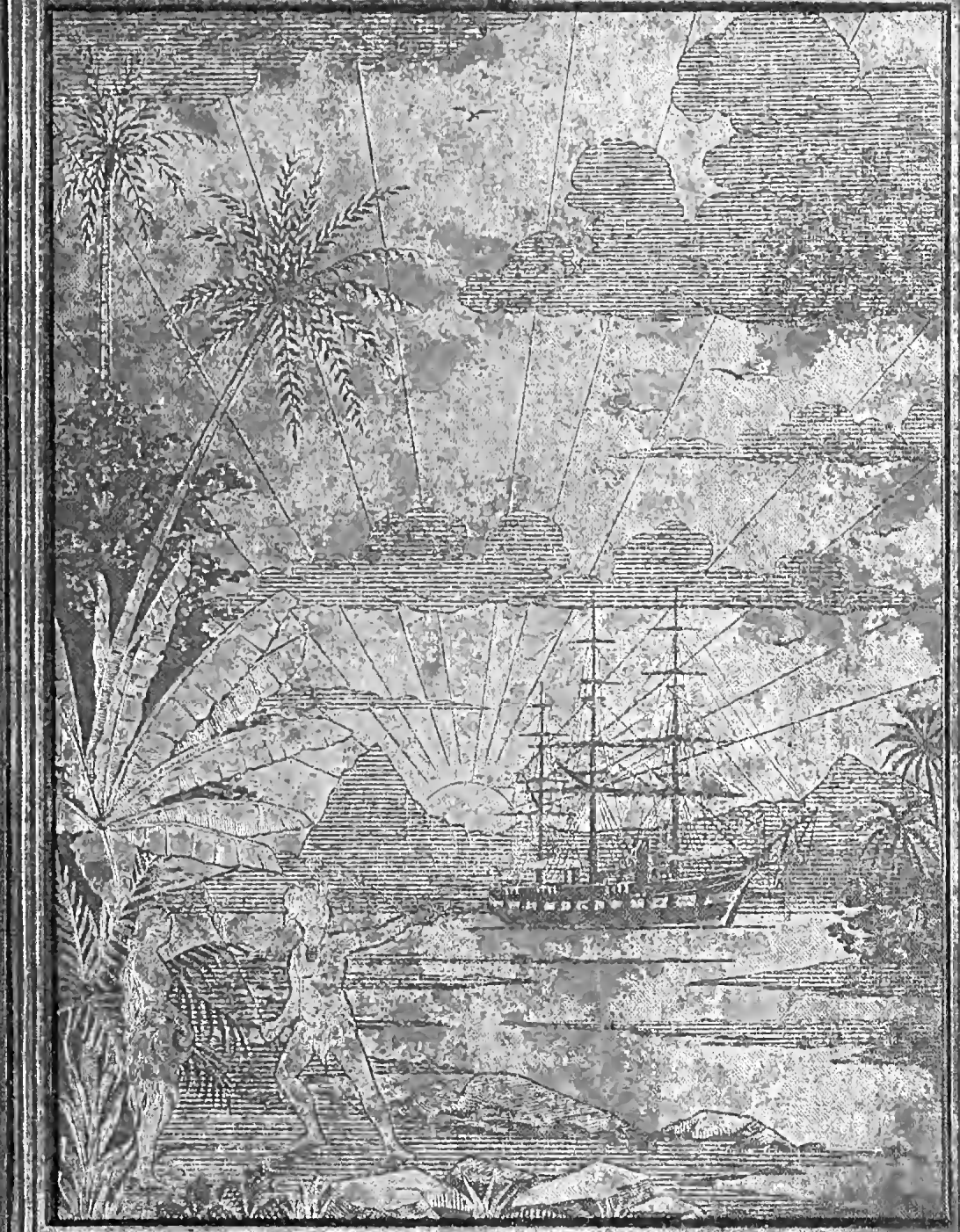
AT ANCHOR

SKETCHES FROM MANY SHORES



VISITED BY H.M.S. CHALLENGER

21/12-6

AT ANCHOR

J. J. WILD

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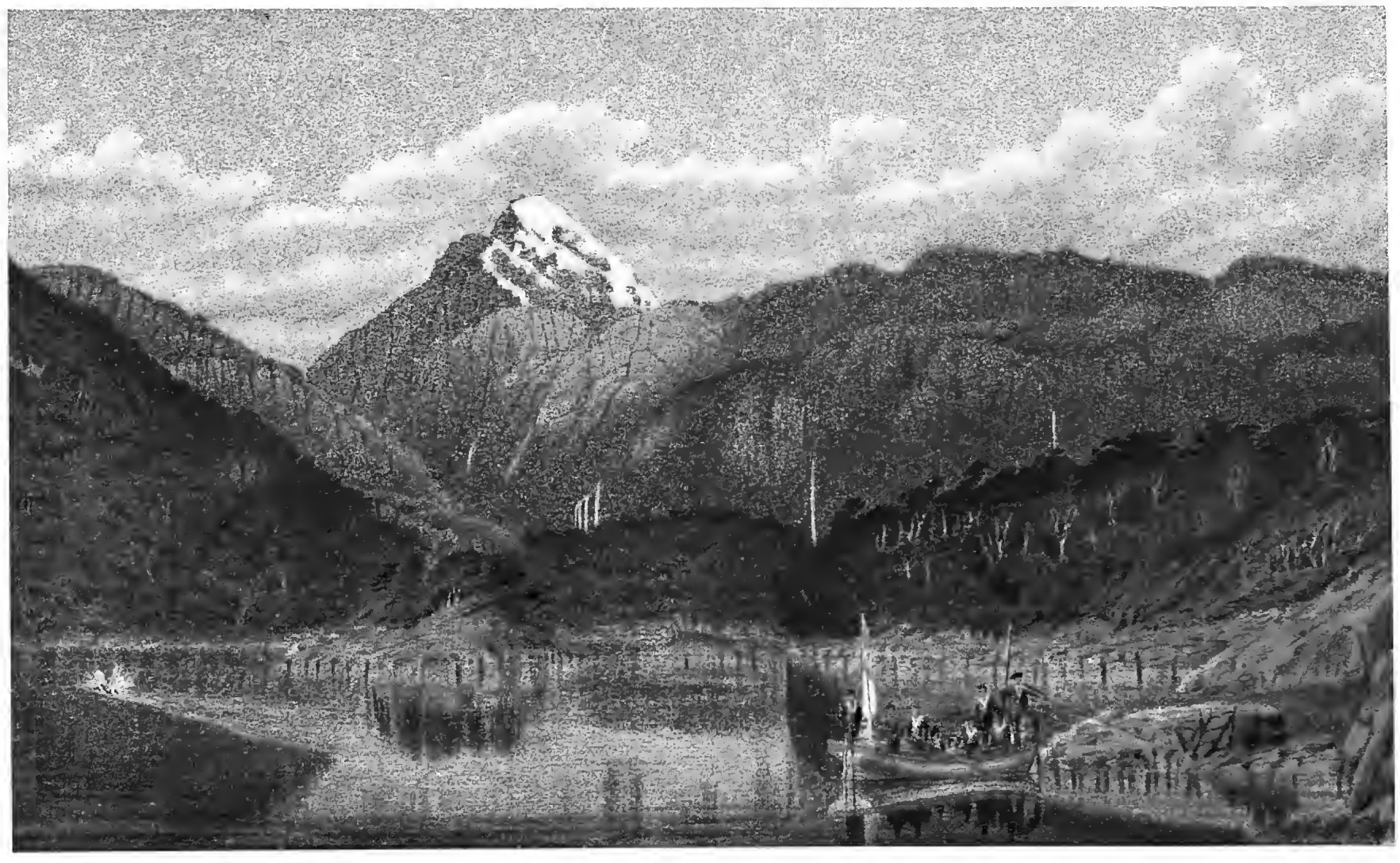


AT ANCHOR

A Narrative of Experiences Afloat and Ashore

DURING THE VOYAGE OF

H.M.S. "CHALLENGER"

FROM 1872 TO 1876

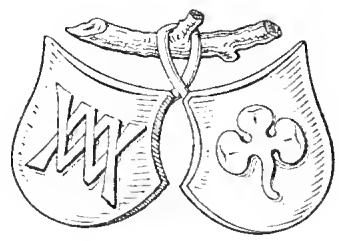
BY

JOHN JAMES WILD, PH.D., F.R.G.S.

MEMBER OF THE CIVILIAN SCIENTIFIC STAFF OF THE EXPEDITION; AUTHOR OF "THALASSA"

With Illustrations by the Author

Hoarse o'er her side the rustling cable rings;
The sails are furl'd; and anchoring round she swings;
And gathering loiterers on the land discern
Her boat descending from the latticed stern.
'Tis mann'd—the oars keep concert to the strand,
Till grates her keel upon the shallow sand.
Hail to the welcome shout!—the friendly speech!
When hand grasps hand uniting on the beach;
The smile, the question, and the quick reply,
And the heart's promise of festivity!—BYRON, *The Corsair*, i. 4.



London:

MARCUS WARD AND CO., CHANDOS STREET

AND ROYAL ULSTER WORKS, BELFAST

MDCCCLXXVIII.

Yours very truly
John D Wild

To My Messmates

ON BOARD

H.M.S. "CHALLENGER"

IN REMEMBRANCE OF PLEASANT HOURS SPENT AFLOAT AND ASHORE.

PREFACE.

THE voyage of H.M.S. "Challenger," between the years 1872 and 1876, must always occupy a distinguished place in the annals of geographical discovery, as being the first systematic attempt made on a large scale to explore the depths of the ocean—hitherto generally deemed unfathomable. Avoiding what may be called the beaten track of the world's commerce, it was our good fortune to follow in the footsteps of many illustrious navigators of the past, and to revisit scenes which they had beheld for the first time.

It occurred to the Author that a description of the different parts of the world touched at during the cruise of the "Challenger"—intended at first merely as a record of personal impressions for the use of relatives and friends, assisted by fugitive sketches taken in moments of leisure and of rest from more serious occupations—might possess attractions for the educated public, many of whom have taken a deep interest in the numerous successful attempts made in recent years to increase our knowledge of the world we inhabit.

The coloured drawings and typo-etchings contained in this volume are simple topographical and ethnographical sketches, representing, as accurately as the circumstances of their production would permit, the natural scenery and the inhabitants of the regions traversed.

It is hoped that the pages of *At Anchor* may also find a welcome among naval men, as recording the principal features of a great undertaking, the success of which was largely due to the earnest co-operation of the captains and officers engaged, and to the devotion and skill with which they guided the ship through all the dangers incidental to a long cruise in the Polar Seas, as well as among the treacherous coral reefs which guard the approaches to the sunny isles of the Tropics.

JOHN J. WILD.

LONDON, *March, 1878.*

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AT ANCHOR.

CHAPTER I.—FROM PORTSMOUTH TO TENERIFFE.

SHORTLY before noon on the 21st December, 1872, an English frigate slowly steamed out of Portsmouth Harbour, followed by the good wishes of the few who had assembled to witness her departure, and of the many who felt interested in the success of the mission with which she was intrusted. Deprived of her armament, and undermasted, there was little in her appearance to recall the gallant war-ship which in former days had carried the standard of the mother-country to distant settlements; but she was well adapted for her novel work. Her fighting deck, cleared of all but four guns, afforded ample space for zoological and chemical laboratories; while her wide ports, sea and sky permitting, admitted sufficient light for microscopical and anatomical operations, writing, and drawing. All available space, allowance being made for the large stores of coal and provisions required on a long sea-voyage, was reserved for the stowage of the dredging and sounding gear, and of the natural history treasures to be brought up from the bottom of the sea. It was expected that the observations to be carried on during her contemplated cruise round the world would throw new light upon the character and distribution of animal life, and the conditions of temperature and of depth throughout the vast ocean which covers nearly three-fourths of the earth's surface. From this point of view, the voyage of H.M.S. "Challenger" might be deemed no unworthy successor of the exploring expeditions commanded by Ross, d'Urville, Franklin, and other illustrious navigators of the present century.

No sooner had the shores of England faded in the twilight of the shortest day than our good ship encountered heavy seas and head-winds, which continued for several days. In consequence, my first impressions of life at sea are reduced to a dim recollection of daily and nightly tossing by the furious waves, amidst an unearthly chorus of sounds strongly

suggestive of the first scene of "The Tempest"—the groans of creaking timbers, the howling of the gale through the rigging, the hoarse voice of the commanding officer trying to outroar the storm, the screech of the boatswain's whistle, and the tramp of many feet overhead. Christmas Day still found us in the same plight about a hundred miles to the westward of the Scilly Islands, now breasting the gale under steam, now driven back towards the land by the unrelenting south-wester. Most of the patients had sufficiently recovered to share in the festivities of the day, though they would have preferred to celebrate them amid happier surroundings. During the following days we were able to shape our course towards the south, but when, on the morning of the 27th, I stepped on deck to try my newly acquired "sea-legs," I found the ship still surrounded by a chaos of green waves, whose foaming crests, blown into cloud-like spray by the force of the wind, fell back in impotent rage from the stout sides of the "Challenger." The dreary scene, now and then illumined by a few rays from the pale disc of the sun half-hidden behind the scudding clouds, was completed by the appearance of a ship's hull bottom up—to judge from the floating wreckage, probably some overladen timber-ship sunk by one of the numerous squalls we had encountered. Thus did we fully experience the terrors of the Bay of Biscay, that most dreaded of seas.

