper rendered the darkness of the spacious chancel all the more impressive, and whilst the voices of unseen choristers were chanting the appointed psalms, at the close of each psalm a stoled figure came out of the darkness and put out a light in the body of the church. At the last I could only just discern the kneeling figures of the women, but I felt no inclination to remain till the final close. The thing designed to be commemorated was over true to be associated with sore feelings. Sorrows had befallen Him Who came to be the light of the world; but a right appreciation of His sufferings and of the cause of them was not, I think, to be attained by keeping the people in darkness.

Wherever my little book may be read, there may be some who will condemn my estimate of Havana. Now, I have no belief in innate badness; and I do not suppose that people there are worse than they are elsewhere. But I have a firm belief in the bad consequences of public mistakes, and the attempt, to reconcile a kind of half-Turkish treatment of

women with Christian civilization, is a mistake. I believe the men in Havana to be hospitable and liberal to visitors; but even if I understood their language I should not care to partake of their hospitality. No amount of dining-room or drawing-room politeness to women would reconcile me to the relations between the sexes which prevail in Havana; in which place I assert without hesitation that women are neither regarded nor treated as they are in England, America and France; the result being what I have stated.

*April 15th*, Saturday before Easter.—"Argo" on the way to Vera Cruz. About 2 A.M. the breeze strengthened, and when morning broke it became evident that we were in for what in these parts is called a "Norther." It was a moderate one only, but sufficient to raise such a tossing sea, that it was almost impossible to do anything more than hold on tight to a chair or stool lashed to some fixture on deck. I had gloomy forebodings for the morrow, and feared the great disappointment of a comfortless and wearisome Sunday. No one on board thought it possible for us to have a quiet sea so soon; but our fears proved to be needless, and a lovely morning with a bright sky and a sea smiling with the blandest of ripples, ushered in our Easter Day. Divine Service with Holy Communion at 10-30. If Divine Service at sea had no other value, yet it would be most refreshing as the best of all possible occasions for remembering, and being thankful for, dear friends at home.

*April 17th.*—Weather as propitious as we could wish favoured our entrance into the harbour of Vera Cruz about noon. Nor was this an unimportant advantage; for coral reefs, extending from the shores on both sides, almost cross each other, rendering the navigation difficult and dangerous when the sea is high. About half a mile from the town, and immediately in front of it, an island of coral rock is occupied by a large fort and a lighthouse. Under the shelter of the fort the yacht was made secure with every possible precaution, in case of the visit of a "Norther," which occasionally half drowns the city, and wrecks the vessels in the port, or compels them to put out to sea with short warning and much risk.

The appearance of the city from the harbour is very peculiar. Not a villa, nor a garden, nor even a tree, softens the hard outline beyond the town and on either side of it. A frontage of a long line of large white buildings is on the beach, and the natural elevations in the neighbourhood are scarcely more than sandy dunes. But it is when the eye is raised above the frontage line that the distinctive character of Vera Cruz is recognised in the towers of the numerous churches, but especially in the large domes. Six or seven of these are of sufficient size to seem almost crowded in a city so limited in its size. One of them, the dome of the cathedral, glistens in the sun, being covered with enamelled tiles disposed in arabesque

patterns, somewhat resembling those of the Mosque of Omar in Jerusalem.

Early in the afternoon we went on shore, and found the streets generally wide and clean, with a stream of water running down the middle. The town is never wholly free from the much dreaded yellow fever; but we had arrived in the healthiest season of the year, and might remain for a while without apprehension. The shops appeared to be good and substantial; and the few natives of the better class that we met were of a clear pale olive complexion, with very black eyes.

We had intended to proceed direct from Jamaica to Vera Cruz; but, for reasons already stated, it was deemed expedient to obtain for our passports the *visé* of the Mexican consul at Havana. The British consul at Havana assured us that it was useless to carry passports at all; and the Mexican consul in signing them suggested no difficulties as likely to arise; a portion of the line of rail had, he said, been taken up, but it was replaced and the traffic had become regular. On our arrival at Vera Cruz we found it very much otherwise. There had been fighting on the line, and bridges had been broken down. Whilst we were at the railway station the train from Mexico came in; but it had been five days on the road, instead of seventeen hours as in ordinary times. The passengers had depended for food on supplies of cakes and fruit casually provided by the villagers on the line, and

an official message had been brought from Mexico requesting that no train might leave Vera Cruz till further notice. Besides all this, a train which had been despatched from Vera Cruz that morning had been stopped, after proceeding about 20 miles, and sent back by the insurgents. Greatly disappointed, yet still not without some hope of being able to accomplish a visit to the far-famed city of the West, our party, as the evening drew on, returned to our quarters on board the "Argo."

That evening was more than ordinarily serene and beautiful. Venus sank below the horizon undimmed; the two large stars in the constellation Centaur, pointing to the Southern Cross, were not obscured by the usual haze prevailing in the S.E.; the "Argo" was motionless, and the fort hard by displayed the outlines of its ramparts sharply defined against the sky, or vanished altogether as the glare of its revolving light struck the eye of the beholder. A flotilla of boats and lighters moored between us and the castle seemed to be entirely deserted, and stillness prevailed on sea and shore. Little did I imagine, as I left the deck about 11 o'clock, what a tragedy was being prepared within the walls of that quiet-looking fortress almost within a stone throw of the yacht. Nor did I suspect any mischief even when awakened during the night by the roar of a heavy gun from the fort. The story came to our ears only piece-meal and by slow degrees: and if I briefly anticipate a few particulars

which we subsequently learned, it may render the circumstances I have to record more easy of apprehension.

The President of the United States of Mexico was at that time Senor Lerdo de Tejada; the leader of the malcontents was General Porfirio Diaz. I shall not attempt anything so hopeless as an elucidation of Mexican politics, but may mention that General Diaz adopted the more liberal programme, whilst both he and the President were alike anti-ecclesiastical. There was a large majority in favour of Diaz in the state of Vera Cruz; and one prevalent cry amongst his friends was "Diaz and the abolition of conscription." With or without sufficient reason, the people thought that if Diaz was in power no man would be compelled to serve as a soldier against his will. On this ground a large amount of excited feeling existed amongst all classes, and the most natural thing for a Mexican to do when he is politically excited is to take up arms and fight.

The fort at Vera Cruz included barracks for the garrison and a spacious prison for offenders. I fear it is but too likely that many of the prisoners had been incarcerated on political grounds. We were assured by Senor ———, a banker in Vera Cruz, that more than a thousand revolutionists were under arms within two miles of the city. "They will be here," he said, "by and by. When a man's business is interrupted, or he is tired of a quiet life, what is there

for him to do but to shoulder his rifle and fight?" It is marvellous how very coolly hostilities come to be regarded by people who are used to them. Preparations for a *movement* had, no doubt, been going on for some time, but the crisis seemed to have been reached on the very night of our arrival. The action commenced at midnight in the fort. Some of the soldiers mutinied and attempted to set the prisoners free; and in this they succeeded; but the bugler of the garrison, attacking the commandant in his house, was shot by his intended victim, who not only managed to defend himself, but also to fire a cannon as a signal to the troops on shore. This was the gun I heard in the night. Sixty of the garrison remained true to the officers, three of whom were killed, and several soldiers.

The rising was so far successful that about two hundred soldiers and prisoners got on board a large lighter which was lying moored near the fort. Their progress from the fort to the shore was necessarily very slow, and they had scarcely commenced moving off when a fusilade was opened on them from the ramparts, killing and wounding many of them in the boat. This, however, was only a beginning of their disasters. The signal gun had been heard and understood, and as the lighter neared the shore a company of soldiers on the beach opened on them a most destructive fire. Many of them threw themselves into the water, and were shot before they could land; others landed, and were made prisoners; and a good

many, it was said, escaped, being favoured by the darkness. About 90 bodies were counted, and it was known that several were drowned and not reckoned amongst the slain. I saw the lighter afterwards: parts of it were riddled almost into match-wood by the bullets, and the wonder was how any in the boat could have escaped.

Amongst the dead were several women. On the following day my two assistants were collecting shells on the shore, when they came upon the body of a well-dressed Indian woman. She was lying on the shore just as she had been cast up by the sea, and her long black hair was streaming on the sand for several feet behind her head. The fearful slaughter I have mentioned was going on within about a quarter of a mile of us, whilst we were quite unconscious of anything unusual. Mr. C. was the only member of our party who heard musket shots.

The next morning some of our party went on shore about six o'clock. Under an archway near the quay we passed a batch of about twenty prisoners standing heavily manacled, and surrounded by a line of soldiers. They exhibited no distress nor even concern at their unhappy fate, and one of them was smoking a cigar. Close by them were piled, with horrible significance, stretchers made of canvas on long and light frames with handles for two bearers. Poor fellows! when we returned to breakfast on board, they were no longer prisoners. They had been shot just outside the city,

and buried in the sand. Many more were shot in the afternoon, and twenty on the next morning.

I offer no reflections on the subject, because it is impossible for a stranger to form an opinion worth recording. Nevertheless, sympathy will not and cannot always wait for the decision of a judgment matured in the light of full information. If Diaz and his followers are fighting to shield their homes from conscription, such as a conscription in Mexico is likely to be, I honour the memory of their dead, and wish the insurgents success in the struggle that is before them.

The above account is copied from my notes written at the time. Subsequently I learnt that the severe measures taken with the insurgents did not quell the insurrection, but that in consequence of a battle fought in the following November Don Carlos José M. *Iglesias* was elected Provisional President of the Mexican Republic.

Disappointed of our visit to Mexico, and finding our chance of procuring characteristic *souvenirs* of the country limited to what might be accomplished during two days in Vera Cruz alone, our foraging parties were more than ordinarily on the alert. Foremost in our quest were, of course, specimens of living animals and birds, for which we went to the market held in piazzas surrounding a moderately spacious quadrangle near the landing place. Here we found dealers for the most part seated on the ground surrounded by their

goods, or on stools by the side of little tables spread with trinkets and smallwares, almost all of them of French manufacture. The fruits were very fine, pine-apples, melons, bananas, sapodilla, star-apples, sour-sops, small apricots, and various productions unknown to me, the most plentiful being a pretty drupe resembling a ripe greengage, but of a most peculiar flavour, only to be tolerated, I think, after a persevering course of efforts originally made under the pressure of extreme hunger. A magnificent pine-apple could be purchased for six-pence, and an equally fine melon at from sixpence to a shilling. Tropical fruits are valued by travellers more because of their abundance and suitability to the necessities of the climate than because of their superior excellence. With the exception of oranges, I have tasted all the ordinary kinds of fruit in greater perfection in England than in the East or the West. But it was something to have pine-apples on the table three times in the day with the thermometer at 80° in the shade.

Market people are alike, and put on the same expression of countenance before their customers, all over the world; and perhaps the remark may be extended to the purchasers also, for "it is naught, it is naught, saith the buyer; but when he goeth away then he boasteth." The principal bird-seller seemed to be one of the chief men in the market. He was a short, stout man, evidently with Indian blood in his veins, wearing a shepherd's plaid folded round his

neck and shoulders, though the thermometer must have stood at above 80°. A pair of keen eyes looked out from under his Spanish hat and bushy eye-brows; and to see him on a low box eating his savoury looking breakfast, the point of his knife serving him for a fork, and giving orders the while to his satellites, was to feel sure that he was an oracle in the market, and not likely to make worse bargains than his neighbours. Yet he had good birds, and knew his own mind as to how much he would take for them; so that he was not bad to deal with.

Most of the birds offered for sale were in excellent condition, and were kept scrupulously clean. Three or four green parrots with yellow heads and red elbows would certainly have taken a prize at a show of fat birds. Not a feather or even a fibre was out of place in their whole plumage; in fact they were perfect models of sleekness. For these birds, noted for their clever loquacity, prices were asked varying from twenty to forty dollars, £4 to £8 each. But of similar parrots we had already a sufficient number on board. Other birds of gay plumage were the Grosbeak Cardinals, splendid birds with scarlet bodies and crests; an exquisite little finch, scarlet, blue and yellow, called the *Nonpareil;* a fine crested woodpecker, *Carpentario;* a very small yellow-breasted finch, and one or two kinds of troupials. Of these gaily coloured birds altogether twenty-three specimens were purchased. Less gay in colour, though some of them more grace-

ful in form, were the birds of song. Of these were brought on board from the market seven clarines, one red nightingale, seven Mexican mocking-birds, and three thrushes. Each songster was priced according to his individual accomplishments, and the pains bestowed on his training. These, together with a leash of a charming little animal, the Dorsal Squirrel, formed a total of fifty-one specimens added to Mr. C.'s collection at Vera Cruz.

There is a popular impression that in hot climates the voices of birds are either harsh and screaming or loudly sonorous, as that of the bell-bird. But this is not quite the case, although the real songsters are nowhere plentiful; and being generally plainly coloured, and as cage birds commanding a high price in their own country, they are very rarely brought to England. So far as I have heard, whether in the woods or in confinement, the song of tropical birds bears no comparison with the music of our nightingales or even of our blackbirds and thrushes. The great charm in the voice of a tropical song-bird is the exquisite quality of its two or three simple notes. In this accomplishment the clarine is supposed to excel all other singers; yet its notes are very limited, and they are the notes of a very sweet and perfect instrument rather than expressions of a happy bird life.

The prolonged twilight of morning and evening affords to such of our birds as are inclined to sing, a fine opportunity for a leisurely practice of all their

vocal powers; but a thrush in low latitudes beginning its song at sunset would be benighted before it had exhausted half its melodies. Perhaps this may be one reason why in the tropics there is nothing approaching that wonderful sequence of varied musical phrases which may be heard from any one of half-a-dozen of our British warblers, nightingale, garden-warbler, blackbird, black-cap, or thrush; still less are the tropical song birds lavish of their song as the lark. Each country has its own kind of mocking-bird, and some of them utter sounds which might be supposed quite to exceed the power of a small bird. The best example of this, heard by myself, was in a thick wood in Venezuela where, by a bird about the size of a starling, the caw of a rook as it sits by its nest in spring was so exactly produced, it could not have been imitated, that I could have fancied myself listening to the old familiar sound.