On the 30th the light of Cape Finisterre came in sight, and we recalled the fate of the unfortunate "Captain," lost at a point not far from our track. We were now hourly approaching latitudes where nature is "more kind," and advantage was taken of the improved state of the weather to make our first experiments in sounding and dredging. The feasibility of lowering a dredge to a depth of over 1000 or even 2000 fathoms, dragging it for some distance along the bottom of the sea, and bringing it and its contents safely to the surface, had already been demonstrated by the experiments made a few years before on board H.M.S. "Porcupine;" but some uncertainty was still felt as to how far a vessel of larger dimensions would lend itself to a performance sufficiently critical to tax the skill and the patience of the most practised operator. The success of the whole expedition absolutely depending upon the result of these first attempts, it was a subject of considerable gratification, to those more immediately interested, to find no serious obstacles to a thorough exploration of the abysses of the ocean. On a subsequent memorable occasion, the sounding-apparatus and thermometers were lowered to a depth of over five miles, and successfully recovered, together with a sample of the bottom. The first days of the year 1873 were spent in repeating these experiments with varying results.

LISBON.

New Year's Day found us about forty miles to the westward of Cape Mondego, and the following day we neared the Burlings Islands off Cape Carvoeiro. Though we had been only a fortnight at sea, we had received such rough handling that the prospect of touching land was hailed with unmixed satisfaction. It was on a fine breezy morning that the ridge of Cintra appeared above the horizon, and shortly after entering the Tagus we cast anchor in front of Lisbon.

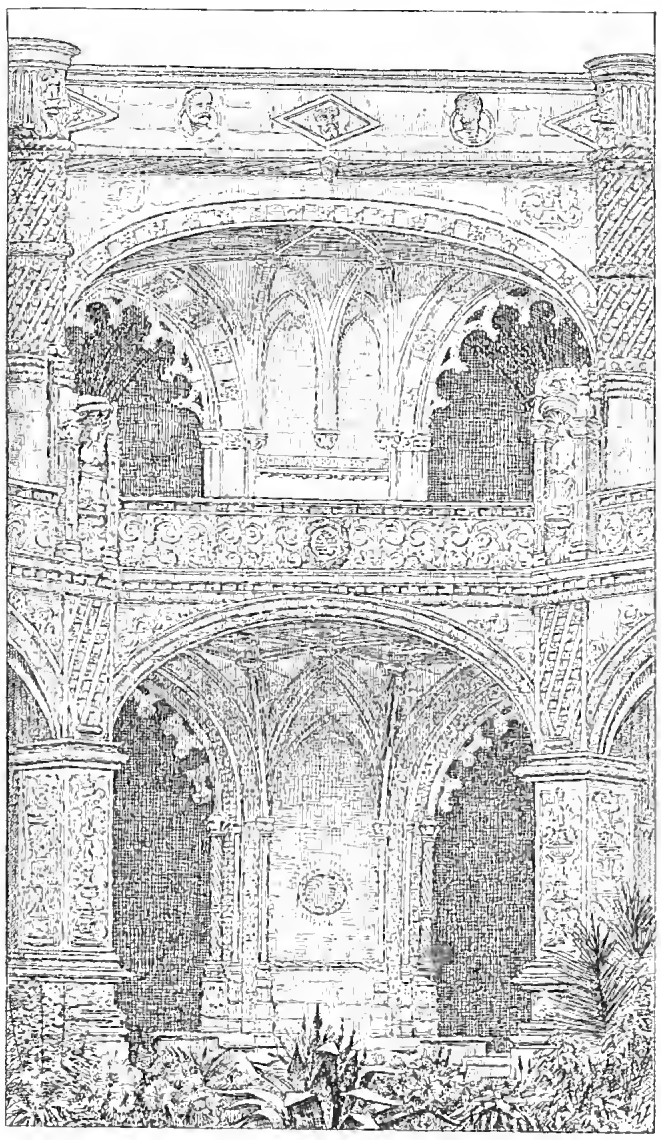
Seated on the southern slopes of a range of hills which extends along the water's edge a distance of four miles, from the Tower of Belem to the Castello de S. Jorge, Lisbon rivals in beauty of situation the most queenly cities of the Old and New World. One of its principal charms for the visitor from the North, and one which he cannot fail to notice in the first hour of his arrival, is its climate. But for the shivering figures we met at the corners of the streets, muffled to the chin in their cloaks thrown over the left shoulder in accordance with the approved fashion of the South, there was nothing to remind us of the fact that it was January; and in the interval between a few showers we revelled in the mild breezes and bright sunshine of what seemed to be the pleasant days of April and May. Sitting one day in the Passeio Publico, I could not help contrasting the gay social scene before me with the appearance at the same season of a famous thoroughfare in a northern capital—the wet pavement dimly lighted by a few rays of yellowish gas struggling through the yellower fog; a sullen-looking crowd hurrying and jostling through the darkness.

There was a time when Lisbon was the London of the then civilised world—when its outward-bound galleons spread their wings at the mouth of its beautiful river, to return laden with the wealth of the Indies; and the remembrance of those days of Portugal's greatness gives to a visit to Lisbon the character of a pilgrimage to the cradle of modern international commerce. Here Columbus came to live with his brother Bartholomew the chartmaker, and here he married the daughter of an Italian naval commander who had sailed on several voyages of discovery. The visitor to Cascaes, a small seaport at the foot of the Cintra range, is told that it is the birthplace of Affonso Sanchez, a pilot who, having been carried by a storm to an unknown land in the West about the year 1486, on his return imparted his discovery to his host Columbus, then settled at Madeira. Whether this report be true or false, it is highly probable that Columbus, while engaged in trade between Madeira, the Azores, and the Canaries, all of which are washed on their west coasts by the return-current of the Gulf Stream, may have fallen in with numerous traditions of strange plants and fruits, or perchance canoes, stranded upon their shores, and thus become convinced of the existence of a continent beyond the seas which he was in the habit of navigating, though under-estimating the distance which separated him from the unknown land.

The palaces, squares, fountains, and semi-tropical gardens of Lisbon offer many attractions to the sight-seer, but our short stay afforded but few chances of adding anything new and interesting to the descriptions of previous travellers. The lover of art finds in the numerous churches of the Portuguese capital a rare collection of masterpieces of sculpture, carving, and mosaic, although in the outward aspect of some of these buildings he may recognise the prototype of that degraded style of architecture, mainly consisting of scroll-work and plaster, with which both Portuguese and Spaniards have endowed their colonies in the two hemispheres.

Nevertheless, Lisbon possesses several monuments of the golden age of architecture, foremost among which are the imposing ruins of the "Carmo," in the centre of the town; a church founded in 1389, and reduced to its present condition by the great earthquake; and

the better preserved Church and Monastery of Belem, commenced in the year 1500, and erected on the spot where Vasco de Gama embarked in 1497 on his first voyage of discovery to the Indies. The much-admired porch of this church contains a series of between twenty and thirty statues, each standing in its own elaborately-carved niche, and furnishes an example of the profuse ornamentation of the 16th century. The cloisters of the monastery present a curious but not unpleasing mixture of Gothic, Moorish, and Italian styles. As an illustration of the freedom with which the builders of old treated the materials at their command, I may point to the manner in which the lines of the lower arches are continued into and through the fenestrated ornament which connects the pillars with the niches above. The effect of this combination, which perhaps few modern architects would venture upon, is charming. The hard and opaque stone here seems a liquid and transparent substance, allowing the features of one design to be seen, as it were, through the lines of the other.



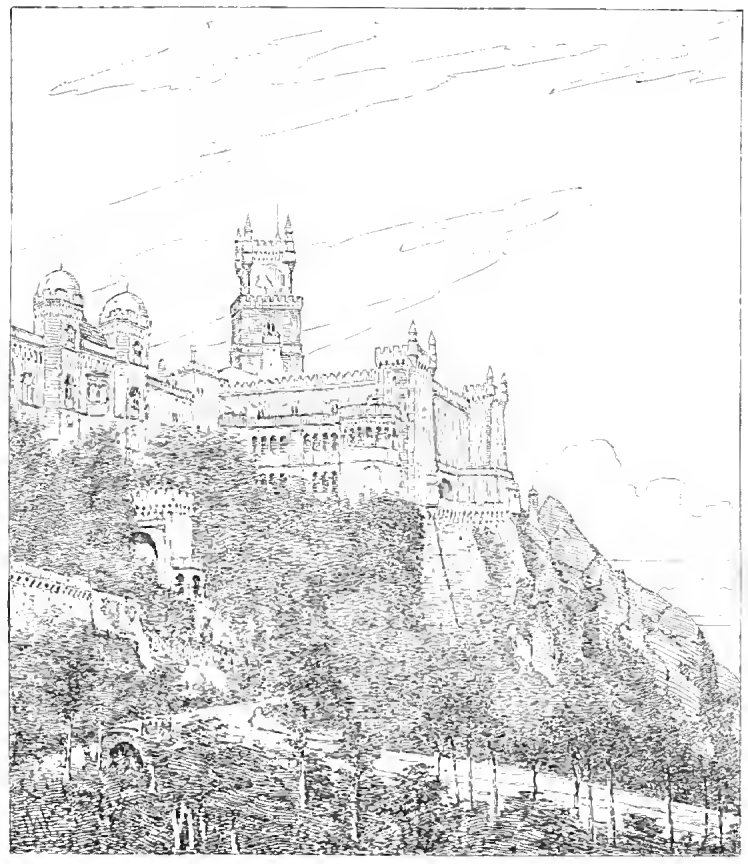
THE CLOISTERS OF THE CONVENT OF BELEM.

The associations of the romantic pile of buildings which crowns the granite rocks of Cintra, amidst surroundings which nature and art have joined to render one of the most picturesque spots in the universe, form a sort of epitome of the history of Portugal. From the high tower of the Castello da Penha, Don Miguel is said to have often watched for the return of Vasco de Gama. Portugal is apparently resuming her place in the van of scientific progress. The meteorological observatory of Lisbon, the botanic garden, the natural history museum, as well as the active share which her learned societies are about to take in African exploration, attest the steps she has made in this direction.

A few days before the "Challenger's" departure, his Majesty Dom Luis I. honoured the ship with a visit. The King, who was dressed in the uniform of an admiral, was received on board by Sir Charles Murray, the British Minister at Lisbon; Captain G. S. Nares and the officers of the ship; the director, Professor C. Wyville Thomson, and the members of the civilian scientific staff; and, after the usual ceremonies of presentation, proceeded to examine with much interest the various instruments and appliances for sounding and dredging. It seemed a good omen when, at the termination of his visit, the successor to the throne of D. Henrique and D. Manoel expressed his good wishes for the success of the expedition.

Our departure from Lisbon had been delayed by unfavourable reports as to the state

of the weather outside; but on the evening of the 12th we again passed the Tower of Belem, and on the following day, when off Cape Espichel, we resumed what was to be for the next three years and a-half our almost daily routine of life at sea: shortening sail, getting up steam, sounding, lowering and hauling in the dredge, sorting and bottling the contents of the latter, &c.—proceedings which generally occupied the whole day between sunrise and sunset, amidst the monotonous thump of our busy little deck-engine. On the 15th we rounded Cape St. Vincent, and on the succeeding day an experiment was made which largely contributed to the success of our future dredging operations. It had been observed that the dredge, with its iron frame and weights, had a tendency to sink into the ooze, and, once choked with mud, it was rendered useless for catching the animals which might come in its way. Some one suggested the substitution of the ordinary trawl used by English fishermen. This consists of a triangular bag-shaped net about thirty feet long, attached to the iron runners of a wooden beam measuring fifteen feet. Having been lowered to the bottom at a depth of 600 fathoms, it returned to the surface with numerous specimens of animal life, some of which were new to the zoologist; and the success of this experiment justified its frequent repetition, though the dredge was not altogether discarded. During the progress of the expedition, the trawl was often seen to rise from the sea studded with a perfect coruscation of star-fishes and other denizens of the deep. From the day we left the Tagus, we had been favoured with blue skies and a summer atmosphere—a great inducement to linger on deck up to a late hour. Midnight of the 17th found some of us still on the bridge; the moon was up, and we were running before the breeze under all sail without the least sensation of motion, the light of Cape Trafalgar on our right, that of Cape Spartel on our left. I had turned into my cabin and taken a few hours' sleep, when I was roused by a message from the officer of the watch. A moment after, I was looking at the mountains of Europe and of Africa fronting each other in the gloom of the early morn; then I suddenly saw rising before me in the east a tall mass of whitish rock tinged with the rosy light of dawn, and standing out grand and weird from the deep-blue background of the retreating night-clouds. It was the rock of Gibraltar; and as the sun rose, he revealed a panorama of sea and mountain more lovely and majestic than any I had seen before. A few hours after, we were anchored off Gibraltar in company of H.M.SS. "Minotaur," "Agincourt," "Sultan," "Hercules," and "Bellerophon."

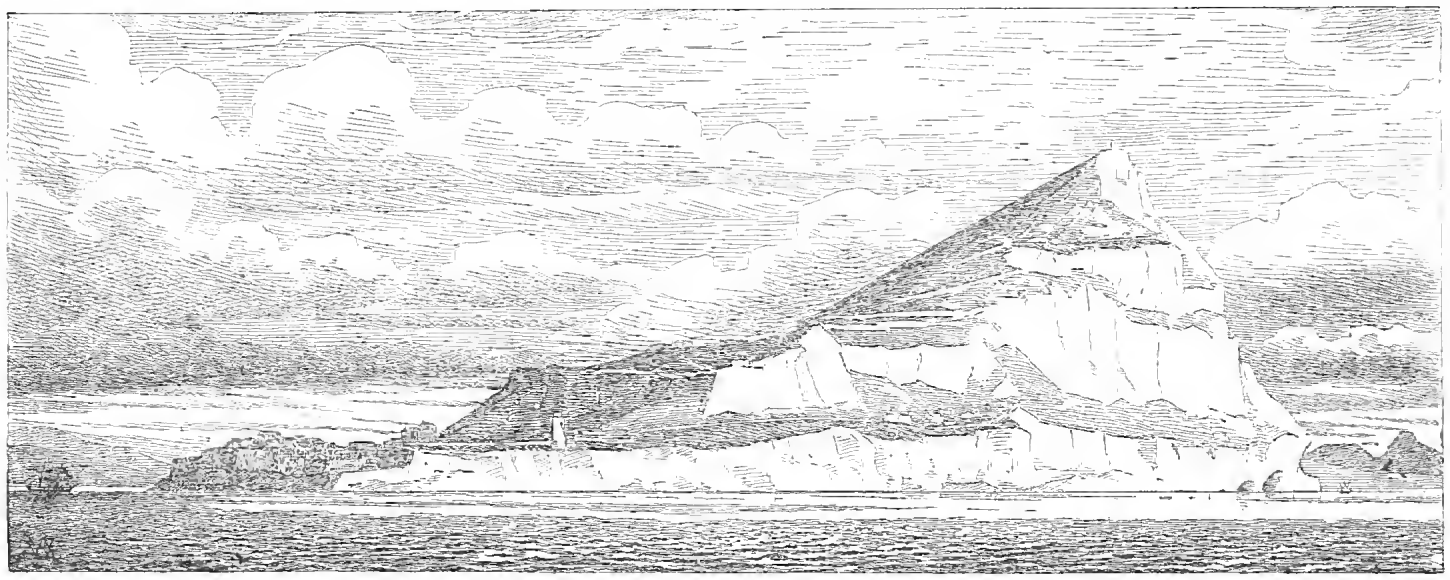


CASTELLO DA PENHA, CINTRA.

GIBRALTAR.

Stirring recollections are aroused by the name of Gibraltar—that "lion couchant" which keeps watch and ward at the gate of the Mediterranean. To the newcomer it presents a singular combination of rocks and bastions, barracks and piles of cannon balls, red coats and strange turbaned and slippered white figures hailing from Ceuta and Tangier. An unexpected feature of street life is the Irish jaunting-car, probably introduced by some patriotic warrior from Erin.

One of our earliest visits was paid to the famous Cave of St. Michael, the entrance to which is a short distance below the O'Hara Tower. We were furnished with a supply of blue lights, and the aspect of the vast cave when thus illuminated was truly sublime.



THE ROCK OF GIBRALTAR, FROM THE SEA.

The stalactites suspended from the roof—the grotesque masses of stalagmites rising from the floor of the cave, sometimes assuming the shape of an altar—the massive pillars formed by the junction of both—seemed the work of the fabled genii of the under-world, and presented in their ensemble the similitude of a Gothic cathedral. A number of bones and pieces of earthenware collected in this and other caves were subsequently sent on board, but on examination they proved to be of comparatively recent date.

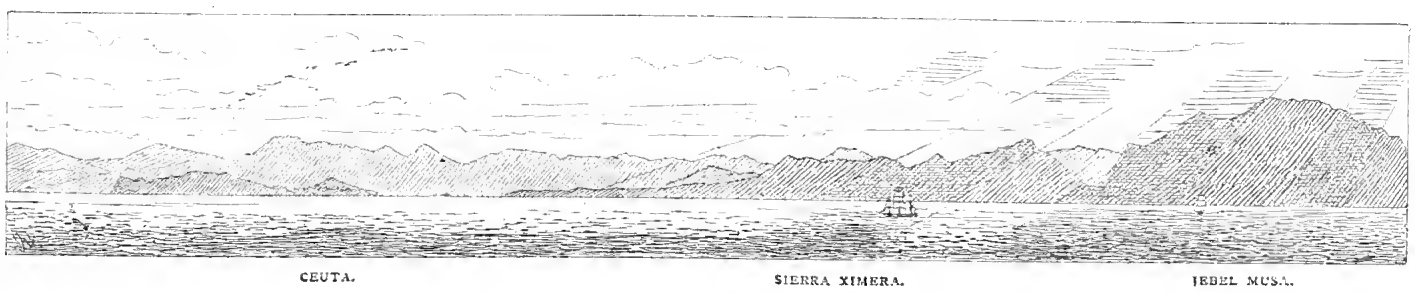
On the 23rd of the month, His Excellency Sir F. Williams "of Kars," Governor of Gibraltar, visited the ship. Next day H.M. gunboat "Pigeon," placed at our disposal by Commodore (now Admiral) Phillimore, carried us across the bay to Algesiras. Having paid our respects to the Spanish Governor, Don Beaumont, and inspected a recently-erected amphitheatre devoted to bull-fights, we started for our destination—a waterfall called "La Chorrea," situated at the head of a romantic glen. While resting and admiring the scene before us, which bore no slight resemblance to some of the summer resorts of holiday-folk in our own islands, we witnessed an operation with which northern life had not rendered us familiar—namely, the gathering of oranges. The sight of the golden fruit profusely

scattered in the grass like apples in an English orchard was both new and pleasing. On our return we noticed some fine old oak trees, with a beautiful fern *(Davallia)* growing from the chinks of their weather-worn bark.

One of the favourite promenades and drives of the inhabitants of the "Rock" is the

THE GOVERNOR'S COTTAGE AND O'HARA TOWER.

fine carriage road which leads towards Europa Point, and, bending round, runs along the eastern face of the rock, past the Governor's Cottage and O'Hara Tower. This road commands a wide view of the Bay of Algesiras, the Strait, the opposite African shore, and the distant Sierra Nevada. Outside the South Port is the Alameda or public garden, laid out

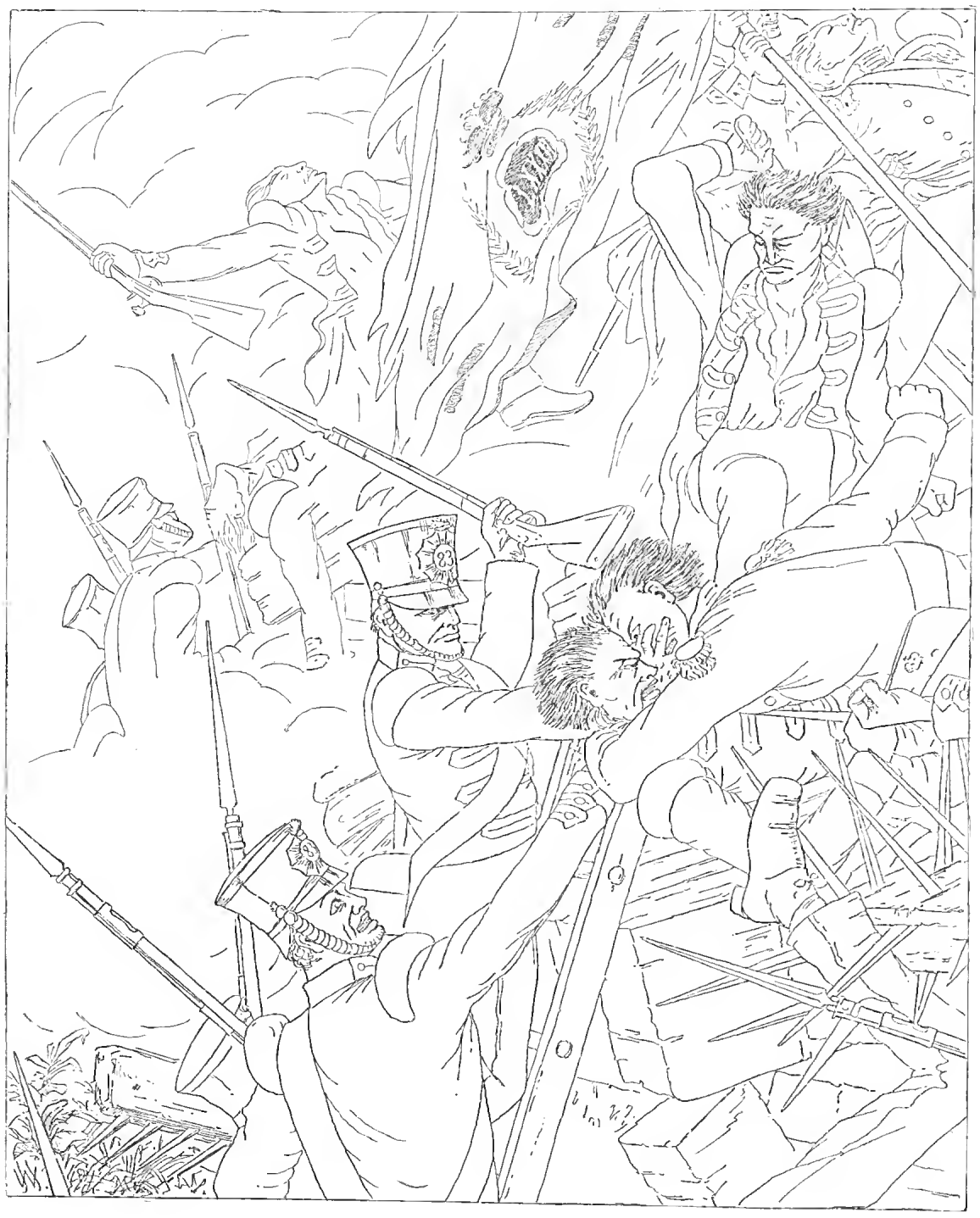


THE OPPOSITE AFRICAN SHORE.

with much taste, and kept in excellent order. Thither I went to enjoy a foretaste of the splendours of tropical vegetation, to breathe the balmy air of a more genial clime, or, in the cool of the evening, to watch the quivering sheen of the golden bridge which the moon cast across the Strait.

The walls of the courtyard of Government House are adorned with two large

drawings in black and white. These, according to report, are the work of a Colonel some time stationed at Gibraltar, and represent scenes from the storming of Badajoz and the siege of Gibraltar. Whether it be the vigorous touch of the artist, or that the hand of Time has toned down the harshness of the original outlines, these drawings, which seem to have been executed by one not unfamiliar with the horrors of the battlefield, have at first sight the appearance of bas-reliefs.



A lengthened residence in Gibraltar may at times remind its valiant defenders of rock-bound Prometheus; yet the place has a kind of fascination for the British soldier and sailor, by whom it is affectionately called "Gib." This is not to be wondered at, for, barren rock though it be, it is perhaps, of all conquests achieved by British valour, the most impressive symbol of England's greatness.

The sound of the fiddle and the measured tramp of the men at the capstan were heard on the 26th, and the time had come for commencing our voyage across the Atlantic. As we were turning our back upon the Mediterranean I cast a lingering look behind, for what names were written over the gate we had entered only a few days before—

ROME, CARTHAGE, GREECE, JUDÆA, EGYPT!

But our path lay towards the New World, and our business was with the future, not the past.