It has been questioned whether the notes of any animal or bird are in strict accordance with the intervals of the musical scale. The notes of the cuckoo, notwithstanding they are quoted by Beethoven in his Pastoral Symphony, are not, I think, distinguished by the interval of either a major or a minor third. A troupial which used often to favour me with a recital in the morning before I left my berth, approached very closely, in its song of three notes, to the constituent notes of the second inversion of a common chord; first G, then the E above, returning to the tonic C. I

thought the pretty bird, one of the greatest pets on board, sang as if it felt the tonic close. Last time I saw him was on the breakfast table at Condover, not long ago. He had presumed, on being so great a favourite, to eat something unwholesome for him; and was consigned for a few moments, by way of punishment, to the interior of the toast-rack. His look of penitence, with just a sly glance to see if his contrition was noticed, was irresistible, and he was soon set at liberty.

Ladies of England, who live at home at ease, are inclined to suppose that in the towns of far off lands nothing can be easier than to pick up in every street, if not in every shop, trifles peculiar to the country and suitable for charming presents on the traveller's return. I once thought so myself, but on this point I am better informed now. Hot and dusty, you explore *tienda* after *tienda*, up one street and down another with about as much success as if you were looking for sweet violets in the Sahara. At length your hopes are raised. Ah! here is something, this must be native work, old, no doubt, probably before the Spanish conquest. You enter and make signs to have the treasure brought; but the smiling proprietor produces an exact counterpart not yet detached from its card, and on that card you read, "Third Prize, Grand International Exhibition. Paris, 1867." The truth is that really characteristic "trifles" are exceedingly scarce, and can only be obtained after a persevering search.

I do not speak only of towns visited by all West Indian voyagers, such as Port of Spain, Kingston, and Havana, but of places less frequently explored by bric-a-brac hunters, such as Caracas, Carthagena, and Vera Cruz. At the first two of these scarcely anything was to be found. The last afforded a richer harvest, and may stand first in this respect of all the places we visited. Amongst the objects of interest collected was a gold chain seventy-eight inches in length, the metal being of rare quality and colour, and every link a specimen of fine workmanship. Being engaged in explorations of another kind, I seldom met with anything worth buying except articles of recent manufacture. At Vera Cruz I purchased a Campeachy hammock of very large size, made of the Maguey or Aloe fibre, worked in a diaper pattern very elaborate and fine in texture. Hammocks of this kind are rarely met with, and are said to be manufactured only by the Indians. The time necessary for the production of such a work without machinery renders this probable. Like an elaborately carved New Zealand paddle, it may have been the work of years.

One of my most cherished day-dreams in the prospect of a voyage to the West Indies filled my imagination with the delight of floating gently over submarine gardens of living zoophytes; in the place of palms and ferns, flexible corals waving their graceful plumes; shrubberies of delicately branched

madrepores; beds of variegated star-corals; quaint undergrowths of tubular and palmate sponges; above all, the counterparts of lichens and mosses seen in rich tufts of plumulariae, sertulariae, and bryozoa. Already I felt a pride in abstaining from wilful spoliation of the homes of so much loveliness; just the specimens that were needed and no more should be collected; anything that was new, or interesting, or particularly fine, should be gathered in sufficient abundance, but without the wanton destruction of a living thing. And then the return of the boat to the "Argo" with its full load of treasures; the spreading of them on the deck, after the fashion of the fish and game in Landseer's picture of Bolton Abbey in the olden time; the circle of admirers; the closer inspection; the finding here a shell and there a twining brittle-star; and lastly the directions for putting every thing safely by; all this yielded intense gratification—in anticipation.

It is not safe to generalise from a limited acquaintance with facts, otherwise, at this stage of my voyage, I might have been inclined to say that it always blows fresh where coral grows: that in every coral bed, where the water is shallow, occur tall forms of madrepora palmata, sharp-edged, and strong as iron, going at a single bump through a boat's side as if the planks were made of pie-crust: above all, that a black diver, except by chance, never brings up what you want from the bottom, even though you may have seen it there, and pointed it out to him ever so distinctly.

Now the truth may probably lie somewhere between such a statement, and the day-dream. Nearer, I think, to the latter, for I did get some very brief glimpses of sub-marine productions, and the boats *were* not, but only would have been stove in if they had not been got off the coral ground very expeditiously. In the matter of the wind I have nothing to retract, having never been so fortunate as to find a calm surface where corals could be well seen. Near shore we had always a fine breeze, except in the harbour of Port of Spain, or where the bottom was muddy.

*April 18th.*—Seen from a distance the long white lines of foam bordering the reefs, on one of which the fort of San Juan de Ulloa at Vera Cruz is built, seem to stretch away for miles into the open sea. Within the lines of surf the water is shallow and free from rollers dangerous to boats. To visit these shallows it was necessary to obtain a boat from the town; and a strongly built craft with a crew of three boatmen was procured. Having fully explained our wishes to the crew, and made an agreement that they should take us on the shallows, a small party of us, including Mr. C. and myself, left the "Argo" at 3 P.M. with great expectations, in which, however, we were destined to be disappointed. We soon found that the men were taking us along in the deep water outside of the reef; and although the curling crests of the waves close at hand were very beautiful, we were not simply in search of the picturesque, and reminded our men that

we wished to go inside to get corals. "Si, Si, Si," they exclaimed; "just a little further on we will go in." This was continued till we were more than two miles away, and we found that, notwithstanding they had been expressly engaged to go on the reef, nothing would induce them to make even the attempt. When expostulated with, they said they would go on the reef nearer the fort; so we returned, and I pointed out to them an opening where the water was fully deep enough for the boat, whilst on the reef itself was only the merest ripple. "No, we could not go there," they said, "without an order from the fort." It was plain that, whatever might be their excuse at the moment, they did not intend to take us where we wanted to be; so the main object of our excursion had to be relinquished.

To make the best of our disappointment, we then determined to take the boat along the base of the castle walls, and, if practicable, to visit the interior. The fort is entirely built with coral limestone, the species being identical, I believe, with corals now abounding in the neighbourhood. About twelve feet above the level of the sea, and extending for a considerable distance round the outermost walls, were windows about sixteen inches in height by eight inches in breadth. Even this scanty aperture was divided longitudinally by a massive iron bar, indicating too plainly the nature of the apartment within. Generation after generation had passed away since

first the sad eyes of prisoners, wasted with vainly longing looks, had gazed from these hopeless cells on the glorious sunshine, and the rippled sea and the snowy crests of the breakers. Even now some victims of despair might be listening to the unwonted sound of oars and voices so near their prison walls, and for a moment might wonder if help was coming from without.

Quite close to the fort the water was several fathoms in depth, and in bygone days, when Vera Cruz was one of the chief cities on the Mexican Gulf, many a proud galleon of Spain had been moored under the shelter of the fort. Massive rings of copper with ponderous bolts and staples of the same metal still remain as relics of a greatness which had borne only the sad fruit of tyranny and insecurity. The rings are not now in use.

A considerable number of prettily marked crabs, species of *Grapsus* and *Sesarma*, were climbing on the walls many feet above high-water mark. Aided by the natural inequalities and asperities of the coral limestone they were much too nimble to be caught by the hand; but by placing a skimming net below them, and chasing them with the end of the boat-hook, some of them were excited to rush about madly till they fell into the net; and in this way we secured a good many specimens. Littoral shells of several kinds and a few sea-urchins, together with the crabs and some small sponges, saved us the mortification of a fruitless afternoon's collecting.

A low shelving quay on the western side of the fort afforded us a convenient landing place, and the officer on guard, in the most polite manner, directed a soldier to show us over the place. The interior seemed to me to be occupied by a complicated system of inner defences and outer defences, the military merits of which I am quite incompetent to discuss. They included a narrow dock, deep and spacious, for the reception and protection of the boats belonging to the fort. The whole was kept as scrupulously clean and orderly as the deck of a vessel of war. On the eastern side were the officers' quarters and the house of the Commandant. These, as a matter of course, we did not expect to approach; but our conductor was anxious to execute his commission thoroughly, so we had to wait whilst he went forward for further instructions.

The Commandant was not within, but his lady, learning that we were from England, gave orders that we were to be shewn everything that could interest us. After what had just happened, the house of the Commandant had a mournful interest as we passed it in going to the southern ramparts. At the open door sat the lady with her children, occupied with her needle-work; her room was tastefully arranged; vases of flowers were on the tables; small flower beds adorned even the area close by the grim "gun" which had recently spoken with such deadly effect. The perfect quietude was almost painful. Could this be the place where only a few hours previously a fearful tragedy

had been enacted; murder attempted, and avoided only by the death of the assailant; hundreds of prisoners wild with the excitement of escaping; companies of mutineers aiding them; the faithful sixty defending themselves and their officers, and firing on the retreating boats? Sentries were now pacing leisurely in the sun; knots of soldiers were chatting quietly as they lay on the ground in the shade. Truly, to a civilian, this kind of discipline is a rare and wonderful thing.

We were taken to inspect the machinery of the revolving light. All the apparatus belonging to it was of recent construction and was kept in efficient order.

From the western ramparts we looked over a vast plain spreading in the direction of the city we so much wished to visit. The sun had just gone down and the atmosphere was in the condition most favourable for a distant view. Where were the mountains between us and Mexico? A pocket compass and a map gave us the exact bearing of the chief peak; but we all looked for it for some minutes in vain. Sen. Padron was the first to discern it, and by degrees we all recognised it. There indeed was *Orizaba,* the "Mountain of the Star," more than a hundred miles from us. Through a binocular the snows on its conical head were seen distinctly.

A very sensitive disposition is scarcely requisite for the consciousness of a peculiar charm in a distant object seen in the west at the close of the day.

Whether it be a solitary bird flying, or a spire in sharp relief against the rufous sky, a floating cloud, a clump of trees in the horizon, a mountain, or the sails of a ship, it becomes transformed and beatified as if belonging to a purer and a brighter region. Such a feeling is embodied in the legend of the Hesperides, and is not even peculiar to cultivated races. The happy hunting grounds of the Indians are always in the far west. Orizaba seemed to belong to a region of perfect tranquillity where the traveller might find uninterrupted repose after his wanderings. I fear that on a nearer intimacy the spell might have been roughly broken.

Our visit to the fort was concluded by an inspection of a quantity of shells and corals collected and offered for sale by the soldiers of the garrison, who were occasionally permitted to go with boats on the shallows which we had unsuccessfully attempted to explore. Perhaps this might in part account for the unwillingness of our boatmen to comply with our directions; for the soldiers might have regarded our proceedings as a kind of poaching. At all events, we had now an opportunity of seeing the more common and conspicuous shells and corals of the locality. Mr. C., who had only recently commenced collecting shells, obtained some very fair specimens at reasonable prices. My own acquisitions were few in number and small in size. A list of the names of all the species observed may be found in Report No. 1 of the Free Public Museum, Liverpool.

*April 19th.*—On shore early in the morning. More sad accounts. We left the harbour about mid-day with a fine steady breeze. It was a great relief to get away from a place where the chief news in the morning related to the number of bodies cast on the shore during the night, and the number of insurgents shot at day-break. Who is to blame for all this miserable waste of life? Waste indeed, for the victims were not foreign conspirators but fellow citizens. It was said that the wounded amongst the prisoners were compelled to be the executioners and to fire upon their comrades. For such enormities the way had been prepared by the perversion of a system originally owing its strength to the good that was in it. The revolution at Vera Cruz was a bursting of bonds which had been rendered unendurable. In a city the very name of which identifies it with a foreign power that brooks absolutely no control, a city crowded with ecclesiastical buildings, all the churches had been closed but one, the Cathedral, and from the Cathedral the Bishop had been first suspended then expelled. Yet some are looking wistfully to a future in which this country shall assume the cast off yoke of the ancient cities of the West.

*April 24th.*—"Argo" on the way to Nassau, Bahama Islands.

We have had splendid weather for passing the Florida Keys. These are long lines of coral reefs stretching out irregularly for more than two hundred miles

from Cape Sable, the extreme southern point of the mainland. Some of them form small islands; others show themselves just above water as rows of coral blocks, whilst for areas of many miles in extent the water is scarcely deep enough to float a ship's launch. In dark or windy weather the navigation is dangerous, and it is prudent to give the Keys a wide berth. But we had a cloudless sky with hardly a breath of wind, and were thus made spectators of a phenomenon which I do not recollect to have seen before—a mirage at sea.

The features of a mirage in the desert have frequently been described. I have myself observed them on many occasions. The traveller crossing a plain of burning sand sees before him apparently a lake with trees and shrubs growing on its borders. As he advances the waters seem to recede; but the trees and shrubs, What becomes of them? He does not recognise them though they are all around him. That stunted bush of white broom, from which his camel crops a sprig as he passes it, is the object which half a mile or so back, he had taken for a tall tree; that tussock of wiry grass has seemed to him a flourishing shrub; the illusion having been the result of reflection. The layer of atmosphere in contact with the sand becomes so much rarified by the heat as to present a surface capable of reflecting light, just as light is reflected by the surface of water, and as the sand is not perfectly even, the reflected tuft of grass

appears to be greatly enlarged so that it may easily be mistaken for a shrub.

A mirage on the sea is produced precisely in the same manner; but it can only occur where there is a considerable area of extremely shallow water; the reflection being probably in part from the water and in part from the heated air in contact with the water. All our party were confident that we were looking at clumps of mangroves intermixed with taller trees a mile or more from us on the broken line of reef. I can bear witness to the completeness of the illusion and was myself thoroughly deceived. Yet the mangroves and the trees were simply lumps and blocks of coral limestone of no great size. When once the mistake was made clear any one accustomed to the desert might easily recognise the very peculiar *mirage* effect, which was not dispelled even by the use of a powerful binocular.

Flying-fish have been previously noticed. Here they were more numerous, of a smaller kind, rose nearer to the ship, often in bevies of six or eight, skimming the water like flocks of small birds, and keeping their relative positions in the bevy when turning to the right or the left. Watching them with a binocular, whilst the surface of the sea was of an oily smoothness, it was easy to observe a continuous track left behind it by a fish flying low, and that a fizz was made by the water when a flying-fish dropped in, plainly proving that the pectoral fins must have been in rapid vibration in the air.