There were rumours on board of looking in upon the Moor at Tangier, but the rough weather of the 27th drove us out of the Strait. We were now bound for Madeira, 600 miles distant. This part of the cruise was specially devoted to obtaining practice in, and completing

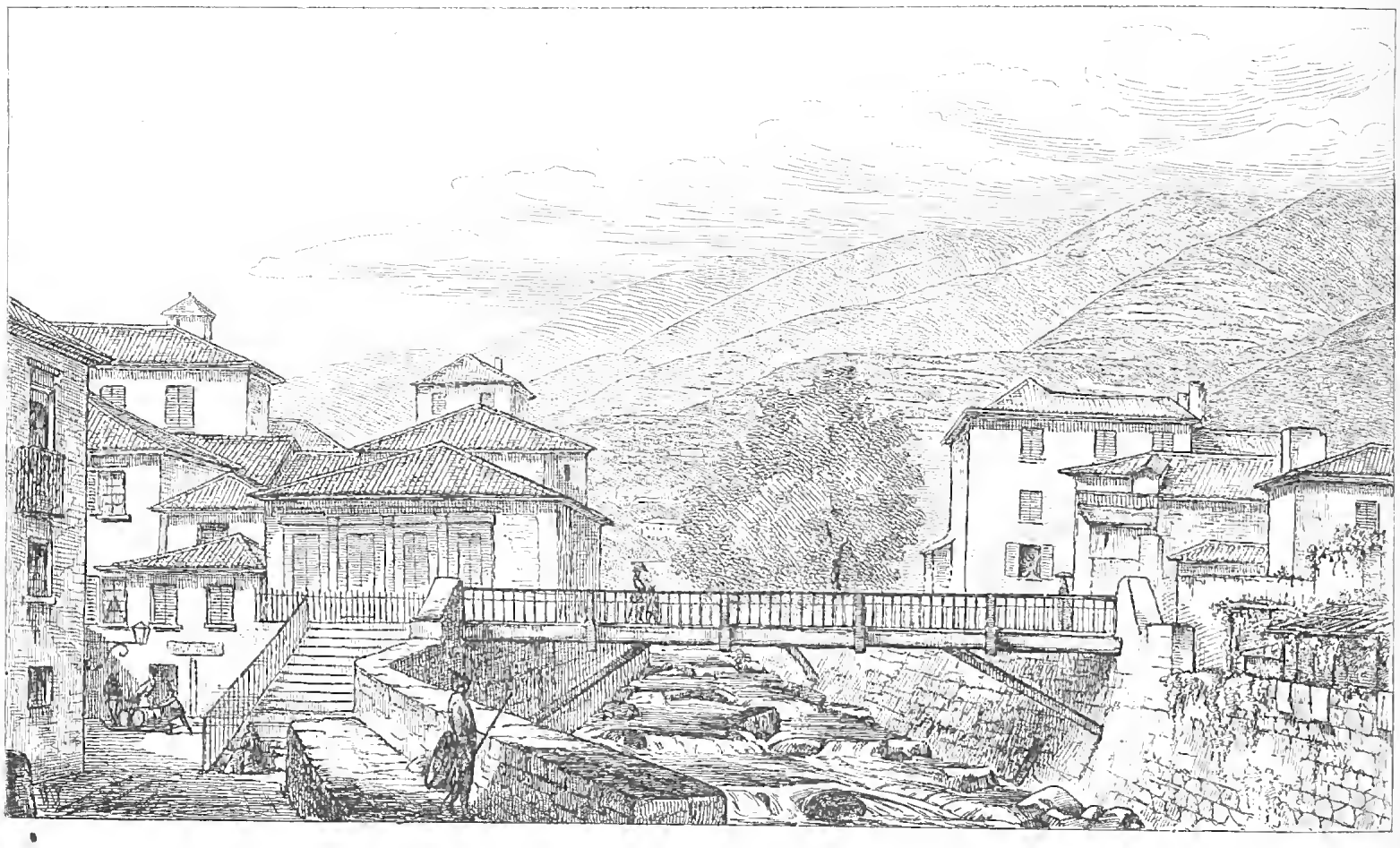
our arrangements for, serial temperature soundings; that is to say, observing the temperature of the water by lowering one or more self-registering thermometers to various depths between the surface and the bottom of the sea. The earliest experiments of this nature brought to light an interesting fact, fully confirmed by subsequent observations—namely, that the solid body of the earth is wrapped as it were in a layer of cold water from one to two miles thick, and of a temperature only a few degrees above, sometimes even below, the freezing-point of fresh water. The only exception to this rule, as was discovered afterwards, is found in the smaller seas which fringe the coasts of our great continents, some of which are cut off by submarine ridges from the cold layer which occupies the bottom of the ocean outside; and in these the water is found much warmer at all depths. This envelope of cold water reaches up to the surface of the sea towards latitude 60° in both hemispheres; and were it not that the heat of the sun creates a belt of warm water about half-a-mile in depth, which spreads out on both sides of the equator as far as the 60th parallel, the whole surface of the globe would be reduced to the condition of the Arctic Region, and the enormous masses of ice which even now come down as far as the 40th parallel would be found floating between the tropics. So delicate and precarious are the conditions, so narrow the limits of temperature, on which depends the existence of all life upon our planet.

MADEIRA.

Land was sighted on the morning of the 2nd February, and soon the summits of Porto Santo and the steep barren flanks of the Dezertas came into view; but it was not until sunrise of the 3rd that we steamed up towards Funchal and anchored off the Loo Rock. The clouds, which on our approach had hung low about the mountain-tops, disappeared before the rays of a blazing noonday sun, and the flower and fruit laden gardens and terraces of Madeira lay before us in all their loveliness, rising tier upon tier from the dark shingly beach, until lost among the wood-clad hills which overlook the roadstead. A portion of the enthusiasm which the first glimpse of Madeira excites in the traveller, may be due to the fact that often it is the first land sighted after his escape from the horrors of the Bay of Biscay; but the island possesses, in its almost perfect climate, and in the endless variety of its scenery, now rugged and wild, now graceful and sylvan, sufficient claims to justify all that has been said and written in its favour.

The climate is, perhaps, too relaxing for a European frame, and the heat reflected from the steep mountain slopes facing due south must at times be excessive, though to this we are indebted for the golden beverage which has made Madeira a household word. The big boulders which strew the bed of the deep walled-in torrents that traverse Funchal attest the violence with which, after heavy rain, they rush down to the sea, carrying destruction before them. The roadstead is open to the fury of the southerly gales, and it happens but too often that whole fleets, unable to gain the open sea, are cast upon the beach of Funchal.

The place is defended by some old forts, but there are very few buildings or monuments of interest. A favourite pastime consists in riding up to the Convent of Nossa Senhora de Monte, whose towers rise conspicuously behind Funchal, on the back of one of the small steeds of the island, which gallop up the steep roads with the utmost facility, the guide holding on by the horse's tail. The return journey is made on a wooden sledge, which, skilfully managed by the natives, shoots down the hill with the rapidity of lightning, and lands the traveller in the streets of Funchal. These wooden sledges seem to be a survival of the ancient vehicles of the island, and the paving-stones are worn quite smooth by the constant friction. Excepting a small black cap, surmounted by a tall spike, there is little peculiar in the costume of the peasants. The latter may be styled good-looking, sometimes even handsome;

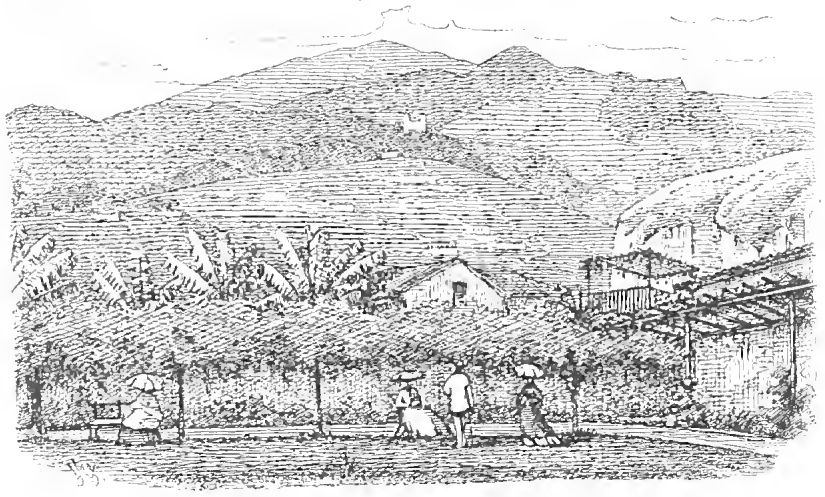


FUNCHAL, MADEIRA.

their black eyes and black curls and their general physiognomy proclaim a type which, if not aboriginal, has acquired a character of its own through long separation from the parent stem, and the influence of different habits, food, and climate.

Madeira, with the adjacent islands of the Dezertas and Porto Santo, occupies the southern extremity of a submarine elevation which, according to recent soundings, extends as far as the Josephine and Gettysburg Banks off Cape St. Vincent, and may have been connected at one time with the plateau of Europe. The island itself, about thirty miles long and twelve broad, stretches from east to west, and forms the crest of a volcanic ridge, which rises from a depth of three miles to the surface of the sea, and about 6000 feet more above the level of the latter.

We weighed anchor shortly before noon of the 5th February, and were already on our way towards the Canary Islands, when a large ship was seen coming round the eastern point of Madeira. It turned out to be H.M.S. "Orontes," bound with troops for Bermudas. Having received her signal that she carried letters for us, we turned back, and, the welcome messages from home in our possession, once more spread our sails, when a fine breeze from the north-east soon carried us out of sight of land. Next day at noon we had left 174 miles behind us; and the rising sun of the 7th shone upon the fantastic cliffs of Teneriffe. Many an eye, during our approach to the island, had been strained to catch sight of its far-famed Peak; but the snow-clad giant, enthroned behind the clouds, was, for that day at least, invisible.

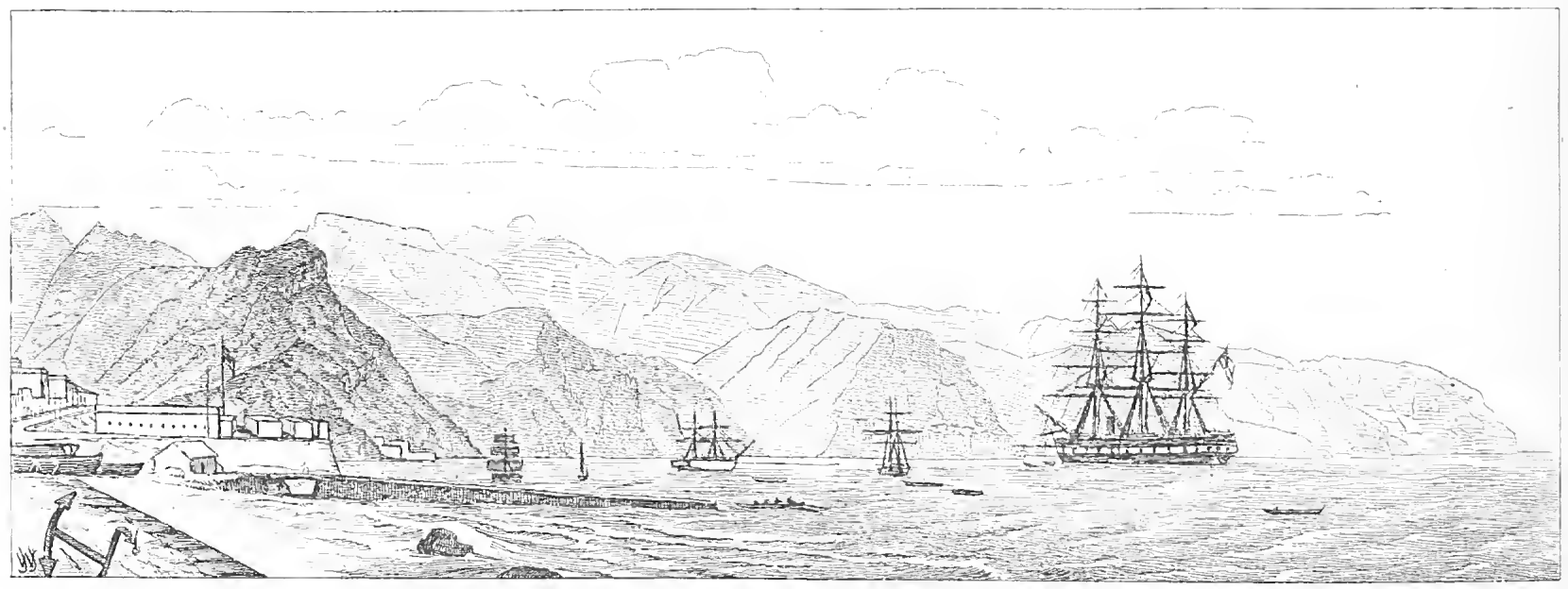


FUNCHAL, MADEIRA.

CHAPTER II.—FROM TENERIFFE TO BERMUDAS.

SANTA CRUZ.

WE found all Santa Cruz *en fête* to celebrate the birth of a Spanish Prince, a grandson of Victor Emmanuel, and at noon a royal salute was fired from the forts in honour of the event. The contrast between the barren, precipitous crags which front the sea from Santa Cruz to Anaga Rock, the eastern extremity of Teneriffe, and the wooded slopes of Madeira, was so great as to take us quite by surprise. While the latter recall some of the fairest scenes of Southern Europe, the former look as if a piece of Africa had by some chance drifted out into the Atlantic—an impression quite in harmony with the flat-topped houses of Santa Cruz, and the unexpected appearance in its streets of the "ship of the desert," with its

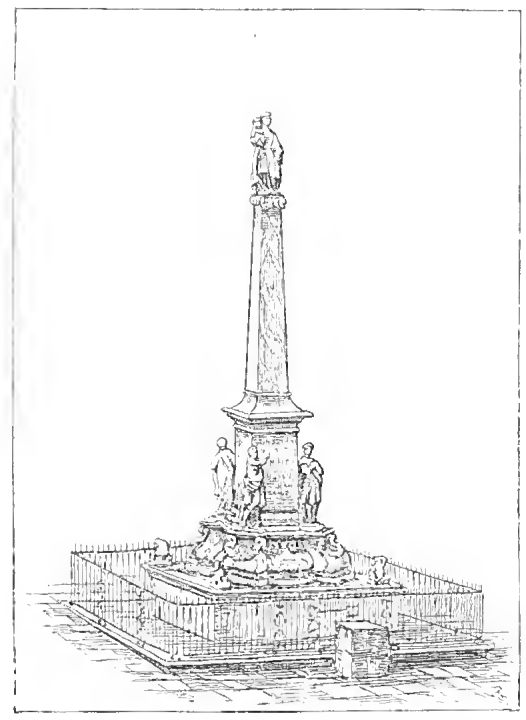


ROADSTEAD OF SANTA CRUZ, TENERIFFE.

slow stride, drooping eyelids, and cynical physiognomy. A journey of a few miles inland beyond the barren coast-range, however, brings the traveller into a well-cultivated district; indeed, the island is noted for its fertility, producing both the vine and the sugar-cane—the fruit-trees of the temperate as well as those of the torrid zone. The costume of the

peasants is chiefly remarkable for a heavy woollen blanket which they fasten round the neck with a string, so that, seen from a distance, they have the appearance of perambulating sacks.

The most artistic monument in Santa Cruz is the obelisk which adorns the principal *plaza* or public square. The shaft is surmounted by an image of the Virgin and Child, and below are ranged four statues, said to be the effigies of native kings converted to the Christian faith by their Spanish conquerors. The "Guanches," the race over which they ruled, have left nothing but their name and a few mummies. At the corners of the base are four well-carved figures of children, representing the Seasons.



MONUMENT AT SANTA CRUZ.

The month of February offered but a remote chance of a successful ascent of the "Pico de Teyde," as the great mountain is called here. Nevertheless, a party of officers and civilians started for this purpose shortly after our arrival. After a brave struggle they attained a height of 9000 feet above the sea-level; but the remaining 3000 feet being covered with snow, the guides refused to go any farther. Meantime, the "Challenger" had left her anchorage for a sounding-cruise round the island. On the morning of the 10th, when we had got clear of the land, we obtained the first view of the Peak. Late on the evening of the 11th, as we were sailing along the north coast of the island, our attention was attracted by what seemed to be a white cloud, but which, a moment after, assumed the delicate outline of the snow-covered volcano. Far above the bank of clouds which concealed the lower regions, it rose like a huge silvery tent, vying in silent splendour with the light of the stars which shone beside it upon the dark night sky.

THE PEAK OF TENERIFFE, 12,180 FEET.

In steady pursuance of our task of sounding, dredging, and registering temperatures, we came next day in sight of Palma—with its "caldera" or volcanic "kettle," from three to four miles wide, and bounded by a circle of precipices from 1500 to 2500 feet high—an object of no less interest than its neighbour, the Peak of Teneriffe. When off Gomera, one of the smallest of the Canaries, its sister island Hiero or Ferro—amongst the inhabitants of which are said to be some descendants of Columbus—was visible above the western horizon.

The 13th February found us once more anchored before Santa Cruz. Notwithstanding its somewhat rude and forbidding aspect, the town is not without the attractions of civilised life. A visit to the theatre and a ball at the house of the British Consul, attended by the notabilities of the place, gave us an opportunity of paying our tribute of admiration to the graceful *señoritas*, otherwise seldom visible to the passing traveller except when quietly gliding with veil and parasol to afternoon mass.

Late on the 14th, H.M.S. "Challenger" started on her first long cruise across the Atlantic, her next port being St. Thomas in the West Indies, distant about 2700 miles. Our progress during the first days was rather slow, on account of the light winds and the frequent stoppages. The dredge came up empty once or twice; but in the course of the 18th we made one of the most interesting captures of the cruise. The dredge came to the surface filled with fragments of a large coral, which, from their number and size, must have formed a shrub several feet high, attached by its base to the rocky bottom of the sea. The outer layer of the fragments was black, but the fracture showed that the original colour of the coral had been white. Entangled among its branches were two large sponges, which were soon identified as *vitreous* sponges, so called because the more solid portion or skeleton of their bodies consists of a network of delicate transparent needles or spicules, which resemble threads of spun glass, and present under the microscope an extraordinary variety of form and combinations. Some of these spicules attain a considerable length, and, clustering at the base of the sponge, form a white glassy beard, probably intended to enable the sponge to obtain a firm hold upon the ooze in which they are generally found embedded. In the present case, the two sponges were joined together by their beards, and the interstices between the spicules were choked with a mass of small shells, chiefly of pteropods and other minute inhabitants of the sea. We looked upon this curious find as a promise of the many wonders which the ocean had in store for us.

We were now approaching the sailor's paradise, namely, the region of the trade winds; and, after devoting the day to our usual work, were sure of being able to add during the night another hundred miles to our log. A visit to one of Her Majesty's ships is a favourite treat for the landsman at home, though it conveys to him a very imperfect idea of life on board when at the full height of its activity. A man-of-war is an epitome of a nation, with its complement of king, prime minister, chancellor of the exchequer, executive staff, board of health, church and school dignitaries, and obedient subjects skilled in every craft devised to satisfy the daily wants of man. Imagine the stately ship, half-hidden under her press of sails, running swiftly before the steady breeze, coquettishly leaning now to one side, now to the other, as she ploughs her straight furrow across the watery plain. Above, the blue sky, with its banks of soft clouds; below, the intense blue sea, speckled with white crests. Broad sunbeams fall upon the dry, smooth decks, and light up the interior in all its fair-weather finery of gilding, painting, and whitewash. The big guns, in their pride of polished metal and varnish, look more like toys than formidable engines of destruction. And what life between decks! The cook, the baker, the butcher, the tailor, the shoemaker, the carpenter,

the sailmaker, the smith, the armourer are all at work. Here a weather-worn tar is cutting out a useful garment upon the clean white boards; there a sailor boy is untwisting ropes or manufacturing swabs. Behind a canvas screen the schoolmaster is teaching youngsters how to spell and cipher, or is preparing them for the degree of A.B. Forward, one hears the cackling of poultry and the bleating of sheep; while from unknown regions below comes the grunt of a trombone or the shrill sound of a piccolo—it is Jack, turned amateur musician, practising the "Blue Danube" waltz. Suddenly the bugle sounds to quarters, and in the twinkling of an eye the peaceful scene has put on the grim features of the God of War. Jack is at his post, ready to shake the air with the thunder of his big guns; the marines crowd the after-deck, and blaze away at an imaginary enemy. Such is life afloat when the skies are blue and the wind is fair.

On March the 2nd, when in about lat. 22° 30′ N., long. 42° W., we observed the first patches of Gulf-weed, whose golden yellow contrasts agreeably with the colour of the water. Floating in the shape of solitary bunches, or congregating in large masses which cover the surrounding sea, this weed gives shelter to a multitude of animals—fishes, crustaceans, &c.—which make it their home. What is still more remarkable is that most of these animals imitate the colour of the weed, especially a small crab found in great abundance. The colouring of its shell reproduces every tint, from the light yellow to the dark brown of the leaves, and even suggests by light spots the whitish berry characteristic of the Gulf-weed, so that its presence in a bunch is not suspected until it begins to stir.

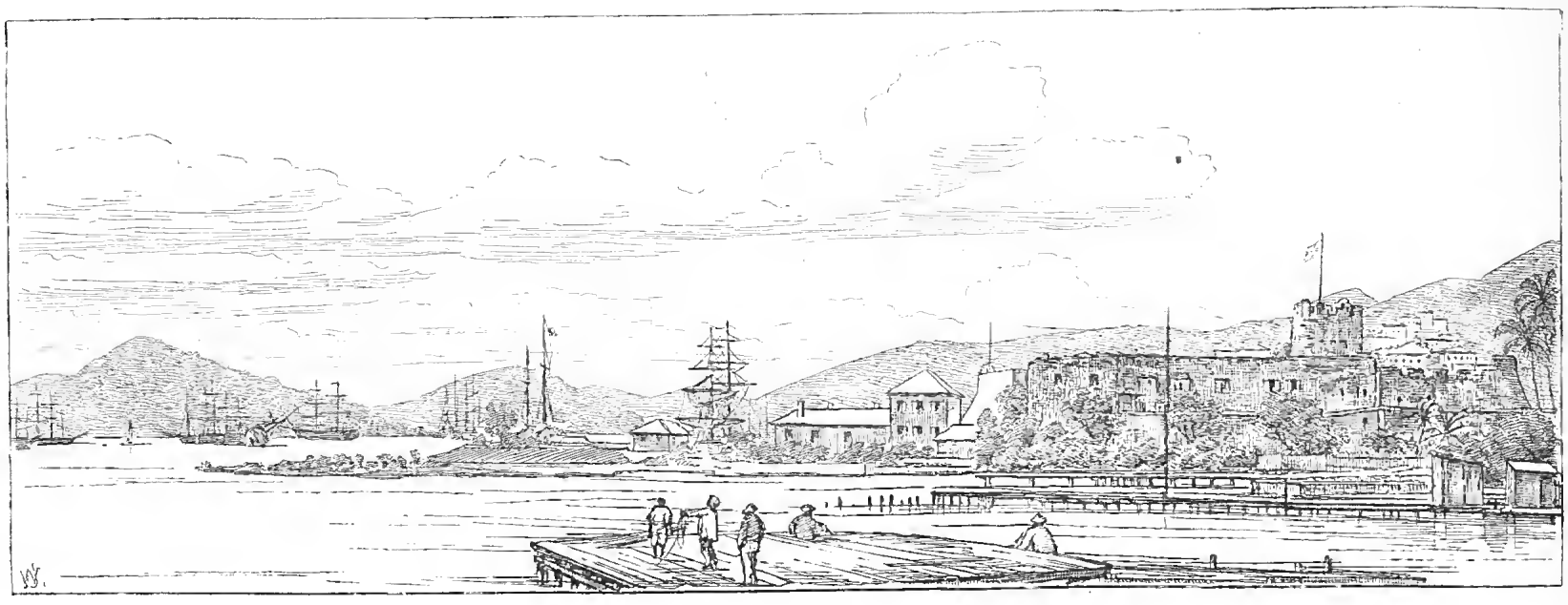
March the 11th was rendered memorable by the first sounding obtained in 3000 fathoms, nearly three and a-half English miles. The specimen of the bottom brought up proved to be a dark chocolate-coloured mud, ice-cold, very tenacious, and so fine that, on being rubbed between the fingers, there was not the least trace of grittiness. We had learned to associate this sediment, already obtained in previous soundings, with depths exceeding 2000 fathoms; as the samples of bottom brought up from lesser depths were generally found to consist of a whitish ooze, almost entirely composed of minute calcareous and siliceous shells, so small as to be only distinguishable under the microscope.

At daybreak of March the 15th, land was reported from the mast-head. We had been shaping our course for Sombrero, a small uninhabited island which marks the point where the chain of the West Indian Islands turns to the westward. In the course of the day we entered the Caribbean Sea between Sombrero and Anguilla, visible on the southern horizon, and on the following morning our good ship lay safely anchored in Gregarie Channel, a sort of outer harbour to Charlotte Amalia, the capital of St. Thomas.

ST. THOMAS.

The town, with its red-tiled roofs and old fort surmounted by the Danish flag, lies cosily embosomed among green hills, and its general neatness and cleanliness proclaim the influence of a northern race. Looking through the glass, we saw objects resembling white bundles

with black top-knots moving along the beach. These were the negro women, and this reminded us that St. Thomas has shared in the general ruin of the West Indian Islands—the price paid for the emancipation of the slaves. The land is reverting to its primitive state of jungle; and the free negro, when pressed by want, crowds into the seaports to assist in the coaling of the steamers which trade between Europe and Central America.



ST. THOMAS.

The narrow tongue of land which formerly separated the Gregarie Channel from the harbour proper of St. Thomas has been cut through to give free egress to the contaminated waters of the latter; by which operation, we were assured, the sanitary condition of this port, once notorious for its outbreaks of yellow fever, has been greatly ameliorated.

The King's Wharf, our usual landing-place, was about a mile distant, but sometimes we stepped on shore opposite our anchorage, and, proceeding on foot, entered the town by a long suburb inhabited by negroes. Lounging idly about the doors of their little wooden huts, the latter were always ready to receive "Massa" with that smile free of all worldly care so characteristic of their race. They seemed to belong to an inferior type when compared with the negroes we met afterwards in Bermudas, the Cape de Verde Islands, and Brazil; and their large mouths, with other decidedly animal features, deprived them of any claim to beauty in a European's eye. The big eyes and less-developed traits of the children were more pleasant to look at, as the little ones gambolled about in our path.

NEGROES AT ST. THOMAS.