More than a hundred miles from habitable land, in the midst of shoals and reefs innumerable, we were hailed from a little open boat managed by a crew of four men. They had turtle and some small shells for sale, and begged a supply of water, which was given them. Our skipper evidently eyed them with suspicion and dislike, and as our engines were started he turned from looking over the side with the remark, "Those fellows, I take it, don't earn their living by selling shells." Possibly not; possibly when they met a vessel they might be ready to help others or themselves as circumstances might dictate; but what a strange habit of life! As we left them and saw their boat a mere speck on the wide ocean, I could not but feel a desire to know their story; for it seemed unlikely that such wandering Arabs of the deep could be, like the knife-grinder, with none to tell.

*April 25th.*—Arrived about mid-day at the pretty little seaport town of Nassau, in New Providence Island, Bahamas. As in other coral islands, the shores are low and level, and the interior is neither intersected by rivers nor elevated into hills; but the streets and buildings of the town are delightfully *posed* on a gentle slope, and large gardens with fine trees everywhere relieve the glare of the white walls. We had evidently reached a place where people might think it worth while to live; and might live very happily. The "Argo" was anchored, to the lively satisfaction of our party, well within a quarter of a mile of the landing

place; and in little more than an hour we were all on shore with something of the feelings infused into schoolboys by the sound of the twelve o'clock bell. Much must, no doubt, be allowed for the predispositions engendered by our late experiences; but we *did* enjoy Nassau. Even the Colonel was, I think, shaken in his preference for St. Kitts; and certain it is that we left Nassau unanimous in regarding the four days spent there as the most thoroughly cheerful part of our journey.

As for myself, it was a relief greater than I can express to have emerged from the sphere of Spanish manners and the Spanish language. I mean nothing offensive. My ignorance of the beautiful Spanish language is my misfortune. From the time we landed at La Guayra to the time of our leaving Vera Cruz, with one short interval at Jamaica, on shore nothing but Spanish was spoken. Everyone agrees that the language is as easy to learn as it is elegant in its diction. It is the true courtly language. But it is not therefore the less tedious to one who is so unfortunate as not to understand it. Therefore, let all who mean to travel in the Western tropics learn Spanish. As to Spanish manners, to an Englishman they are difficult of assimilation. The people to whom you are introduced are actively kind, most kind; but their kindness is flavoured with condescension. The people of Nassau too were most kind, and their kindness was flavoured with friendliness. They made us thoroughly happy without imposing a sense of obligation.

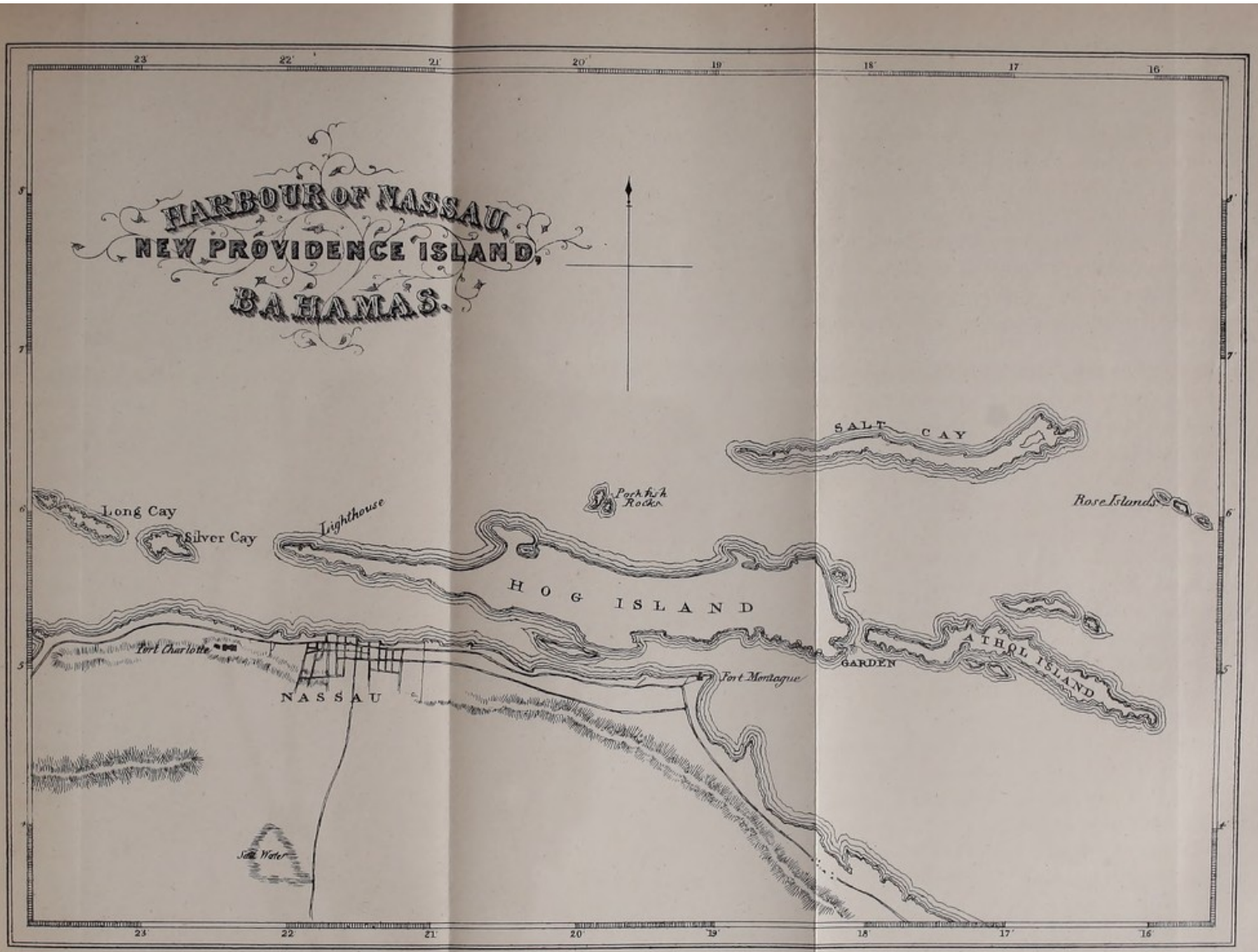
Now, as a time of peace and prosperity is less favourable to the historian than an age of reverses, so our pleasant days at Nassau, where we were all as busy as bees from morning till night, appear in my notes as marked only by a succession of details which, I fear, will prove entertaining only to those who are possessed largely of the field naturalist spirit.

A great connoisseur in wine once requested a friend who was a botanist to procure for him a monograph of all the known species of oaks, with as full an account as possible of the habits and life history of each species. The botanist complied; but, knowing that his friend cared very little for science, his curiosity was roused, and he enquired for the reason of so extensive an order. "O," said the connoisseur, "everything about oak trees interests me very much, because one kind of oak produces *corks!*" It may, I trust, be needless to suggest the application of this anecdote to such of my notes as may have a remote connexion only with natural history.

It had become quite evident that for a day's work in collecting, men and boats could not be spared from the "Argo." At Nassau, however, there was no difficulty in making the necessary arrangements. Any number of men and boats were waiting near the quay to be engaged; and good fortune threw in my way a young master boatman named Albert, quite black, but very intelligent and good looking, well acquainted with the coast, the owner of several boats, accustomed

to the kind of thing required, and ready to enter into the spirit of it. A trial trip of exploration was to be made that afternoon, and all things got in readiness for a grand effort on the morrow.

The preliminary trip was eventually extended into a moderately hard afternoon's work; but the wind was fresh from the N.E., and the harbour being exposed in that direction, dredging was difficult, and a sight of the bottom not to be obtained. What was to be done on the next day if the wind continued? Albert was fully equal to the occasion. He said that if the master did not mind the distance, there was an island about six miles away called Long Key Island. On the lee side of this island the water would be sheltered, and some good work might be done. "All right, Albert; but how about getting there? Should the boat capsize we shall all feed the sharks." "Master need not say one word. What become of my family if I go to feed the sharks?" This was quite sufficient; he looked as if he might be trusted, and both he and his boat had behaved admirably during the trial trip. We had not been very successful, but under more favourable circumstances the locality promised excellent collecting, sufficient to make up for former disappointments. Albert and his men were dismissed with strict injunctions to be alongside by ten the next morning; and that night reminded me of the eve of a first of September in the good old days of well-trained pointers and high stubbles, when bird shooting was real sport.


HARBOUR OF NASSAU,
NEW PROVIDENCE ISLAND,
BAHAMAS.
SALT CAY
Long Cay
Silver Cay
Lighthouse
Porkfish Rocks
Rose Islands
HOG ISLAND
Fort Charlotte
NASSAU
Fort Montague
GARDEN
ATHOL ISLAND
Salt Water
23
22
21
20
19
18
17
16

*April 26th.*—At breakfast time the deck of the "Argo" was an animated scene. A whole flotilla of of boats tailed off from below the gangway, each waiting in turn to exhibit a load of miscellaneous treasures—fishes, birds, fruits, seeds, corals, shells, crabs, beads, trinkets, and knicknacks of all kinds. Most of the vendors went away rejoicing, especially, I should think, the sponge merchants. Nassau seems to be the principal locality for West India sponges. The first comers got the best prices. My first purchase was one for two shillings, then two or three at a shilling each; my last bargain just before leaving the island was a pretty lot of sixteen, about the size of cauliflowers, all for one shilling. The rage for buying sponges became general: officers, engineers, crew, and cooks, all bought sponges. In some cases it was sincerely to be hoped that they used them; but many of them bought enough for themselves, their relations, their sweethearts, and all belonging to them: in fact, one or two of them, I thought, had an eye to doing a bit of business in the sponge line.

The negociations on deck were always vastly amusing; and this morning they might have detained us longer, but already two detachments of our party were off. Mr. C. was not going on shore till the afternoon, and Albert was alongside with his trim boat and his crew consisting of a pair of swarthy divers, bound to use the oars in case of need.

Then came the outfit of collecting apparatus. What

a putting of things into the boat! Dredges, ropes and spare ropes, grapnel, crow-bar, skimming-nets, bag-nets, sieve, trough for large animals, cans, large and small glass jars, bottles, phials, tubes and boxes too various to particularize, lastly a basket of provisions, for we were to be away a whole day. More than one return was made to the deck for things forgotten, and, after all, a hammer and cold chisel were omitted, much to our subsequent regret. Whilst J. C. was gone for the indispensable water-glass, it struck me that some ingenious versifier might do good service by putting all the implements required for marine collecting into a stanza answering the purpose of the line

"Powder, shot, gun, waddings, caps and case"

which has often been of use to the shooterman in ante-breach-loading days. At length Albert's voice was heard singing out cheerily, "All right *now?*" "Aye, aye, sir." "Shove off!" and away sprang our little craft; J. C., myself, and the boatmen forming her crew of five all told.

The breeze had *not* abated, but its strength was so steady and the sky so bright that Albert thought the sail might be used quite safely, so we literally bounded along over those glorious waters. I have often thought that to tread the deck of a ship, is not to feel the life of the sea as it may be felt in a small boat under sail. Talk of a vessel "walking the waters like a thing of life," the vessel is a thing of iron and brass, and wood and hemp, the life is in the ever-changing water, source

of all beauty, as the old myth teaches, and teaches truly.

It was easy to make a cast with the dredge, but the getting it into the boat again without upsetting everything, *that* was the difficulty. There were however some small patches of rock above water on our way, and, being very impatient, we made the best use we could of the poor shelter they afforded. Down went the dredge, and the divers, more than once, but the water was too shallow for the dredge; and the divers plunged without directions, for we could not even use the water-glass. Still the proceeds were good and encouraging under the circumstances.

"Make all trim, Albert, and steer away for Long Key, four miles off, it is only wasting time here."

Whilst we are on our way I may describe one or two things that, notwithstanding difficulties, we managed to get; and first some pretty little flexible corals called Sea-fans. These are amongst the objects most commonly brought home from tropical seas; but the species so called are very imperfectly defined. A Sea-fan is something like the catgut part of a lawn-tennis racket, only the meshes are very much smaller. If it be a compound animal, it is often impossible to determine the limits of an individual in a bed of Sea-fans; if it be a colony, it has a life which is shared by many individuals. As the coral expands, the little constituents, the polypes, increase in number, secreting both the horny stem and the soft bark, which differ as much as the tip

of the finger differs from the nail which protects it. We found two varieties of the Sea-fan growing in the same locality, one purplish lilac, the other sulphur coloured. Feeding on the polypes of these Sea-fans were many specimens of a small mollusc, *Volva subrostrata*. Not the animals only, but the shells too were always of the same colour with the coral; on the lilac variety they were lilac, on the yellow they were yellow. Have we here a fact of protective imitation, or a result of a peculiarity in the food? If the reply be that the case is an example of both, then a special property of the coral protects its natural enemy, which is not very consistent with the utilitarian view. It may, however, hereafter be found that the little mollusc in some way befriends the coral on which it feeds.

Similarly employed on the branches of a much stouter coral, *Plexaura mutica*, occurred numerous specimens of another mollusc, *Cyphoma gibbosum*. No part of the shell was visible when first I saw the animal, which is of a beautiful buff colour sprinkled with annular spots of a bright chestnut. The shell is highly enamelled and of a plain buff colour or buff and white. It is collected extensively and sold to be used for shirt studs.

Long Key Island is about a mile and a half in length; one portion of it supports a scanty vegetation, but at the lower end, which has more recently been elevated above the water, the coral limestone is quite

bare, and is intersected by many shallow channels and pools. After our voyage we felt no inclination to use the dredge; the island moreover appeared to be excellent as a collecting gound; so having found a small cove, where the boat would be afloat at ebb tide, we went on shore. Certainly if tossing on sea had been irksome, walking on the island was execrable. The knife-edged rocks to the North of Filey Bay might be chosen for a promenade sooner than the coral rag of Long Key. Imagine walking on a huge mass of slag from an iron furnace washed absolutely clean. It was impossible not to think of the consequences of a fall, though, fortunately, there was not much likelihood of slipping. Asperities not much thicker than nails did not give way in the least; points and ridges trodden on remained points and ridges; and there was no sense of anything yielding under the foot. Still, in the novelty of the situation, and in the richly varied fauna of the reef there was more than sufficient to make up for any amount of inconvenience in moving from one part of the island to another.