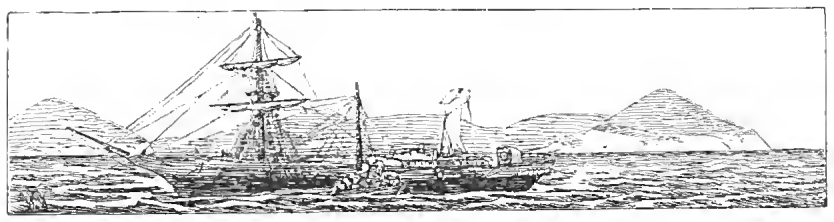
During our stay at Charlotte Amalia we enjoyed the hospitalities of Government House,

and the comforts of a club had been placed at our disposal with that frank cordiality which here and elsewhere added much to the attractions of a temporary sojourn on *terra firma*. The verandah of the Club-house commanded a magnificent view of the town, the harbour, crowded with shipping, and the islands, looking fresh and green after recent rains.

CLUB-HOUSE AT CHARLOTTE AMALIA.

In the course of March the 22nd we shifted our anchorage to St. Thomas Harbour, in preparation for our departure next day. At the moment of leaving, news was brought in by a coasting schooner that an English merchant-vessel was lying dismasted off the eastern end of the island. Accordingly we started in that direction, and, after a run of about fifteen miles, fell in with the ship near St. James Island. She turned out to be the "Varuna" of Liverpool, carrying a mixed cargo of cotton, rosin, staves, &c. Having left New York, she encountered heavy weather, was abandoned by her captain, and taken in charge by a prize-crew, who succeeded in navigating her down to where she was found, although her main and mizen masts and fore-top mast were gone. Taking the derelict in tow, we returned to St. Thomas Harbour.

We were now free to depart, and before dawn of the 25th we had re-entered the Atlantic by the Culebra Passage, which divides Porto Rico from the Virgin Islands. On this day occurred the first serious accident in connection with our dredging operations. The dredge, lowered to 625 fathoms, had become entangled probably among the rocks at the bottom, and the consequent strain upon the rope was so great as to cause the iron hook of a block to give way, and the latter, rebounding, struck the head of a sailor lad who was passing at the moment. The violent blow rendered him unconscious, and he died a few hours afterwards. The day following this sad event, which cast a gloom over our small community, we sounded in 3875 fathoms, the greatest depth ever yet ascertained in the Atlantic. It was into this deep grave that we lowered the remains of the young sailor.

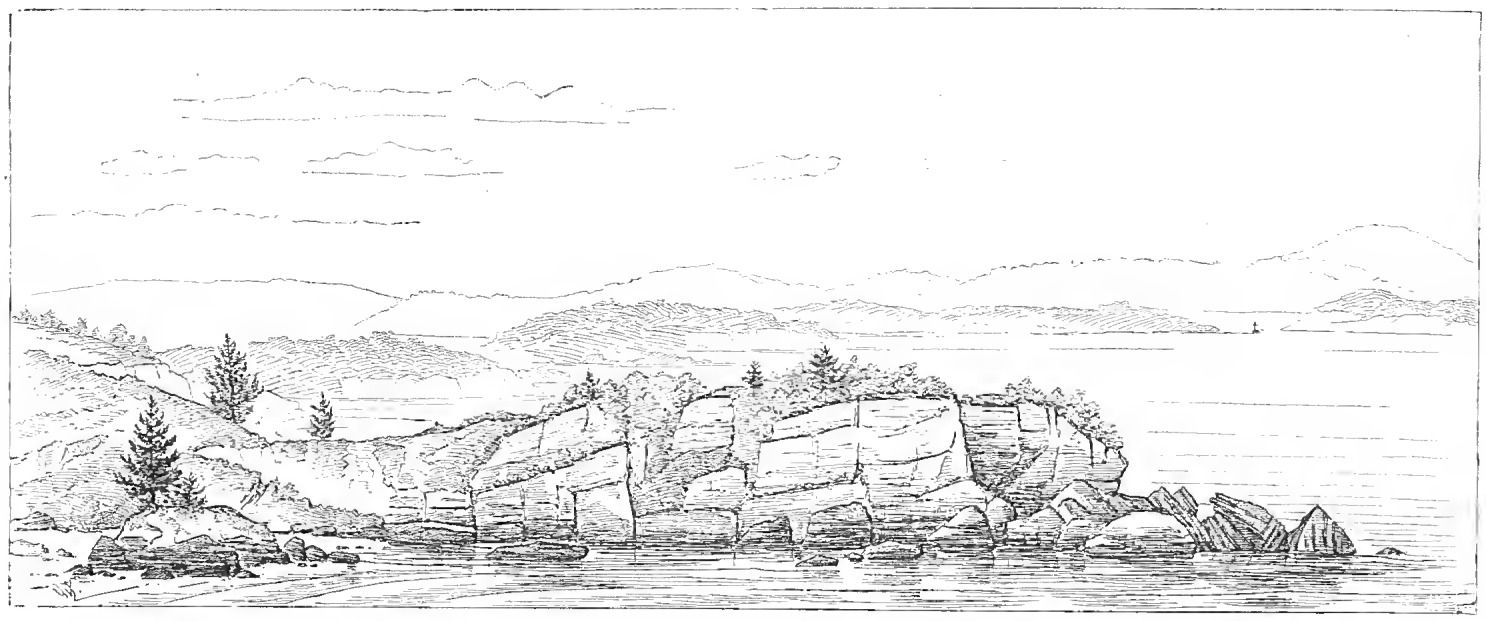


THE "VARUNA" OFF ST. JAMES ISLAND.

Laying our track close to the meridian of long. 65° W., we gradually reduced the distance of 800 miles which separated us from Bermudas. In the afternoon of the 3rd April the light-house on Gibb's Hill came in sight. Though only about 360 feet above the level of the sea, it occupies the highest point in these islands. Next day we steamed along the dark wooded hills of Hamilton Island, past St. David Head and the white-roofed houses of St. George's, and, cautiously threading our way between the coral reefs off the northern shore, anchored in the afternoon of the 4th outside the docks of Ireland Island.

BERMUDAS.

Separated from each other by narrow channels, frequently spanned by bridges, the principal islands which compose the group of Bermudas range themselves somewhat in the shape of a fish-hook, of which St. George's in the east occupies the eye, and Ireland Island in the west the point, while Gibb's Hill in the south is placed upon the bend of the hook. Apart from the historical and literary associations which have invested the Bermudas with a halo of romance, there are perhaps few spots on the globe which contain in so narrow a compass more abundant materials wherewith to gratify the student of nature. A gem set in the ocean, protected from its fury by a wide circle of coral reefs, and occupying the summit as it were of a mountain which rises all round from a depth of 2500 fathoms—the height of Mont Blanc—its varied fauna and flora, its remarkable rocks and caves, and the exquisite charm of its scenery, supply an ever-present stimulus to scientific inquiry and artistic inspiration.

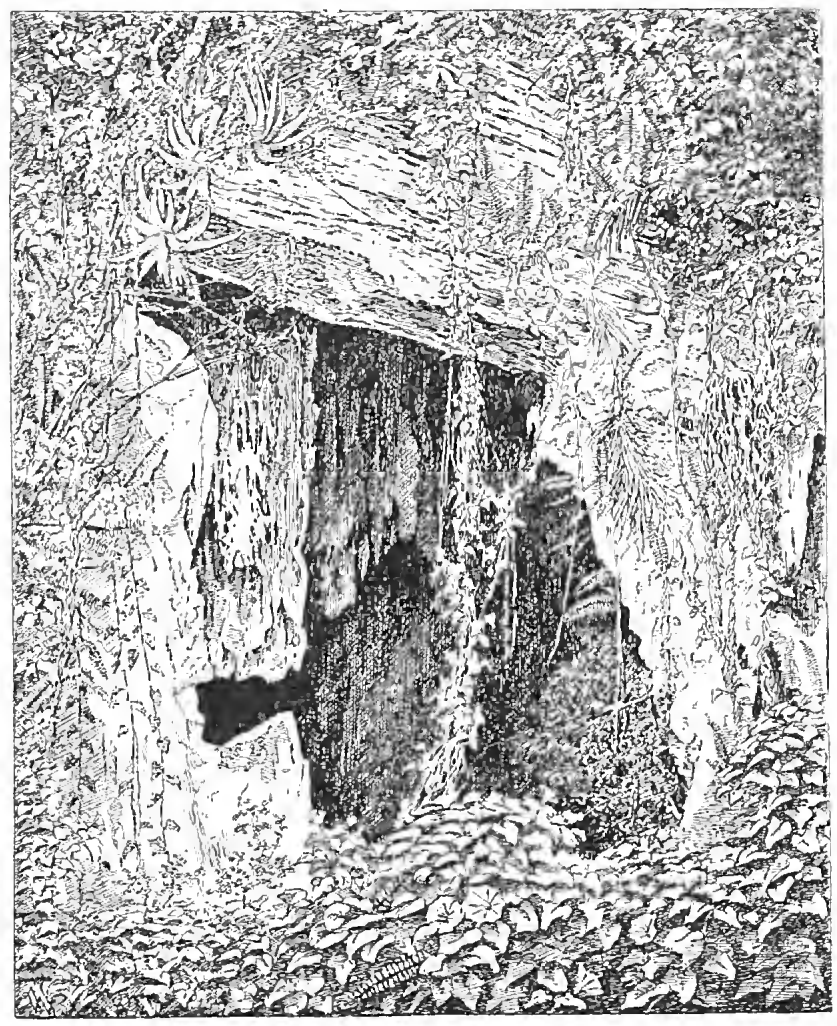


SOMERSET ISLAND, BERMUDAS.

Near the centre of the group is an almost land-locked basin known as Harrington Sound. The elsewhere gentle slopes of the hills assume here a bolder shape and overshadow the Sound with their steep cliffs, while the blue mirror reflects the image of rocky islets crowned with trees and flowering shrubs. The whole Sound, not too extensive to be taken in at one glance, presents a picture of rare loveliness. Upon the narrow isthmus which divides it from Castle Harbour, scarcely inferior in beauty, are the famous Walsingham Caves, to which we paid several visits. After creeping through narrow and damp passages, we were rewarded with the curious sight of incrustations suspended from the roof or rising from the floor, or grown together so as to form immense columns, which, when the caves were lighted up with a fire of brushwood or with the magnesium light, repeated their phantom shapes in the calm pools of water at their feet, which no breeze from the outer world had ever ruffled.

Over the black mouth of one of these caves falls a mass of convolvulus, hanging down in festoons, and gathering below into a sea of green leaves and large violet flowers; and as you look into the cave, the descending stalactites show through the darkness like teeth in the mouth of some gigantic monster.

The last word reminds me of a capture, effected a few days after our arrival, of a large octopus—the sea-monster of Victor Hugo's *Travailleurs de la Mer*. It was discovered in a fish-pond on Boaz Island. I did not see its arms fully extended, but its body alone measured about one foot, and specimens of less size have been known to span a length of ten feet. Pliny, in his *Natural History*, mentions an octopus, with arms thirty feet long, as having come on shore near Carteja, in the Strait of Gibraltar, to plunder a fish-pond, and a piece of which, weighing 700 pounds, had been preserved at Rome. There is a well-authenticated case of a sailor, belonging to a ship anchored off Ireland Island, who was caught in the arms of one of these monsters, and drowned before his comrades could release him. Another specimen, weighing upwards of a ton, was cast ashore a year or two ago on the south side of the island.



WALSINGHAM CAVES, BERMUDAS.

The Bermudas offer to the geologist an excellent opportunity of studying a *modus* of rock formation, called by its discoverer, Lieutenant Nelson, who was stationed here in the early part of this century, the "Æolian" formation. The islands of Bermudas occupy the southern half of an oval-shaped coral reef about twenty-four miles long and twelve miles broad, stretching from the south-west to the north-east. As already mentioned, this reef crowns the summit of a submerged area of elevation, gradually rising from a depth of about three miles. The slopes of this submarine mountain, as was shown by our soundings, are covered with a fine mud, chiefly consisting of the detritus of corals, shells, &c. The mud left upon the beach by the waves, and dried in the sun, is transformed into an extremely fine whitish sand, which even the gentlest breeze sets in motion and carries inland. Along the southern limits of the reef, especially in the south-east, this sand is seen to make its way through the openings left by the hills, and to accumulate to a great height, gradually covering up the groves, the cultivated ground, and even buildings—not unlike the slow progress of a glacier. Under the continuous action of the winds, the sand-hills are shifted from place to place, now occupying new ground, now adding their mass to previously-formed hills. How these sandy strata

are gradually transformed into layers of greater consistency, and ultimately into hard and even crystallised rock, is as yet an obscure—indeed, one of the most difficult problems of geology; but that such is the case seems to be proved by the rocks of Bermudas, which furnish illustrations of every stage of this process. It seems not improbable that these islands, which occupy the portion of the oval reef most exposed to the action of the prevailing winds, owe their existence to the formation of sand-hills through aerial agency, and to their subsequent consolidation. The sections exposed by the road-cuttings in different parts of the islands show that the road has been carried through the side or over the summit of dome-shaped hills, whose strata were originally deposited at the same angle (about 30°) at which the strata are seen to accumulate in the sand-hills now in process of formation.

If we plant one end of the compass upon Bermudas, and, with a radius of about 800 miles, draw a semicircle to the westward of its meridian, the line will pass over Porto Rico, Haiti, Cuba, the United States, and Nova Scotia, and it would seem as if the Bermudas

AMONG THE OLEANDERS.

marked the site of a former volcano or centre of volcanic action, whose gradual subsidence below the surface of the ocean permitted the growth of the coral-formation which, in its turn, supplied the materials for the sand-hills and rocks now composing these islands. The reefs and rocks ground down by the waves formed the coral ooze which was again to be changed into sand and consolidated into rock. How long this process may have continued, transcends the bounds of human imagination.

Among the trees which contribute most to the park-like character of the scenery is the oleander. It lines the roadside, and grows in thickets about the pleasant country houses. During our visit it was just putting forth its large bunches of rosy blossoms, making the islands bloom like a garden from end to end.

The "Challenger" had now undergone some necessary repairs in preparation for her next cruise, and on the morning of the 21st April she left the camber at Ireland Island. As if

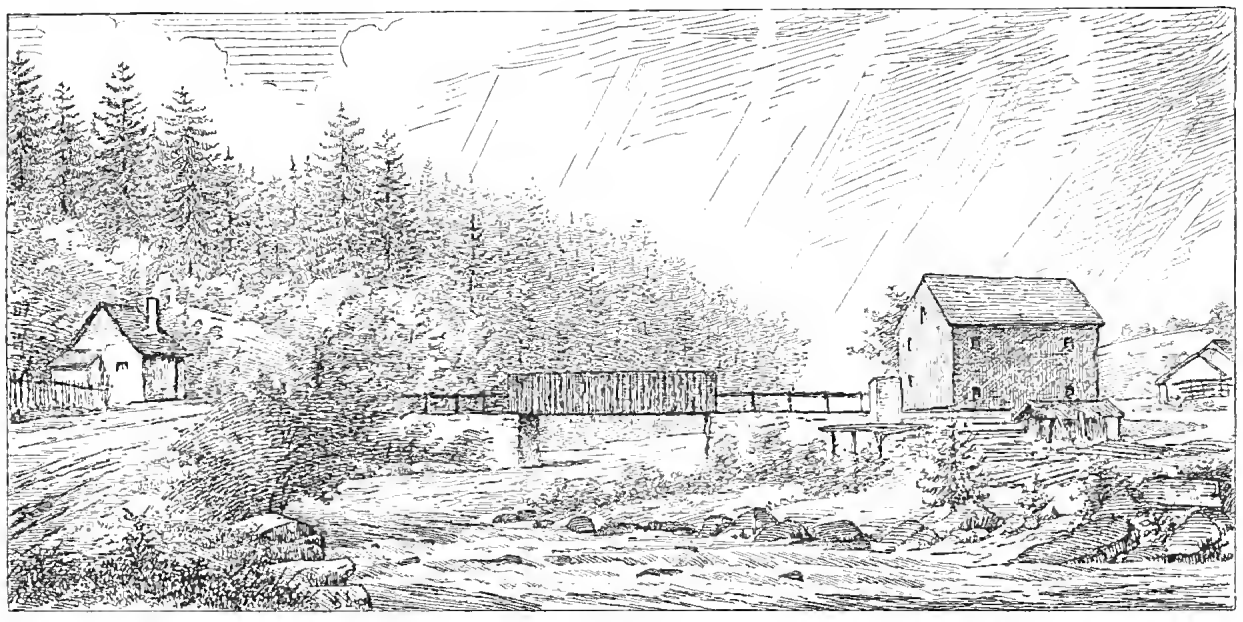
reluctant to depart from so pleasant a spot, we devoted the next two days to a sounding and dredging cruise round the island. Starting westwards on the 24th, we were soon to be reminded of the fact that we had left the charmed circle of the tropics behind us, for on the 26th we were assailed by a furious gale from the north-west, in consequence of which, after beating about all night under double-reefed topsails, we found ourselves, at noon on the 27th, very nearly at the place where we had been the day before. The weather continued rough until the 29th. Between one and two o'clock in the afternoon of the 30th, the temperature of the sea-surface suddenly rose from 18°.6 to 22°.0 C., and we knew that we had crossed the eastern edge of the renowned Gulf Stream. The temperature gradually rose, until, at 7 a.m. on the following day, May the 1st, it attained 23°.9 C., which proved to be the maximum. Between 11 p.m. and midnight of the same day it fell as suddenly from 19°.4 to 13°.3 C., which showed that we had exchanged the warm flood of the Gulf Stream for the cold water of the Labrador Current. Our operations in the Gulf Stream met a serious obstacle in the high swell which prevailed all day. The first sounding-line parted, and was lost with all the instruments attached. The second apparently never reached the bottom, although 2400 fathoms had been paid out. We had, however, ocular demonstration of the existence of this great oceanic river, for the water was seen spurting up against and running past the nipper on the sounding-line with the rapidity of a mill-race, at the rate of about four miles an hour.

The total width of the Gulf Stream at the time of our visit and at the point where we crossed was found to be about sixty miles, and the thickness of its warmest surface-stratum (temperature from 18°.3 to 23°.9 C.) 100 fathoms, or 600 feet. At a more advanced season of the year the volume of the current is known to be much greater.

On the 4th May, when about 140 miles from Sandy Hook, the weather being unfavourable to our further progress towards New York, we turned about and shaped our course for Halifax. On the 6th a brilliant halo was observed round the sun, showing prismatic colours. Both air and water were getting colder every hour, and had on the 7th fallen to 3° C., or only a few degrees above freezing-point. Attired a few days before in the lightest of summer garments, we now might be seen energetically walking the deck disguised in Ulster coats and sealskin caps. On the same day the dredge, evidently heavily laden, was with much effort hoisted on deck. It contained a large block of syenite, weighing about 5 cwt., no doubt a boulder which had come borne on an iceberg from the Arctic Regions. Our exertions on the following day, when off Cape Sable, were attended with better results. While the dredge was collecting a quantity of yellow starfishes on Le Have Bank, at a depth of 50 fathoms, our men, having espied a fishing-schooner at work, at once set about to try their luck on these famous fishing-grounds, and before long every available point of vantage along the ship's side was occupied by an ardent disciple of Walton. The day was a success, both zoologically and gastronomically; about one hundred fish were caught, the largest weighing thirty pounds, and no time was lost in placing the white creamy morsels on the table.

HALIFAX.

Nature celebrated the "Challenger's" arrival off Halifax on the morning of the 9th by a *mirage.* It was a calm frosty morning; the sun had just risen, and our attention was first attracted by an extraordinary distortion of the coast-line, whose rocks rose into

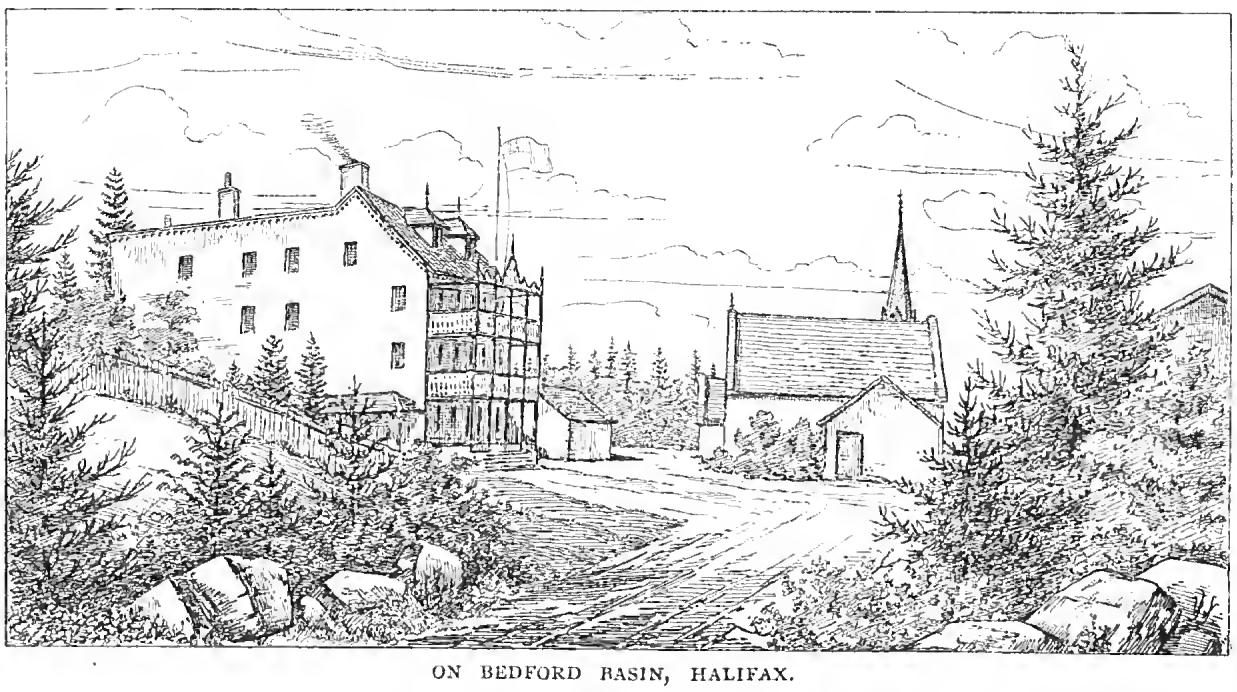


IN ACADIA.

the air like the huge towers of a baronial castle; while elsewhere the sea, mingling with the sky, bore a number of ships, some real, some mere phantom-ships sailing through the air.

"As when, far off at sea, a fleet descried
Hangs in the clouds."

Halifax, as seen from the water, has a grey and dingy appearance. As we stepped on shore, a keen wind was blowing clouds of dust before us. There had been a fall of



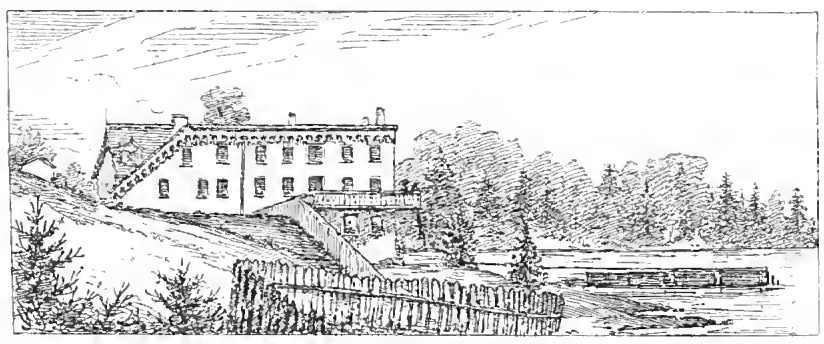
ON BEDFORD BASIN, HALIFAX.

snow not many days before, and, altogether, the contrast with the sunny isles we had left behind us was most striking. We were now in a land of granite and pine forests, where the struggle of man with the wilderness still continues, and might be witnessed at a short

distance from the town—newly-made roads with their rough palings—the recently-erected wooden huts of the pioneer—then a line of felled trees, the front rank of the enemy which had succumbed in the fight—and, just beyond, the primeval forest. A canal running through a series of lakes joins Halifax to where—

> "In the Acadian land, on the shores of the Basin of Minas,
> Distant, secluded, still, the little village of Grand-Pré
> Lay in the fruitful valley."