Magnificent coat-of-mail shells, *Chiton squamosus*, and other species, such as I had often greatly admired in cabinets, were in all the little hollows deep enough to contain water sufficient to cover the animal. The shell of the Chiton is composed of eight valves or plates, and is surrounded by a broad border of a flexible substance resembling shagreen. It was interesting to

observe how a shell of this kind enabled the animal to cleave to the interior surface of a cup-like hollow, where a limpet of the same size, with its rigid shell, could not possibly have established itself.

Most frequenters of the sea-shore have noticed, on rocks and posts between the marks of high and low tide, clusters of small bone-coloured shells called Acorn-shells. They are the property of animals not with soft bodies, Molluscs, but with jointed limbs; this particular group of which is called *Cirripedia*, or curl-footed animals. Exotic kinds are often larger than an egg-cup, and grow singly, or at all events not in clusters. On a platform of coral rock about half-a-yard above low water, which in this locality would be about on a level with the water at high tide, great numbers of large solitary Acorn-shells were growing. Some of these were elevated on pedestals fully two inches in height and not quite so large as the base of the Acorn-shell, which thus resembled the cap of a mushroom on its stem. It is clear that these Acorn-shells had settled themselves on the rock whilst the whole platform was on a level with the bases of the shells.

What then had happened? Something very similar to that which may often be recognised in glaciers when a large block of stone is seen resting on a pedestal of ice less in diameter than the diameter of the stone. A process of disintegration from the action of the rain and the waves had lowered the

whole surface of the coral platform; but the bases of the Acorn-shells had protected the portion of the coral rock immediately under them from being thus worn away, so that in course of time the Acorn-shells rested on pedestals. How long a time might be required for the lowering of the platform to the depth of two inches it is difficult to conjecture. In the absence of frost, and in the case of a material so hard and compact as the coral rock, I am inclined to think that the process of lowering must have been a very slow one. It would not surprise me to hear it estimated at a century; and this would, of course, indicate a corresponding age in the Acorn-shells, in some of which the animals were still living. Having forgotten to bring a hammer and chisel I was unable to detach the best specimens with their pedestals without injury; but by persevering efforts I was enabled to bring away some inferior specimens.

No luncheon bell was needed to remind us that the hour for refreshment had arrived; and as there was not a comfortable seat to be found anywhere on the coral rock, a stretcher from the boat was laid for me from side to side across the bottom of a crevice close to the water's edge. The other members of our little party had to make shift with less luxurious accommodation; but provisions were in abundance for all, and we were soon very merry listening to Albert's stories of boat adventures, which would, I am sure, amuse my readers if only I could reproduce them. As

for myself, after discussing a box of sardines, a sufficiency of excellent bread, and a pint of claret mulled by the sun, and during the time which had to to be devoted to the indispensable "weed," it struck me that I might carry out a plan similar to one suggested by an eminent naturalist, I think by Mr. Darwin, who recommends as a useful exercise in botany that a collector should observe, and if possible name, all the plants within his reach whilst sitting on the grass.

Accordingly, I set myself to collect all the living forms I could reach without moving from my seat. The following were included:—Periwinkles, *Littorina*, three species; small *Planaxis*, one; Acorn-shell, *Balanus*, one; from under a loose piece of coral at my feet, Feather-star, *Ophiocoma*, one; Brittle-star, *Ophiura*, one; small crabs, *Plagusia*, and another, two species; Sea-worm *(Amphitrita?)* of a beautiful sulphur yellow; small black Sea-urchin, *Diadema Antillarum*, with long spines (I could touch this, but not remove it); Bleeding-Tooth Shell, *Nerita peloronta;* and *N. versicolor;* from a small pool in the crevice at my back, Magpie Turbo Shell; and Hermit Crabs, *Pagura*, two species. All these were common objects, except the Sea-worm; but they may serve to illustrate the variety and profusion of life on the reef.

After luncheon, as it was now low water, we began the more productive work of collecting by wading. In corals the locality was far from rich in species, being,

in fact, much too shallow for the finer kinds. Yet we were wading, ankle deep, amongst rounded lumps of yellow and brown stony corals, interspersed with sturdy little fruticose growths of flexible corals. One purplish lilac Alcyonian, stout and erect, with very blunt short tips, was a most desirable acquisition. The blocks of coral just by the water's edge afforded us the best sport, exhibiting, when turned over, swarms of lively little crustacea, shrimps, prawns, and porcelain-crabs of marvellously bright hues—crimson, sapphire-blue, and scarlet; but there was little hope that their charming colours could be preserved.

Hours fly quickly when one is occupied in the midst of things new and strange; and it was only too soon time to think of returning. The wind had fallen to a gentle breath of delicious freshness, just sufficient to give motion to the boat in which Albert and myself coasted alongside the island on our way back, whilst J. C. and the divers walked on the beach of white coral sand, finding, however, nothing except a very large cuttle-fish, *Octopus*, against which they made a vigorous onslaught. I was surprised to see how active the creature was on the sand. Its motions decidedly conveyed the impression that it had not been cast on shore, but rather that it had for some purpose sought the shore of its own accord, and that if it had been unmolested it would easily have regained the water.

At about a mile from our collecting ground we

took leave of the island; a mere patch of coral rock; one of a thousand in the Bahamas known chiefly as spots to be avoided by ships; yet teeming with animal life, beauty, and enjoyment. My visit seemed only to have marred an infinitesimally small portion of the happiness and enjoyment there; it was going on before we went, and it is going on now. Those bright pools are flashing in the sunshine; the coat-of-mail shells glide in their watery hollows; the crimson and sapphire crabs are nimbly darting from one block of coral to another. Yet who now sees or even thinks of the island of Long Key?

*April 27th.*—On deck at 8.30 A.M. Blowing great guns! Faithful Albert shakes his head, by which I know that nothing can be done in the way of boating: a disappointment not without some compensation, for my notes are in arrear; and yesterday's boat-load of specimens has to be sorted, labelled, and put by safely. Then, moreover, the town has yet to be seen, and for such a purpose the day is favourable enough.

Nassau is not so much a place to be lionised over, as to live in; for there is plenty to be seen and studied there, only not of a sensational kind. The fish-market is supplied with an unusual variety of species, some of which, from their fantastic forms and bright colours, seem less suited for the table than for the cases of a museum. In some way it does not at first seem either natural or quite right to buy for

breakfast a fish weighing five or six pounds, as blue as the sky or as red as a poppy. But one may get used to it. I am not an icthyologist, so I could only request my valuable second assistant J. W. to purchase and preserve all the kinds of fish in the market not already collected. The results of his diligence in this line at Nassau and other places will be noticed elsewhere.

The warehouses for shells used in the manufacture of cameos are well worth a visit. The shells are of two kinds, the King-conch, *Cassis tuberosa*, and the Queen-conch, *Cassis Madagascariensis*. The decrees of fashion, too often unmindful of good taste, have discouraged the use of the shell-cameo as an ornament, thus seriously diminishing the exportation of conchs from Nassau. Nevertheless the piles of these shells still collected for the Italian artists would surprise a stranger. The pink cameo shell, *Strombus gigas*, is generally distributed in the Antilles. The red cameo shell, *Cassis rufa*, is from Ceylon and the East. Of this shell I have seen, in Old Gravel Lane on the Thames below the Tower, piles resembling large hayricks. The exterior layers of the shell are carved into the relief of the cameo, the smooth enamel of the interior forming the polished back-ground.

Have you seen the Ceiba tree? enquired one of our Nassau friends whom I met on my return from the shell warehouse. As I had not even heard of it he invited me to accompany him to see it. Having

already described the giant Ceiba in Trinidad I need only say that the Nassau Ceiba is indeed a tree of marvellous age and size to be found growing on a small coral island where the soil must be very shallow. The tree must, I think, be much older than the town, and may originally have been the cynosure of its first settlers.

Through the further kindness of my guide I obtained some specimens of a large bean which, I was assured, did not grow in the island but was only found, and *that* rather rarely, lying on the beach. It is known by the residents as the sea-bean, and is the seed of a leguminous plant, *Entada*. It is difficult to account for its occurrence on the shore of New Providence Island unless it may have floated from Cuba or Florida. Owing, perhaps, to long exposure the surface of the bean is extremely hard and is capable of being as highly polished as an onyx. Being heart-shaped and of a beautiful colour it is frequently mounted and used as a brooch.

I had now to hasten to fulfil an engagement with a gentleman whose name will be known to some of my readers, Mr. Saunders, Sponge Merchant of Nassau, whose collection of sea-weeds and other marine productions made me anxious to have the advantage, kindly offered to me, of a walk in his company along the shore where he had for some years worked with enviable success, though without the means of identifying his specimens. I was glad to hear from Mr. S.

that, although the surf might prevent our working near the edge of the water, he thought he should be able to find most of the Algæ which had attracted my especial attention in his series.

Our walk was a delightful one, extending along a platform of coral rock nearly on a level with ordinary high water but covered by the spring tides. A greater contrast to Long Key could hardly have been found. The rock was decayed and soft; animal life was by no means abundant; and whereas on Long Key I had noticed scarcely any sea-weeds, here every tide pool was crowded with them. The treat was a rare one, for many of them belonged to kinds that I had never seen growing. They were of the bright green division, *Chlorospermeæ*, and if not so beautiful as the red sea-weeds, they were far more interesting because of their resemblance to, and affinities with, other forms. The finest of the whole group was there, *Cymopolia barbata*. I could not name it at the time, but made notes of its mode of growth. It occurred in large close tufts below the surface of the water in the deeper tide pools. The stems were branched, and in one pool they attained six or even eight inches in length. The recent growths were of a yellow green so vivid as almost to appear luminous. The older stems, and the lower parts of all of them, were covered with a thick coating of lime, jointed as in corallina, and pierced with pores so beautifully regular and cell-like as irresistibly to remind one of the

Sea-mat, *Membranopora*, often found covering the stems of seaweeds on our own coasts. At the end of each of the little fronds was a tuft of delicate fibrillae, or ramuli, spreading like a bottle-brush. These brushes closely resembled those formed by compound diatoms; and the similarity was even more striking under a lens, for then each fibrilla was seen to terminate in a brown knob, as in *Gomphonema*. I had the plant living for some time on board the "Argo," and found that under a magnifying power of 300 diameters the fibrillae were seen to be jointed, and the brown knobs to be turbinate cells filled with a coarse brown granular plasm. The late Professor Harvey, in the tenth volume of the "Smithsonian Contributions to Knowledge," notices these fibrillae as corresponding with deciduous leaves. It is no wonder that Lamoroux, who seems only to have met with dried specimens, should have looked on the whole thing as an animal, and included it in his history of flexible polypes. I regard the plant as one of the most interesting objects observed during the whole voyage, and think that any botanist who had with me seen a large pool entirely surrounded by the fully expanded tufts of the cymopolia, would agree that it might well be so.

For a considerable distance the surface of the rock was covered by a black crust, which on examination proved to be the tubes of a sea-worm welded together, and forming a layer of sufficient strength to be quite firm under the foot. Returning by the road, we met

a company of merry school girls taking their evening walk; and several small parties of ladies and gentlemen, some of whom had gathered wild flowers. Please not to smile at my simplicity, gentle reader; it is a happy thing for you that such incidents seem to you so common as hardly to be worth recording. They did not *then* seem so to me.

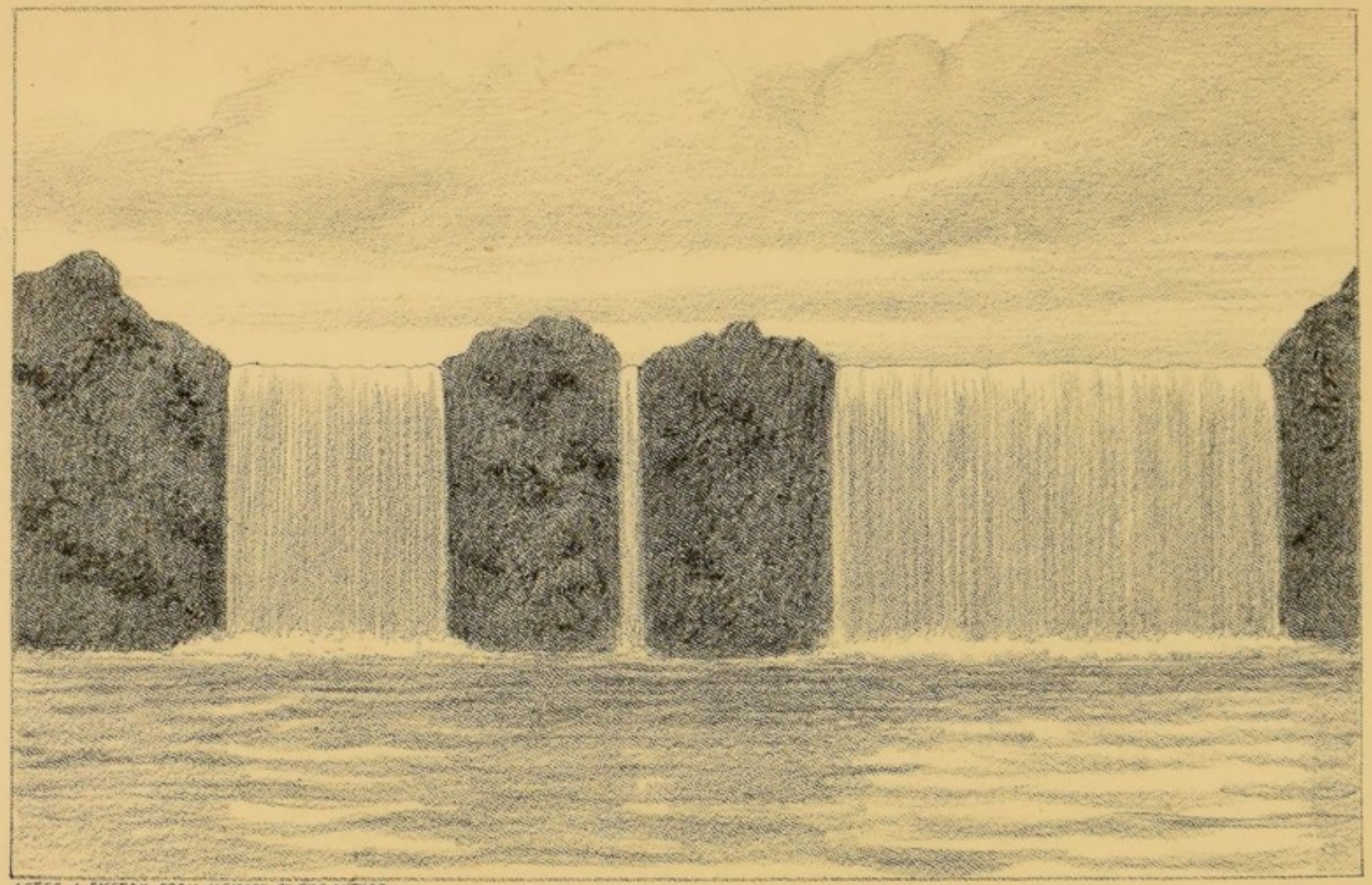
*April 28th.*—Weather more favourable, but the sea still running high. Albert was ready with his boat, and said he thought that we might reach Rose Island, eight miles off, where we should find plenty of Branched Coral, Madrepore, and "Every kind of curiosity that master could wish for." I had told him of my desire above all things to see beds of various kinds of coral growing. Yes, he said, he knew the very place where all sorts of corals might be seen; it was called the "Garden," and we should pass it on our way to Rose Island, but it would be better to take it on our return when the sea would be smoother. The steam-launch, with Mr. C. and A. Wade on board, towed us out for about four miles under the shelter of Hog Island, a long narrow strip of land stretching in the direction of Rose Island. At the end of Hog Island, a sound, half-a-mile across, divided it from another island of the same character, called Athol Island. Close by was the "Garden," but the water was too rough to admit of our seeing it; so our friends in the steam-launch, wishing us all success, returned to the "Argo."

Passing through the sound we entered a fine bay

or lagoon running up to Rose Island on our right, and sheltered on the further side, at a distance of about one-and-a-half miles, by a long strip of continuous rocks called Salt Key, also running up to Rose Island. Here we became spectators of a very grand sight. The rocks Salt Key varied in height from 10 ft. to 30 ft., and being, on the further side, exposed to the open sea, not only was the spray of the waves dashing upon them magnificent, but also along the whole Key, at all the lower points, cataracts were from time to time falling, composed of solid ocean water, which at a distance appeared white as snow. Perhaps the most striking circumstance was the length of time these overflows lasted. They were not the mere dashing of a wave, alike sudden in its onset and in its subsidence, but a steady solid downpour, sometimes lasting, by my watch, fully thirty seconds, and then fading rapidly, but not suddenly.

This phenomenon was due, no doubt, to the long heaving swell of the Atlantic, in which the amplitude of the undulation is much greater than in an ordinary storm wave. It was a wonderful and a beautiful sight, and I do not recollect having met with a description of a similar one.

Notwithstanding the protection afforded by Salt Key, the bay was not exactly in the state described by rare old Jeremy Taylor as suitable to relieve the anxieties of "unskilful persons sitting in a little boat," for assuredly "the watery pavement was not stable



AFTER A SKETCH FROM MEMORY BY THE AUTHOR.

OCEAN CATARACTS.

and resident like a rock;" yet our plans were soon laid. We must cross the bay to obtain a nearer view of the cataracts, and then we would creep up under the shelter of Salt Key to Rose Island. This we did in part only, for having made our way snugly enough close under the lee of Salt Key, we reached its extremity, and had before us a narrow sound of frightfully broken water. This we must cross or give up Rose Island. We sat for about half-an-hour looking wistfully at our *el dorado,* and imagining that all the marine treasures of the British Museum were spread upon its shores. The sea was evidently fast abating, and we might perhaps get across safely. So we thought, but then would come a roller with a sweep and a roar, followed by the exclamation, "There, if we had been crossing when that came!" Enough; mournfully the word was given to relinquish Rose Island, and to steer, with occasional casts of the dredge on our way, for Athol Island.

It was vexatious to be repulsed when so near the goal of our hopes; but work is always the best cure for disappointment, and a good hard spell with the dredge cheered us and made us ready for landing on Athol Island at a little rounded cove where Palmettoes and Mangroves promised shade, and a line of silvery-white sand afforded a favourable place for running the boat ashore. Then followed, as on a previous occasion, sardines and claret, with something more substantial

for the men. After luncheon we were visited by three nice children from the lighthouse, the only children, I believe, in the island; a sister, about nine; a brother, older; and another brother younger than herself. They seemed to be in perfect health; and though their complexions, originally fair, were deeply tanned, yet there was nothing in them of the West Indian olive tint. The sister was a lively little nut-brown maid, and, though very shy, busied herself with her brothers in hunting for shells and sea-weeds. It was pleasant to see them paddling in the water, or racing back along the sand with a "find" as if, rather than otherwise, they enjoyed the sun, though a rock near me, exposed to its rays, was at a blistering heat. I well remember the glee with which Hugh Cumming used to relate his stories of sitting in the shade on the shores of the Philippines after a storm, with a troop of black fellows scattered over the sands, bringing him splendid cones, mitres, and other shells, whilst he emptied his pouch of small coins in payment for rarities which now, since his death, are the property of the nation. I never expected to come so near his experience. In the looks of my little collectors I certainly had the advantage; in the matter of the shells I give way.

The island was, I think, undergoing a slow process of elevation, for the rock at high water mark was much excavated by sea-urchins. Some of their rounded hollows, as large as cocoa-nuts, were lined

by little shells ranged in the most orderly manner, and so close that the head of a pin could not have touched the rock between them. In other hollows the population was too numerous to find even standing room, and the shells formed a mass like a swarm of bees. From one hollow I scooped out more than a pint of little shells all of the same size, but of a considerable number of species, belonging to the genera *Cerithium*, *Scalaria*, *Terebra*, and *Trochus*. These gatherings at first surprised me, but it soon became manifest that each shell was tenanted by a small hermit crab, whose gregarious propensities accounted for these large and very miscellaneous assemblages of shells. On the sand lay rounded tufts of snow-white, lime-coated Algæ, some curiously palmated, others fruticose, but all very beautiful and pure, like the crystal water which had thrown them on the beach.

The crowning event of the day, a sight of the "Garden," was still in reserve, and a row of a little more than a mile brought us to the spot. It was soon evident that small waves were capable of hiding the bottom of the sea as effectually as large waves; but with this difference, that they did not prevent the use of the water-glass, which cannot well be used when the boat is tossing. The water-glass is fixed in a wooden frame shaped like a Maelzel's Metronome. The frame is 22 inches in length; the larger end is twelve, and the smaller six, inches square. The larger end is glazed with plate glass, and made water-tight; the smaller end

*Water-Glass.*

is left open. When the larger end is plunged below the surface of the water an observer, looking in at the smaller end, has a view of the sea bottom undisturbed by the ripples on the surface. The water-glass is extensively used at Nassau by boatmen who gain a livelihood by procuring sponges; and it probably was in the course of explorations for sponges that the "Garden" was discovered. In the best parts of the "Garden," the water was more than one fathom in depth; but in some parts it was shallower. As this was the first and the last really good view of a coral garden I had during the voyage, I will describe what I saw, in the words of my notes written two days subsequently.

The stony corals were all of reef-building species, growing in rounded lumps, from the size of an orange to that of a hemisphere eighteen inches in diameter, or forming tufts of short stout branches, forked and rounded at the tips. The prevailing colours were bright citron-yellow, various shades of buff passing into vandyke-brown, cream colour, and nearly white. The branched kinds were olive-brown, and a beautiful violet. The polypes of these corals were not, so far as I could see, particularly vivid or flower-like in their colouring; though where the water was shallower I could perceive that their tentacles were shaded and banded with exquisitely combined tints. The absence of showy colours was probably due to the small size of the calicles or polype-cells in the species present.

But the stony corals, though beautiful, did not form the chief adornment of the "Garden." From between their rounded masses sprang a profusion of tall flexible Zoophytes, Gorgoniae, &c., waving gently to and fro; their branches being thickly studded with expanded polypes. Some were like erect cacti; others resembled ferns; but the general aspect was much more suggestive of a palæozoic than of a recent flora. These graceful *Alcyonidæ* more than made up for any deficiency there might be in the stony corals. Forms distinguished by their colours, rich purple, deep madder, bright yellow, and all shades of brown, might be seen growing together in a space not larger than the mainsail of a ship. The more common West Indian species, such as Sea-fans and Sea-feathers, were in abundance, but. amongst the less common kinds, I noticed one of especial interest and beauty. It grew in loose tufts, each frond resembling a feather from a peacock's tail, being simply pinnate, but having its upper upper extremity clouded in a mass of expanded polypes of a delicate straw colour. It has been described and figured by Esper as *Gorgonia setosa*. On being removed from the water the whole of the upper part of the frond ran together into a jelly-like mass; but, when dipped in sea water, every pinna and each polype on all the pinnæ resumed their former beautiful arrangement in the most charming way imaginable. I was most anxious to preserve this Gorgonia, but was doubtful how to set about it. A portion was, of course,

duly placed in spirits, another portion was steeped in fresh water until the slimy part fell away, when the coloured bark came away with it, leaving only the horny axis which, in the branchlets, was nearly as slender as a horsehair.

But to return to the "Garden." Sponges, scarlet, black, and brown, slender as willow wands, or dumpy as puff-balls, added no little to the interest of the scene. Delicate seaweeds, resembling Jania or Corallina, were growing in tiny sub-aqueous grottoes or on the silver coral sand between the larger flower tufts. Lastly, if all this grace and beauty of form might seem to need the enhancement of gorgeous colouring introduced with a judicious hand, not on the prominent parts, but giving something of a higher glory to the recesses; it was there in the form of shoals of fishes less than a span long; fishes which I could only compare with humming birds, green, golden, crimson, blue; all the colours and the metals of heraldry, with many of its quaint devices in chevron, and bend, and bar, were worn by these favoured little pets of the sea, floating leisurely among the lovely coral stems, as I have seen butterflies sailing between sweet-scented flowers.

At last! There it all was, even as the great naturalist of H.M.S. "Beagle" had said more than thirty years before. "Howbeit I believed not the words until I came, and mine eyes had seen it, and behold the half was not told me." Description is not the proper vehicle for conveying the impression made by such a

spectacle. If the description be full, it is laboured; if concise, it is nothing. I longed for the power of putting it all into music; and am confident that there is in music a promise and potency of being a very adequate exponent of the visible world, as it has long been a language of unseen thoughts and affections. Surely the expression of that which is beautiful and grand and true in nature is more worthy to be the destiny of the "music of the future," than that it should become the pantomime of trolls and gnomes accused of a sordid propensity for hoarding precious stones and metals. The music of the future will be wedded to nature, not to sensational nursery tales.

There can be no doubt that the "Garden" is a thing of beauty, and that of a very high order. We are told that our flower-gardens owe their bright colours simply to the necessity for plants to get themselves properly fertilised. Is it so in the animal gardens under the sea? Surely we may receive, and rejoice in, the theory of development without fancying that we have therein come to the end of the whole matter.

It was well for me that my mind had been set upon a sight of the "Garden," rather than upon robbing it. The divers complained that they were tired; though they had not made a single plunge. Albert was not with us, having been detained as a witness in a trial that was going on. I had no wish to exact too much from the men who had really behaved very well. Still there were a few little things in the "Garden" that I meant to

have, and how were they to be got if the divers would not go down? "Now, my good fellows, come, get ready." One of them declined, and it was long before the other would would begin to prepare himself; and even then each piece of his upper clothing was laid aside as if he was parting with an old friend. At length he was so far ready as to be seated on the gunwale of the boat with his feet dangling in the water. "What does mas'r want?" "Oh, anything,—do just go down, my good fellow, and bring up what you find!" I fondly thought that if he were once in, he would go again readily. Apparently he thought otherwise. At length he disappeared, and came up again with a fine Gorgonia. "Yes, that will do—now bring me one of another kind." Vain hope! He certainly seemed to me to waste more time and strength in resuming his old position on the side of the boat than would have sufficed for three plunges. All efforts to dislodge him again were unavailing. "What kind does mas'r want? Him shew—me get it." "Well, that one, just below you—that beautiful purple one." "Where mas'r? Mas'r give me water-glass." By the time he had got the water-glass the boat had moved on and the treasure was lost. Thus we were compelled to give up the finest part of the "Garden" and to work where the water was only a yard in depth. By perseverance most of the observed species were thus obtained, but the specimens were not so fine. We had several casts of the dredge on our way back to the "Argo," securing some shells and two

huge black Sea-cucumbers. We arrived on board after sunset.

On the "Argo" all was animation. The keeper of the lighthouse on Athol Island had been on board to report that the night would be a favourable one for fishing, and that the seine-net could be drawn with a good prospect of success in the lighthouse bay. This was on the opposite side of the island, not far from the spot where we had rested for luncheon at noon. We sat down to dinner all in high spirits with the busy day we had enjoyed, and with the prospect of a busy night before us. Colonel C. had been fishing in a little yacht called the "Frolic," and had been just about to land a fine fish when a large shark made a rush at the prize, carrying it off with the hook and line into the bargain. I fancy the intentions of the Colonel for the morrow were not of a pacific character towards the sharks. We had already exceeded our proposed time at Nassau; but Mr. C. was determined, if possible, to see the Garden; and it was understood that the "Argo" would only leave her anchorage in the morning, deferring her final departure from the island till the evening.

Our flotilla of boats was in readiness after dinner; and this time we had no lack of volunteers from amongst the crew. The distance was over five miles, but the night was superlatively fine; too fine indeed for successful fishing, but perfect for an excursion on the water. I need not describe the usual accompaniments of the drawing of the seine; the calling and the shouting and

the splashing; the hitching of the net upon a block of coral, the despatch of a boat to lift up and disengage the net, leaving an open space at the bottom for the fish to get out, or, at any rate to bear the blame of their escape in case of an unsuccessful haul. Most of our party, including Mr. C., were present, and the bay with its border of snow-white coral sand, and the reflections of the moon on its waters, were voted beautiful by acclamation. Pieces of coral from Rose Island were exhibited for purchase on the beach, and it was rather a new sensation to be selecting specimens of coral by moonlight. Meanwhile there was such a hurrying to and fro—such eagerness to see the fish! Nut-brown's brother was there enjoying the fun immensely, and I suspected that a pair of eyes were looking on unseen at a distance. A second haul was made. I saw the silvery gleaming of some fish each time in the net, but the number of fish taken I know not. It was enough that we were all gratified, and passed the time so pleasantly that we did not reach the yacht till the approach of midnight. Looking back that night on the events of the morning, it was hard to believe they could all have occurred on the same day.

*April 29th.*—A loud cry of "shark" woke me at 5 A.M., and in a few moments I followed Colonel C. on deck, only to be disappointed by finding the fun all over. Colonel C. had given strict injunctions that if any of the shark-baits out astern were taken during the night, he should immediately be called. Most of our

party were on deck almost instantly on the first alarm, and found a fine shark about nine feet in length, lying close by the rudder, helpless and exhausted, and with running nooses of rope round his head and tail. The quarter-master and some of his mates had kept all the excitement of securing the shark to themselves; and nothing more remained to be done except to give him the finishing stroke with a bullet from a rifle. This was accomplished very expeditiously, and he was hauled on deck. There may be some who expect always to find watches and gold chains in a shark's maw: these things we did not find, but in their place the feathers of a poor bird which had died and was thrown overboard two days previously.

The horny beak of an immense Squid or Cuttle-fish was also found. The jaws or mandibles resemble those of a parrot, and are very frequently taken from the stomach of a shark. I have more than once seen, from the inside of a shark, a large number of cuttle-fish beaks fitting closely one inside the other, like a pile of thimbles, and forming a solid mass as long as one's finger. How the maw of the fish, unable to digest or eject the many cuttle-fish jaws, induced them to assume so convenient an arrangement, is not clear.

As to the size of the cuttle-fish swallowed by the Nassau shark, I fear that I may be thought extravagant if I attempt to form an estimate. I have, however, seen the jaws of a squid which had an internal shell or pen 4½ feet in length; and I think the Nassau jaws

are fully equal to these. Probably, therefore, the body of the Nassau cuttle-fish was 4½ feet in length, or half as long as the shark. The largest squid I have seen entire was about 1½ feet in length, and weighed at least ten pounds. By the simple rule that in similarly shaped bodies the masses, or weights, vary as the cubes of similar rectilinear measurements, it may readily be seen that the squid devoured by the shark at Nassau must have weighed more than a ton. Of course it is not necessary to suppose that the whole of the squid was eaten. But what a battle there must have been if the encounter took place in the open sea! The huge arms of the squid would twine round and round the fish, but its formidable beak would prove but a poor defence against the crashing jaws of its assailant; and I am inclined to think that the shark would make short work with his victim.

It was said to be necessary to cross the bar of the harbour at high water; so about 9.30 A.M. we took leave of Nassau, where we had spent three most delightful days besides the afternoon of our arrival, and steamed out of the harbour, intending to anchor for the day two miles on the outside of Salt Key. Colonel C. had already made up his party and was off in the "Frolic" to fish for ground-sharks. As soon as we reached our anchorage Mr. C., A. Wade, and myself took our places in a fine six-oared boat belonging to the pilot, for a visit to the "Garden." The day was somewhat less favourable than the previous one for a sight

of this beautiful submarine flower show; but quite sufficient was seen to justify my report of it, before the rising of a portentous black cloud in the north rendered it prudent for us to return to the yacht.

I had all along been anxious to dredge in water somewhat deeper than could be attempted with a small boat; no time therefore was lost in getting our apparatus into the pilot's boat, and shortly we had the dredge down in 30 fathoms. It came up nearly full of magnificent specimens of a sea-weed, *Anadyomene*, but with scarcely a trace of animal life. The next cast was in 35 fathoms; but we had not proceeded more than a few yards before the boat was firmly anchored by the dredge. For more than half an hour we tried all kinds of expedients for getting the dredge clear, but in vain; it would neither move, nor let us move without abandoning the rope; so we had to signal for the "Argo". She came slowly up and the dredge rope was thrown on board and made fast. Word was given to go ahead and we knew then that something must give way. There was a creaking and a heavy strain for an instant, and then all was loose. The end of the rope was thrown to us and we hauled in. Anxious eyes peered into the deep and before many fathoms had been got in it was plain that the dredge was still on the rope. Up it came at last, a wreck, a mere wreck, broken and crushed and useless. We had spare dredges on board, but this one had served us since the expedition started, and had come to an honourable end on the very last opportunity which occurred for its use.

The "Argo" was now not very far from Rose Island, and as we had yet a couple of hours to spare before the "Frolic" with the shark-fishing party on board, was expected, A. Wade and myself started in the pilot's boat for the Madrepore bank I had failed to reach on the previous day. It was not so rich and fine as the "Garden," but *Madrepora cervicornis* was in profusion, and was interesting to me as the first branching Madrepore I had seen in a living state. This time we had willing divers and plenty of them. Four of our six oarsmen were soon in the water, shouting, laughing, and splashing each other like so many children. We soon had more of the Madrepore on board than could well be stowed away, besides a number of large *Gorgoniae*; but it was very difficult to direct the attention of the divers to small or delicate forms. A coral of the Fungia group, *Agaricia agaricina*, growing in vertical half-discs, shewed itself a foot above the level of the water, the tide being at low ebb. The polypes were living, though exposed to the air and the sun; but the spray would probably keep them constantly moist.

We arrived at the "Argo" at the same time with the "Frolic." The shark fishers had met with only moderate success, but the deep-sea lines had brought up a most interesting Gorgonia which Colonel C. kindly contributed to the Liverpool Museum series. I had the pleasure of shewing this fine coral to Count Pourtales, when he was on a visit to the Liverpool Museum. He said that he thought it had been des-

cribed, but could not at the moment recollect by whom. I do not find it in any of the older works on the subject, or in the beautifully illustrated volume on the corals of the Antilles by M. Duchassaing.

Thus ended our most delightful sojourn at Nassau. That we visited the place at all was I believe an extension of Mr. C.'s plan, chiefly for the sake of giving me, with increased experience, the advantage of one more chance. Under such circumstances it was extremely gratifying to find that our whole party were more than satisfied with this portion of our voyage.

We left Rose Island on the evening of Saturday, April 29th. Mr. C. had given explicit instructions that our next destination should be the Bay of Alexandra, Island of Abaco, Bahamas. It was, therefore, with no little surprise that, as we assembled on the Sunday morning, we found ourselves fifty miles beyond Alexandra, on the way to Philadelphia. So the head of the "Argo" was put about, and we steamed back the fifty miles, arriving in the Bay of Alexandra on the Sunday afternoon.

Abaco is much larger in extent than New Providence Island; but it is low and flat like the rest of the islands in the Bahamas group. About nine families only are settled in Alexandra, but a considerable number of labourers from Nassau pay an annual visit to Abaco to work in the pine-fields, the cultivation of pine-apples being the chief employment in the island. When we anchored in the bay, only one man was to be seen on

the beach, but before long about a hundred men and women made their appearance, having just come from church. The largest and best room in the place is used for Divine Service. The minister is a Wesleyan, who seems to discharge the functions of governor, teacher, spiritual pastor, and master. So far as I could judge, the order and moral condition of the settlement reflects great credit on the individual who has been intrusted with so comprehensive a charge. We visited the pine-fields and found the plants growing in a shallow layer of soil composed of coral sand mixed with a little vegetable mould.

*May 1st.*—This morning we were very early on shore collecting for the last time in the tropics. The waves had worn the coral limestone into large flat slabs, many of which were lying in the shallow tide-pools on the beach, and when turned over displayed on their under sides, and in the beds from which they had been moved, such vivacious assemblages as forced from us repeated expressions of surprise. The locality was certainly very rich in its Fauna. Omitting corals, we brought back to the "Argo" at breakfast time, more species than we had collected on any previous day during the voyage. The list of Mollusca included 80 kinds, all with one exception previously known as West Indian species. It was, however, new to me to see the animals of the shells so advantageously, especially those of the key-hole limpets, of which eight kinds were found. They adhere loosely to the rocks; the aperture at the apex of the shell

preventing adhesion by atmospheric pressure, as in the limpets and chitons. In several species the mantle of the animal is broadly reflected over the shell, and has a beautifully fringed margin.

In *Lucapina suffusa*, the shell is entirely imbedded in the lobes of the mantle, and all the soft parts are exquisitely tinted. Plainly coloured shells are frequently owned by highly ornate animals; *e.g.*, our little British cowry, *Trivia*; whilst the most elaborately decorated of all molluscous animals, the sea-slugs, have no shell. Of these we found three splendid kinds, two of which lost both form and colour before we reached the "Argo." Amongt the Echinoderms, scores of fine sand-stars and brittle-stars were left behind, as being in excess of the number required. Then we had sea-cucumbers, crabs, mantis-shrimps, tunicates, small cuttle-fish, and sponges; enough, and more than enough; yet I think I never left the shore less satisfied with a mere collector's harvest. A year, instead of three hours, would be needed to do much of the best kind of work achievable in such a station as the Bay of Alexandra. What would be said of a traveller who in some little explored region had discovered a race of people very imperfectly known, and who had brought away to illustrate his discovery only a few of their mummies?

Well, one result of collecting in many lands is that the experience of difficulties and disadvantages before unknown, leads one to make allowances for the short-comings of predecessors in the same line.

In the afternoon of the same day, the "Argo" was lying off the North Lighthouse, Abaco, with just a quiet ripple on the sea, when the admiration of us all was attracted by a bird about the size of a missel thrush, on the water close alongside our quarter-deck. It was a petrel, larger than the kind called Mother Carey's chickens, black, with white feathers on the back. Its flight was much less rapid than that of the swallow, and as it skimmed the water, its wings were frequently held up till they almost touched over its back, whilst it ran with most charming little steps on the surface of the water, picking up floating crumbs and bird seeds from the ship. Its gracefulness and fearlessness were altogether captivating, and we all thought that we had rarely seen a prettier instance of bird motion.

*May 5th.*—"Argo" on the way to Philadelphia. The estuary of the Delaware is very broad, and its banks are low and uninteresting till a much narrower part is reached, dividing the States of Delaware and New Jersey. The coast of the latter is flat and poor, but the Delaware side near Wilmington seems to be a very delightful country, slightly undulating, well wooded, and thickly occupied, though not crowded, with rural homesteads of well-to-do people. It is like some parts of our Southern coast, being evidently a place of pleasant nooks and flowery lanes. Some of the trees are still without leaves, others putting on their freshest green. The peaches, for which Delaware is celebrated, are just showing their pale pink blossoms; the trunks of orchard trees are

lime-washed, as with us. In fact the country was too like England to be seen after a visit to the tropics; considering, that whatever might be its attractions if the thoughts were not preoccupied still, it was not home.

*May 6th,* PHILADELPHIA.—The harbour with its array of vessels, forms a grand scene; but the accommodation for boats, where passengers have to land from ships, is quite unworthy of so great a city. And when at length land is with difficulty reached, a most unprepossessing sight awaits the voyager, of small coal wharves and footways paved with bricks set on edge, herringbone-wise. All our party had purchases to make, but we had not proceeded far before it was found that we were attracting more attention than we could account for. The "gamins" who met us turned and followed us, passengers on the other side of the street stopped to have a stare as we passed. It was not long before the cause was discovered. The Philadelphians had in some way become possessed by the notion that Mr. C. was the Emperor of Brazil, who was expected to arrive at the time; and so rapidly had the rumour spread that when we went into a hatter's shop in Chestnut Street, two policemen had to stand at the door to induce the crowd to move on.

*May 7th,* Sunday. Attended Divine service at Holy Trinity Reformed Episcopal Church. The sermon was preached from within the Communion rail, a plan which seems very appropriate to the sermon's place in public worship. But the peculiarity which pleased me

most was the reading of the two great commandments after the ten; an improvement which admits of being carried out still further. I have seldom heard the lessons read so well as on this occasion. Sunday appears to be observed respectfully and reasonably. The shop fronts are open, but the doors are closed. The interiors are neat, but the goods are not displayed as on ordinary days. This plan obviates the very dreary look of an English town on a Sunday. Gardens, museums, reading rooms and exhibitions are open, but not theatres or music halls; a distinction which may, I I trust, ere long be found practicable in this country. During the afternoon a moderately large and very orderly assemblage enjoyed the walks and sights and resting places provided in the Zoological Gardens, where I met an old botanical friend from Scotland, who returned with me in the evening as far as the quay.

*May 8th.*—The day after to-morrow will be the great opening day of the Centennial Exhibition. I find this note in my journal; but my anticipations of the opening ceremonies were not eager. My sincere respect for the Americans is not joined with any exclusive admiration of republicanism. I should rejoice if all nations were in a condition to emulate the career of the United States; but the times are not mature, and for the present such a throne as that which shelters our native land is an incalculable blessing. A permanent political theory is a political fallacy, but a precocious republic, a disaster.

My time during each day of this memorable week was divided about equally between the Museum of the Academy of Natural Science, and the Centennial Exhibition. Mr. C. with some of our party visited Niagara and New York; but this was a gratification which I thought it better to forego. My work at Philadelphia would occcupy more time than was at my disposal, though it was not of a kind to afford many notes that would interest my readers. As hitherto, I shall limit my remarks to personal incidents and impressions.

My first visit to the Centennial Exhibition was on the Monday. It seemed to be an exhibition of exhibitions; an assemblage of Crystal Palaces. It was however in the building appropriated to exhibitions contributed by the Government of the United States that I found a kind of central home, which I left only to pass more quickly through other buildings and to return. Fossils, rocks, minerals, botanical and zoological specimens, drawings, models, preparations and productions of all kinds, besides machinery, guns, torpedoes and other military and naval stores, were in course of being arranged for the opening day; and employed in the arrangement were several men of science whose names were familiar to me. An introduction to one seemed to be an introduction to all, and it was almost with a feeling of self-reproach, for occupying any portion of their valuable time, that I heard them relate the history of series after series of specimens

brought from the most distant parts of Uncle Sam's territory.

The place reminded me of the reception room at a meeting of the British Association, where friends assemble who are engaged in pursuits of most dissimilar kinds, but who are like-minded in refusing to regard money-making as the great end of life. A gentleman from Iowa told me that for several years past he had been in the habit of going in his yacht with some of his family for eight months in the year to make observations and collections on the Florida Reefs and Keys. He was waiting for the arrival of his contribution illustrating the Fauna and Flora of this beautiful but perilous region.

After receiving so much kindness, it was gratifying to be of some little use. A very fine collection of coloured drawings of American Fungi had been consigned for exhibition to one of the exhibitors in another department of botany. Each drawing had been wrapped up in a large envelope, enclosing a card on which was written the name of the plant. In the hurry of unpacking, the envelopes had been taken off, and the contribution had been received in the form of a heap of drawings and a heap of cards, but with no mark to shew which name belonged to any one of the drawings. Fortunately, the greater part of the more conspicuous Fungi were familiar to me, and I had no difficulty in rendering some assistance. It was thus that I became acquainted with Professor Thomas Taylor, of the Agricultural Department, Washington, and with his

daughter, to both of whom I became indebted for much valuable information, and for many pleasant hours in the exhibition.

Another note in my journal refers to a visit to the Centennial in the afternoon of the same day, by a different approach—through the Park. Chestnuts, elms, and beeches were all in the freshest green of spring. It was very foolish and altogether unworthy of a traveller, but I could not help quite grudging the sweet spring smell of the new mown turf, and the charms of the grassy slopes, and the budding lilacs; and I would have had them all in reserve for the first sight of home. Still it was consolatory to find that there were people across the Atlantic who cared for such things. Then my mind changed, and never before were my feelings touched with so much of cousinly affection towards the Americans as they were by the scent of *Anthoxantum odoratum* in the Park of Philadelphia.

The grand Centenary display resembled a city of exhibition buildings surrounded by suburbs of hotels, restaurants, cafés, and refreshment rooms of all descriptions, built upon the great advertising principle that to be conspicuous is to ensure success. In the main building the exhibitors were busy arranging their "exhibits." Many spaces were as yet altogether unoccupied. It was clearly impossible that all should be in order and complete before the opening. The area was immense, and the piles of cases in which the

goods had been brought were of themselves a wondrous sight. I was walking, or rather picking my way, amidst Alps of packing boxes and glaciers of tissue paper, when, at my feet, I saw a bone, a single vertebra, and a very odd one; a second glance shewed that it was a cast only; then, under some straw, appeared another huge cast of a bone. Why! surely this must be the work of one of whom I may speak, to a good many of my readers, as our mutual friend, Mr. Waterhouse Hawkins; and on looking up I saw himself seated on a box, contemplating an iron frame of portentous height, which he was about to clothe with a likeness of the skeleton of a huge extinct animal. I might have passed him in the flesh, but I knew him in his bones, and was glad to see his work in a central place of honour.

*May 9th.*—Museum of the Academy of Natural Science. On my first visit to this museum I was so fortunate as to meet with Dr. Leidy, with whom I had become acquainted when the British Association last met in Liverpool. Dr. Leidy introduced me to the Secretary of the Academy, George W. Tryon, Junr., from whom I received a ticket admitting myself and friends during our stay.

The present home of the Academy is a spacious building which is pleasantly situated in one of the chief squares of the city, and had been acquired somewhat recently only through pecuniary sacrifices of the most generous kind incurred by the family of Mr. Tryon, and

other friends of science. The museum contains a large collection of birds, some good Mammalia, and a valuable series of fossils. But the most celebrated portion of the collection consists of a very extensive series of shells. Mr. Tryon said that he had been engaged for seven years in amalgamating and arranging the various collections of shells acquired from time to time, and that he now regarded the entire series as containing 20,000 species. Mr. Bentham, in his presidential address to the members of the Linnæan Society, estimated the whole of the Molluscous species, including the Polyzoa, at 20,000. So that if both estimates are correct, the Philadelphia series must be a complete one. At all events it is an extraordinary collection, and it is needless to add that under the superintendence of Mr. Tryon the specimens are carefully and reliably named, the arrangement being that adopted in the "Genera of recent Mollusca" by Henry and Arthur Adams.

The specimens are in trays, to which some of the larger kinds are affixed by some kind of cement; a plan to which I have never been able to reconcile myself, though it is adopted in the British Museum, not, it is said, from preference, but of necessity. It is true that no one but a curator knows the difficulty of keeping names and specimens together, without the use of some adhesive substance, in a room constantly traversed by a crowd. Nevertheless it may be done, though not so effectually as to render needless the occasional replacement of a few specimens. The smaller shells at

Philadelphia are enclosed in glass tubes. The tube is placed within the tray to which the name is attached; a plan which seems to be unexceptionable, if care is taken that the tube and its tray bear a corresponding mark or number.

Conchology has a history of its own, pertaining to art, or at all events to æsthetics, rather than to natural science. The older conchologists made no pretensions to be scientific naturalists; the conchologist was a connoisseur of shells; and it was for qualities proper to art that he valued his choice specimens. Finish, gracefulness of outline, texture, beauty of colour, rarity,—these are points equally prized in works of art, and in shells. The conchological passion was at its height, probably, from twenty to fifty years ago; but more recently so much has been said in disparagement of mere shell-fanciers that the very term conchologist has suffered discredit; and now even dealers are shy of it.

I cannot help a feeling of regret that a delight in the beauty of any class of natural objects should receive discouragement. If the pursuit of conchology had been so fortunate as to include a popular *littérateur*, he might have filled volumes with pleasant anecdotes of social gatherings, and noted sales, of well-filled cabinets and table-talk, all connected with the love of shells. Surely a shell is as fit to be admired as a tea-cup of Dresden ware. Butterflies and shells have been the very "cakes and ale" of natural history; but the biologists of the present day are a matter-of-fact generation, who cannot

sympathise with a love for a thing simply because it is pretty. The change of tone has not, I think, been all clear gain; and scientists may be reminded that Geology would have had far less help from Palæontology had it not been for the patient loving study attracted to conchology by the beauty of shells. Shell-fanciers have been as useful to Sir Charles Lyell, as pigeon-fanciers to Mr. Darwin.

Circumstances have made me acquainted with all the chief older collections in this country, and with many of those on the Continent; and I am convinced that the merest "collecteana" relating to these would, if sifted and disposed in order, afford suggestions of great value. A single illustration will explain and confirm my meaning. Many of the conchological prizes of fifty years ago retain their market value. Collectors are supposed to be fewer in number; but if a *Cypræa princeps*, or a *C. guttata*, or a *Conus gloria-maris* should turn up in Paris, or Hamburg, or at Stevens' Auction Rooms, Covent Garden, it would be sure to command its price of thirty, forty, or fifty guineas, as in days gone by. Many instances might be quoted of a decline in value. *Cypræa Thersites*, formerly worth thirty pounds, is now not worth half as many shillings; but a long list might be made of shells, bought thirty years ago at prices varying from five to twenty pounds each, which are worth as much or more at the present time. Most of them are shells of perfect beauty, as well as of great rarity. They seem to stand out by themselves;

and very few of them at all resemble any other shells. Now, what fact in natural science is here indicated? Perhaps these rare and highly distinct shells may be tips of the branches of the conchological *stammbaum* or genealogical tree; and may have reached the limit of possible development in their own direction. I do not myself think it likely that intermediate forms will be discovered uniting these with other species. Lower down in the tree may be found vigorous branches, with anastomose growth, uniting many so-called species and even genera; as in the Olive-shells, more than 100 species of which my friend Mr. Marrat regards as now capable of being indistinguishably united by a sufficiency of intermediate forms. I quote his opinion because Mr. Marrat has spent many years in forming the series of Olives now belonging to the Liverpool Museum, including all the type shells figured by Mr. Sowerby in the most recent monograph of the genus Oliva.

The formation of an extensive collection is a kind of work that eminent physiologists and histologists are not likely to undertake, but which they ought to encourage rather than disparage. There is room for all classes of workers in natural science; and in a field so *broad*, the strong should help the weak; and I think there is no kind of help that the weak find more refreshing than a genial acknowledgment, from the strong, that they are fellow-workers.

After all, there is one fact which might of itself

be sufficient to commend the formation of collections, such as many that I have known, which had their origin in a liking for shells. Very few important general collections in public museums have been made by curators. They all owe their chief attractions to the work of private collectors. The Liverpool Museum shells include the best parts of four private collections. The Philadelphia collection unites five or six. This series afforded me many hours of pleasant study, and abundant materials for notes which would be out of place here. It may, however, be stated that, although the Philadelphia series contains fine examples of many shells prized by the older conchologists, its chief feature is that the genera are well worked out, and that as a collection for reference it is of the very highest excellence.

On one occasion, as I was leaving the building, I saw in the lower room a very venerable member of the Academy, to whom Dr. Leidy introduced me. It was Professor Lea, of *Unio* celebrity. He gave me a most kind invitation to remain at his residence for as long a time as might be required for a thorough study of the Centenary Exhibition; adding that he would if possible arrange for me to meet at his house Professor Dana, Professor Henry, and Professor Asa Gray. This was indeed a powerful inducement, but I could only return my grateful acknowledgments. Professor Lea said that his collection contained 20,000 specimens of *Unionidæ*, and that he had been careful to avoid having two examples alike.

One of the most interesting departments of the great Exhibition displayed a large series of contributions from the Swedish Government, designed chiefly to illustrate the manner in which, in the schools of Sweden, education is carried on by object lessons; especially in Botany, and Natural History generally. I was shewn a series of drawers designed to be interchangeable between the schools of a district. Those of the drawers which I examined contained fine specimens of Mosses, Lichens, Scale-mosses, and Fungi, all with their scientific names according to the latest authorities. I expressed great surprise, and enquired how the teachers themselves obtained instruction. In reply I was shewn volumes which were said to be generally used in the training-schools for teachers, and were afterwards supplied to them at a reduced price. They would certainly astonish our school-boards if recommended for adoption in this country. For example, amongst them were two large folio volumes on Fungi; one on the mushroom tribe, *Agaricini*, the other on the rest of the larger Fungi. Each volume had an abundance of plates of the finest execution. The price to the public was £5 per volume. The author was no other than Elias Fries, the great Mycologist; who is, I believe, still living and writing, though the first volume of his celebrated work "Systema Mycologicum" was issued in 1821. If other branches of Natural History are taught in Sweden with similar text-books provided for the use

of teachers, Swedish schools must be worth a visit. After all, that a people should be encouraged to live in peace and to understand the natural features and productions of their own country, even if it should cost the Government some expensive school-books, may perhaps not be a foolish or extravagant waste of public money. A good deal in this way might be done at the cost of a single iron-clad.

My notes on Philadelphia may be concluded with a brief account of a meeting of the members of the Academy of Natural Science. The method of conducting the business of scientific meetings has become a matter of interest in many places where, in the early years of the present century, scientific discussion was unknown; and, if attempted, with more than half-a-dozen persons present, would have been prohibited by Government authorities as politically dangerous. Such an interference actually led to the discomfiture of a small scientific meeting of the founders of the Literary and Philosophical Society of Liverpool, who assembled to deliberate on nothing more treasonable than natural philosophy; followed by the further discussion, at the homes of the members in rotation, of a beefsteak and a barrel of oysters. Without putting forward the American plan as faultless model, I venture to think that in some of its details it is suggestive.

The meeting was an ordinary one, and was attended by about thirty members. At eight o'clock the chair was taken by the President, Dr. Ruschenberger, who

conducted the business with strict attention to points of order, yet quietly and with much diginity. After the formal business had been dispatched, written communications were declared to be in order, and a short paper was read on the value of characteristics of various kinds, as affording a basis for classification in Zoology. When the paper had been read, the President put it to the meeting whether it should be referred to a committee. This being carried in the affirmative, the President nominated a member of committee, asking him to nominate a second; the second was asked to nomimate a third. The three names were then read by the President as constituting a printing committee. A second short paper was read, after which verbal communications were invited. Professor Leidy then gave some account of the skulls of various species of Cetaceæ found in a fossil state in Massachussets. The skulls of four species were exhibited, and the Professor announced the names he proposed to give them.

A short but excellent communication followed on the Garnet, illustrated by diagrams. A careful analysis had been made of various zones of a large Garnet crystal, commencing with the nucleus or centre. Then some observations on the effect of *Peronospora infestans*, on the starch of the potato, to which Professor Taylor of Washington replied. Dr. Leidy made some remarks on the value of museums, concluding with a kind and highly favourable notice

of the Liverpool Museum. The proceedings were terminated by the presentation of an album containing original letters from the founders of natural science in America. The collection included several letters from my late dear friend and neighbour Professor Nuttall.

If we take the proceedings above noticed as a sample of an ordinary evening's work done at the meetings of the Academy, we must, I think, regard the average as a very high one. The description of four new fossil Cetaceans, and the communication on the crystalline structure of the Garnet, were of themselves sufficient to confer a high distinction on the occasion. The tone of the proceedings was very grave, more so than that of our best scientific meetings in England; but the gravity was quite natural and did not appear to be in the least affected or constrained. Boys and girls are grave in Philadelphia, so one would hardly expect to find sprightliness prominent amongst philosophers. Pleasantries, in America, are so often not "harmless," that in good society they are frequently avoided.

The "Argo" started on her homeward voyage at five o'clock on the morning of Sunday, the 14th of May. On the 18th the weather was bitterly cold. No ice was visible, though we were evidently feeling the effects of ice to the windward of us. We passed the Rock Light at the entrance of the Mersey on Saturday, May 27th, a little before noon.

Before bringing my notes to a conclusion, it may be

proper for me to explain the absence of an appendix. It is true that there are materials available for an appendix, but they are in a very incomplete condition. A list of the Mollusca, including about six hundred entries, together with a plate of two new species, a *Murex* and a *Sconsia*, has been issued in the form of an appendix to the Proceedings of the Literary and Philosophical Society of Liverpool; and also in the form of "Report No. 1" of the Liverpool Free Public Museum. The Fishes, Crustacea, Echinoderms, and Corals, have been named; but the lists have not yet been prepared for publication. The Insects, Annelides, Polyzoa, and Hydrozoa have not yet been fully named. The Algæ, Mosses, Hepaticæ, and Fungi, have mostly been named provisionally, and brief notices of some of them have been communicated to various Societies.

The Sponges, including some of the most rare and beautiful natural history objects collected during the voyage, have not yet been worked out; but they have been brought under the attention of my valued friend Mr. T. Higgin, of Huyton, who has become one of the best living authorities on the subject. In consequence of his investigations, the half of one very fine specimen has been consigned to Dr. Gunther for the British Museum; one or two forms are regarded as probably new to science; and a very beautiful sponge from Grenada has been added as a fourth species to a genus which has been named after me, from a sponge collected by myself in Bantry Bay; the new

species being named, described, and figured by Mr. T. Higgin in the "Annals and Magazine of Natural History" as *Higginsia coralloides*. The series of specimens of silicified wood from Antigua, awaits a chemical analysis which has been kindly promised by my friend Dr. Campbell Brown. Diatomaceous deposits, and prepared spiculæ of all the flexible corals, are in the hands of members of the Microscopical Society of Liverpool for further examination.

An appendix, which should contain these materials properly arranged, and thoroughly illustrated, would require a volume much larger than the present one. Still I encourage a hope that the biology of the voyage of the "Argo" may eventually be published, if not uniformly, at all events pretty fully. Meanwhile, I trust that what has been said on the subject of an appendix may shew that we, of the Museum, have not been altogether unmindful of the value of the natural history treasures contributed to the town of Liverpool, through the kindness of Mr. Cholmondeley. Of that kindness, I think the facts recorded in my notes speak with sufficient clearness.

And here let me add that if I have not more frequently mentioned the rest of the members of our party on board the "Argo," it certainly was not because they contributed little to the happiness and success of the voyage. My endeavour has been to follow out the plan, adopted from the very first in my notes, which were designed, not to record the history

of the expedition, but to be memoranda of my own impressions, observations and reflections. Hence, I have thought myself bound to omit many an anecdote of my friends in the "Argo," and many an incident, pleasant and creditable to them and to all concerned; which things are still happily fixed in my memory, though they are not found in my notes.

The following notes on Lower Cryptogamic Plants, found in the island of Dominica, are selected from amongst many others which may, I hope, when completed, appear in a collected form. *Hookeria aurea*, of Mitten. This beautiful moss grows in tufts to the height of three or four inches. When fresh the plant is of a pearly-maize colour, varying to a pale straw colour, with a peculiar translucent appearance. Some of the stems and leaves are marked with sharply defined blotches of purplish-crimson. In consequence of this peculiarity I sent specimens of the moss to Paris, for examination by M. Emille Bescherelle, of the Botanical Society of France; who has recently published a beautiful monograph of the mosses of the French Antilles. He identified it as *Hookeria aurea*. No one of the many authorities who have seen and described *H. aurea*, has noticed the occurrence of colour patches, which I therefore regard as peculiar to specimens from Dominica, where it has not previously been found. In the classification adopted by Mr. Mitten, the plant is assigned to the genus *Hookeria*, but it seems probable that its natural affinities are with

*Hypnum scorpioides*, *H. revolvens*, and *H. Lycopodioides*, natives of this country; all of which are mosses found in watery places, and are often deeply stained with purplish-crimson. The excessive moisture prevalent in Dominica has apparently developed in *H. aurea*, elsewhere uniformly coloured, a character of peculiar staining, found also in its close allies. In the drier Antilles the distinctive colouring of the group is absent in *H. aurea*; in Dominica it is present. The circumstance is noticed as an instance of what may be termed a latent character, and as suggestive of the importance of characters derived from colour. I tested the coloured portions of the *Hookeria* and of *Hypnum revolvens* by the application of hydrate of potash, and came to the conclusion that the colouring matter in both plants was of a similar kind.

The following is an extract from a very kind note which I received from M. Bescherelle:—

"No 2.—(*Ectropothecium*, tibi) est une espece d'*Hookeria*, très voisine de l'*Hookeria leiophylla* mihi, de la Martinique, et que je vous demande la permission denommer *H. Higginsiana*. Elle fait partie d'une nouvelle section que j'ai nommée *Hookeridium*.

Believing the moss to be new, I had proposed for it the name *Ectropothecium vernicosum*. It must now stand as *Hookeria (Hookeridium) Higginsiana*, Bescherelle. The following description by myself is, of course, provisional, awaiting the authentic description by the author of the species.

*Hookeria (Hookeridium) Higginsiana*, Bescherelle. *Dioica; caulis procumbens irregulariter sub-pinnatim ramosus; rami ascendentes; folia parum falcata, disticha, breviter binervia, lanceolato-acuminata, integerrima; capsula in pedunculo rubro nutans; dentibus peristomii pallidis; ciliis usque ad mediam coalitis; operculum recti-rostratum.*

Island of Dominica. Found abundantly in fruit, and growing in neat tufts; or clothing the surface of stones, varying in colour from the lightest to the darkest shades of shell-lac.

A very beautiful little moss, much resembling some of the British species of *Campylopus*, occurred in tufts of moderate size rather plentifully in Dominica. The leaves were rigid and bristle-pointed, and the very short fronds, shaped like a closed parasol, were delicately shaded from fawn colour to primrose. Most of the stems ended in long plumes like the seed-plume of the feather-grass, *Stipa pennata*. On examining my large bundle of dried mosses from Dominica, this plant was not to be found; but it soon became evident that the tufts had been broken up into single stems, and that these had travelled in all directions through the dried mosses, so that two stems were rarely found together.

This was evidently an instance of a natural locomotive contrivance designed for the distribution of the plant; as in the case of the seed popularly called the animated oat; which will work its way up one's sleeve or, in its natural condition, will travel through dried stems of grass to a considerable distance. Contrivances for the distribution of seeds in the higher orders of plants are very numerous, and of the most

varied character; but such contrivances have been much less frequently noticed amongst cryptogamic plants.

Many mosses with rigid bristle-pointed leaves, are in the habit of shedding single stems, which often lie scattered on the surface of the tuft till the wind wafts them away; and when they fall amongst the dried stumps of grass, they are able to travel till they find a suitable resting-place. There are two very interesting points in the economy of these locomotive mosses. Some of them very rarely produce capsules, as in some species of *Campylopus;* and being thus without spores, they are entirely dependent on their locomotive appliances for the distribution of their species. Others bear capsules on foot-stalks, curved like the neck of a swan, as in some species of *Campylopus* and *Grimmia*, so that the spore-case sheds its spores on the plant itself, which, being capable of motion, bears away the spores to a spot suitable for germinating. Other mosses have erect foot-stalks, which hold up the capsule for the spores to be disseminated by the wind. M. Bescherelle named the Campylopus-like moss from Dominica *Neckera trichophylla*. I was unable to send him fruiting specimens, not having found any; but his authority is quite sufficient; and the name confers a great additional interest on the plant, the pleurocarpous Nekereæ being so far removed from the other locomotive mosses, which belong to the acrocarpous division.

The following communication from the writer has appeared in "Nature."

### Passage of Plants Across the Atlantic—Haplomitrium Hookeri, Lyell.

Prof. Unger arrived at the conclusion that in Tertiary times there was a passage of plants from America to Europe. A plant found by myself last year in the Island of Dominica, West Indies, led me to think it probable that there had been an extension of at least one plant in the opposite direction. The plant to which I refer is one of the Hepaticæ, *Haplomitrium hookeri* of Lyell. It differs so much from other Hepaticæ that I was able approximately to identify it on the spot where I found it in considerable abundance. Should it prove to be specifically distinct, my remarks may still, to some extent, hold good. It was growing in a dark, moist, shady spot on the north side of a mountain at an elevation of about 4000 feet. *H. hookeri* is generally distributed over the North of Europe, but I cannot find that it has ever before been found out of Europe. Dr. Oliver kindly informs me that there are only European specimens in the herbarium at Kew. I have failed in obtaining information of its occurrence either in North or South America, or in the intermediate islands. Nees ab Esenbeck, in his "Synopsis Hepaticarum," whilst recording a large number of Hepaticæ from the West Indies, mentions *H. hookeri* only from Europe. Now it is by no means an inconspicuous plant, and it seems altogether unlikely to have been overlooked by such careful observers as Swartz and others who have studied the Hepaticæ of the West Indies. Hence I draw the following inferences, to which may be attached a greater or a less amount of probability. 1.—That the biological centre for *H. hookeri* is Northern Europe. 2.—That it has thence crossed the Atlantic in a rather narrow zone. 3.—That it did not reach

the Continent of America. This, of course, is subject to correction. It may have been found there. From the great extent of territory and variety of climate on the mainland, I think if it had ever reached America it would still be found there. 4.—That it may have reached the West Indies and have died out from Cuba, Jamaica, and other islands, through the prevalence of dry seasons, before the lower Cryptogamic plants were studied by competent botanists. 5.—That it has remained in Dominica because of the altogether peculiar moisture of the climate in that island. 6.—That it has not hitherto been found in Dominica because, from some reason unknown to myself, botanists seem to have neglected this *true* pearl of the Antilles, matchless in the beauty of its natural scenery, and in the wealth of its Cryptogamic flora.

*H. hookeri* is noticed as peculiar in not recovering its freshness when moistened after having been dried. This I found to be the case. On being carefully moistened about eight months after it was collected and dried, it remained flaccid, whilst the rest of the mosses and Hepaticæ from Dominica, when similarly treated, looked as fresh as when they were gathered. But *H. hookeri* exhibited another peculiarity even more remarkable, for it alone of all the Muscineæ that I brought home, grew and produced fruit after so long a period of desiccation. The fruiting parts of a specimen which I sent to the herbarium at Kew, were entirely developed in a moist case on the table at which I am now writing. It seems as if the plant, incapable of the imbibition or intussusception of moisture sufficient to restore the freshness of its foliage, nevertheless retained, in a very unusual degree, its capacity for such development as might secure the continuance of its species. Such a peculiarity no doubt favours the suggestion that *H. hookeri* may have crossed from the East. I found many mosses in Madeira and several lichens in Jamaica, which I have been quite unable to distinguish from British species. These may be common cases of widely distributed forms. *H. hookeri* does not appear to be of this class.

This little plant is the subject of a most elaborate memoir in "Acta Nova" by Dr. Gottsche, occupying 120 closely printed quarto pages, and illustrated by eight plates. He does not, I believe, mention its occurrence out of Europe.

My notes have already exceeded the limits proposed for them, and must now be brought to a close. Many of the questions suggested by friends since my return have been borne in mind in the selections made from my journal. But one enquiry, "What did you like best?" remains to be concisely answered. The two occasions which afforded me most pleasure were, the days passed at Paradise Estate, Trinidad, and those spent on the mountain in Jamaica. These were equally delightful. Of single events, the most gratifying were, the ride in the Island of Dominica, and the visit to the "Garden" at Nassau. The former of the two holds the supreme place in all my recollections of the Western Tropics. I must not, however, omit to mention the nights. The early darkness; the cloudless skies; the leisure on board ship; and the perfect temperature; all combined to render the evening walk on deck felicitous. I had previously no conception of the nightly *hours* of enjoyment capable of being afforded in the tropics by the mere occupation of looking at the heavens.

In deciding to relinquish for so long a time my professional and home duties, several objects were before me; the improvement of my health; the hope

of contributing something to the advancement of science; the desire of furthering the interests of the Institution which I was to have the honour of representing. Personally, there was one question of transcendent interest, in the presence of which all other questions seemed to be trivial. Is Nature inconsistent? Beneath a smiling aspect, is there a lurking cruelty, or even a ruthless indifference to suffering? Does the world contain one example of needless, profitless pain? There are many by whom the affirmative reply is boldly and persistently urged. On two points some additional confirmation was afforded me during my journey to the West:—1st, That it is not easy to fathom the depth of all that is involved by the assertion that there is cruelty, or the infliction of needless pain, in Nature. 2nd, That to a mind not hopelessly fettered by having to make Nature square with preconceived notions, a more extended field of observation, and more of actual out-of-door contact with Nature, bring more clear conviction of the pure benificence displayed in the visible universe.

The assertion that certain animals are provided with organs for torturing other animals, distinct from appliances for more effectually defending themselves and securing their prey, first attracted my notice in a work entitled "The Testimony of the Rocks," by Hugh Miller; who speaks of "examples in primæval time of weapons formed not only to kill, but also to torture." It is hard to say what masterpiece of pes-

simism might not be favoured by Mr. Miller's assertion if only it were true; but science knows of no such fact. Severity there is in Nature, parallel to the severity of the parent, the surgeon, and the judge. Only the weak-minded confound severity with cruelty.

Year by year, moreover, the grim phantoms of malignant powers, truculent, malevolent, vindictive, with which imagination prompted by superstition has ever peopled the unseen universe, are decaying and waxing old, and are ready to vanish away. Is there no solid advantage, no positive benefit to humanity in this? The Dawn, the True Dawn, mystically worshipped under an all glorious symbol, by yearning hearts in past ages, is being accomplished. Perseus could not slay the Gorgon, but he must first seek out the dwelling of the three spiteful sisters on the shore of the frozen sea. They are now, as Kingsley inimitably tells us, icebergs floating up and down, and weeping whenever they meet the sunshine.

I think, alas I can scarcely wonder, that we often forget who best announced the noblest charter of freedom that heaven could bestow on earth—the assurance that man in his path of duty has no supernal power to propitiate or to distrust.

The single regret which attended me on most days, frequently on many occasions on the same day, was, that friends who are dear to me could not share my enjoyment. Nor were friends alone included in this regret; for I have the deepest conviction that, in the

end, the teachings of Nature will prevail to the acknowledgment of a common Father of all. Not for any purpose less than this is it true that "There is no speech nor language where their voice is not heard." Whilst I write, some of the fairest provinces in God's world are ghastly with the horrors of a religious war. Will Christians adopt Islam, or Mahometans become staunch Protestant Episcopalians? No; but when we of the human family rightly appreciate Nature as the common heritage of all, there is One whose most truthful and loving words will be better understood and better kept. And with the clearer recognition of the All Father, I anticipate the passing away of the doubts and fears which now harass and perplex the minds of many. In strict accordance with logical consistency, as well as in the light of a more child-like trust, it will seem plain to us that if precisely what we expect in the future is not to be fulfilled, then in its place there will be something better.

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