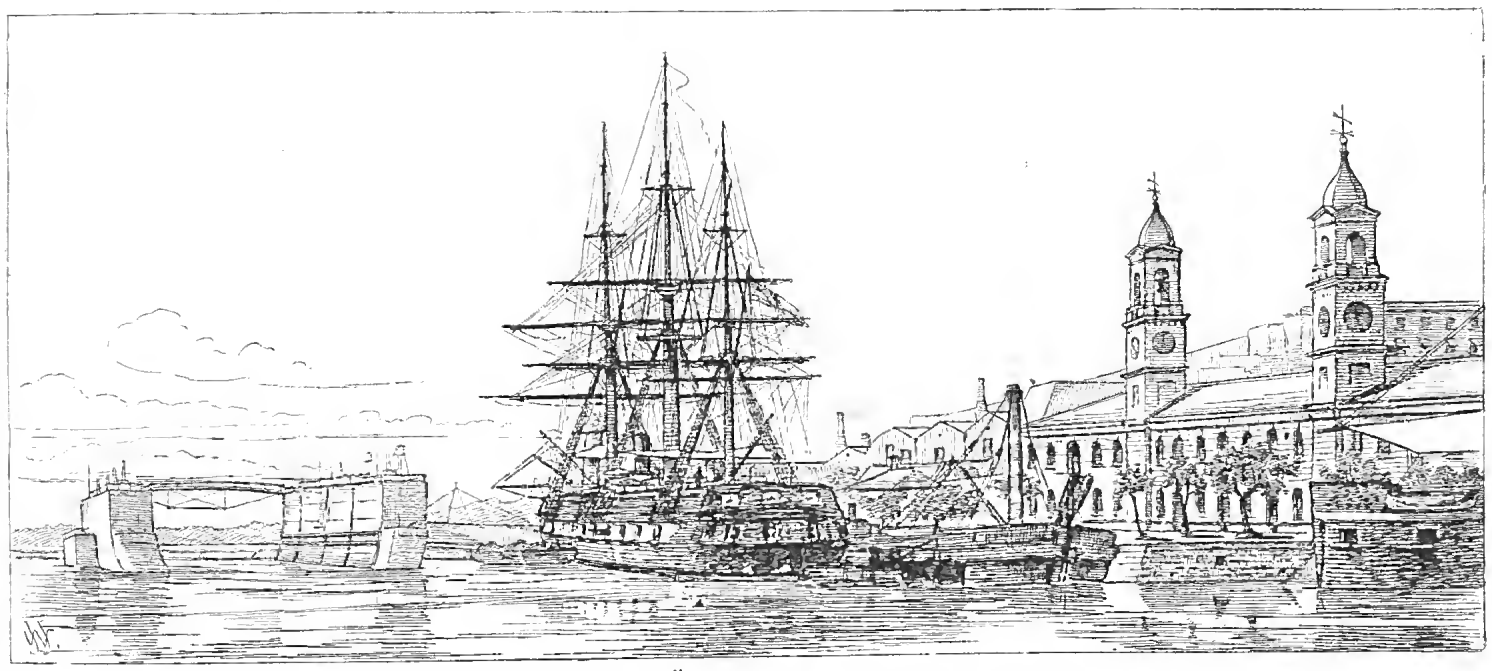
The town of Halifax is built upon a peninsula enclosed by two arms of the sea, and is protected by numerous forts. The eastern and wider arm forms the harbour proper of Halifax, separating the latter from Dartmouth on the opposite shore. Further inland, it first contracts to a narrow channel and then widens out into a lake-like basin, known as the Bedford Basin, whose pine-clad banks are a favourite resort of the Halifax people.



PRINCES LODGE, BEDFORD BASIN.

Close to the water's edge, and commanding a beautiful view of the peaceful scene, stands Princes Lodge, originally erected for H.R.H. the Duke of Kent, father of Her Majesty Queen Victoria. Certainly no more attractive spot could have been selected wherein to repose from the cares and anxieties of public life.

Amid the strains of the band of the "Royal Alfred," the Admiral's flagship, and the cheers of her men, who had manned the yards, H.M.S. "Challenger" spread her sails in the



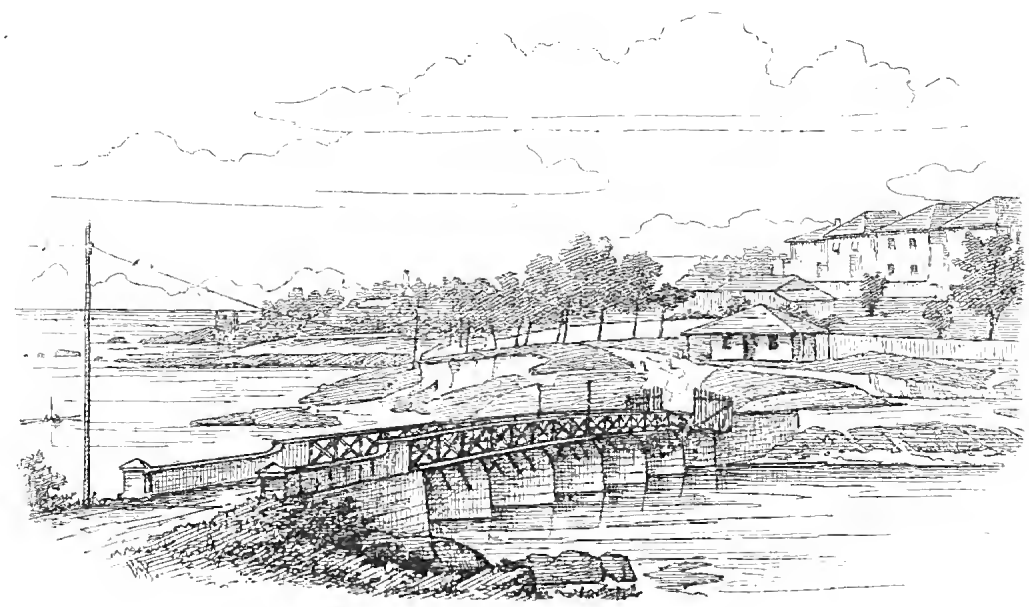
H.M.S. "CHALLENGER" AT IRELAND ISLAND, BERMUDAS.

afternoon of the 19th May. With the thermometer rising every hour, we soon passed from the green waters of the Arctic Current into the blue but still stormy waves of the Gulf Stream. To judge by our experience, it would seem as if the track of this warm current were the scene of perpetual atmospheric disturbances. The now familiar Bermudas came in sight at daybreak

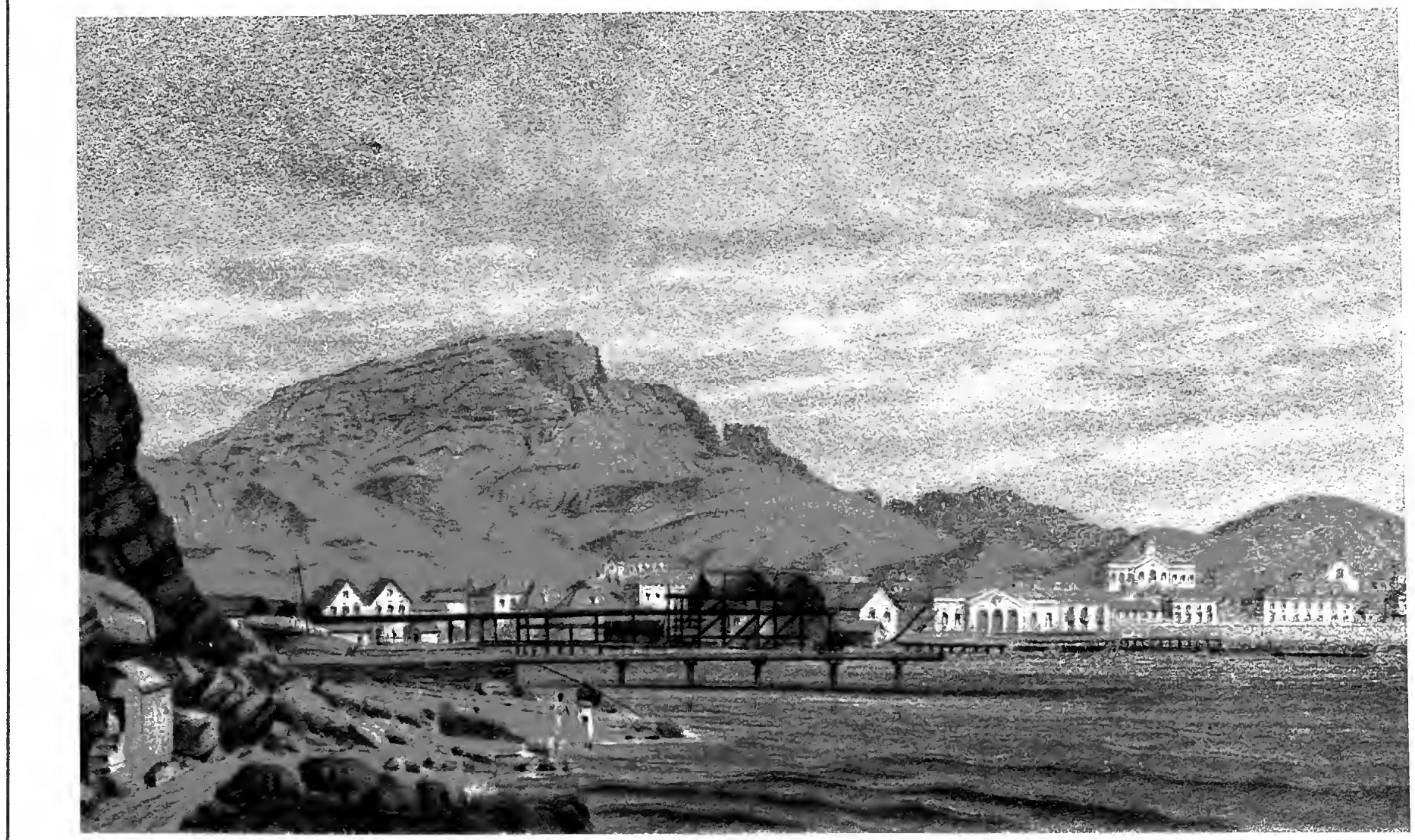
on the 29th, and, after a few more hauls with the dredge, the last day of the month found us once more at our old moorings. The latter were close to the floating iron dock, which, as may be remembered, was put together in England, and towed across the Atlantic, a distance of 3000 miles.

At the time of our first arrival at Bermudas, we had been startled by another death on board, that of the schoolmaster, a man greatly esteemed for his attainments, and quiet, unassuming character. Apparently in good health during the day, he had suddenly expired shortly after retiring to his hammock. We now brought from Halifax a memorial stone, inscribed with his name and that of the young sailor we had lost off St. Thomas, and performed the mournful duty of setting it up in the graveyard of Ireland Island, already crowded with monuments of England's sons who met here an early death in the service of their country.

On the 12th of June, His Excellency the Governor of Bermudas came on board to pay a farewell visit, and not many hours after the pleasant Summer Isles had faded from our view.



IRELAND ISLAND, BERMUDAS.



Chapter III.—From Bermudas to Cape of Good Hope.

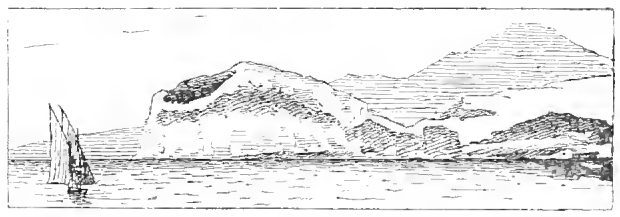
THE 1800 miles which separate Bermudas from the Azores were traversed in eighteen days. The weather proved very favourable for our operations, and, although the dredge or trawl came up on several occasions empty, or nearly so, the naturalists on board appeared satisfied with the results. As a matter of course, a single specimen hitherto unknown to science would outweigh a bagful of specimens which had already found a name in the daily lengthening records of zoology. The soundings taken during this cruise establish the great depth of this portion of the North Atlantic. Showing a depth of 2000 fathoms at a distance of about thirty miles from Bermudas, it attains a maximum depth of nearly 2900 fathoms in the first third of the total distance between the two island-groups. For the space of the second third, the sea-bottom remains at an almost uniform level of 2700 fathoms, from which it seems to ascend by successive terraces towards the plateau of the Azores, reaching the latter with a depth of 1700 fathoms and at a distance of 300 miles from Fayal. At this point a large current of cold water was discovered, probably a branch of the Labrador Current, which seems to flow along the western slope of the plateau, and makes its influence felt to a depth of several hundred fathoms.

But for the frequent stoppages, and the monotonous character of our daily labours, our lot, as we floated from island to island, might well be envied. The sunny Bermudas still fresh in our memories, we were now approaching another cluster of islands of much greater extent, and justly famous for the grandeur of its scenery, its gardens and groves of oranges, and its most genial climate. In the course of the last day of June, Flores, the most westerly of the Azores, was just visible above the horizon, and in the afternoon of the 1st July, Fayal and Pico came in sight.

FAYAL.

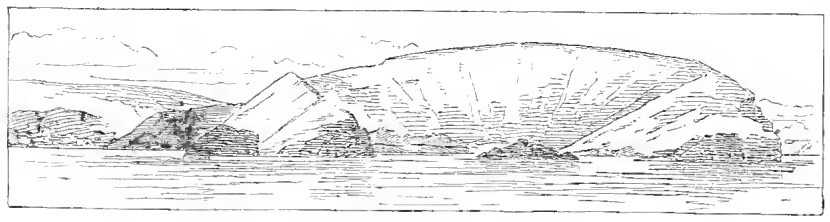
The volcanic celebrity of these islands was called to mind by the sight of two extinct craters close upon the sea-shore not far to the westward of Horta, the capital of Fayal. Castello Branco—so called probably from the white rim of the crater, which, at a distance, suggests

the white walls of a fortress or castle perched upon the summit of a rocky precipice—first attracted our attention by its extraordinary shape. The original cone has been stripped in course of time of its outer covering, leaving nothing behind but the fire-baked walls of the crater, so that the whole looks like a huge chimney thrown up on the margin of the sea. The interior of the volcano is filled up to a short distance from the rim, and the bottom of the crater, visible from our deck, seemed to be covered with trees. The vertical walls, as they rise above the tree-tops, present one of the most remarkable sights in nature.



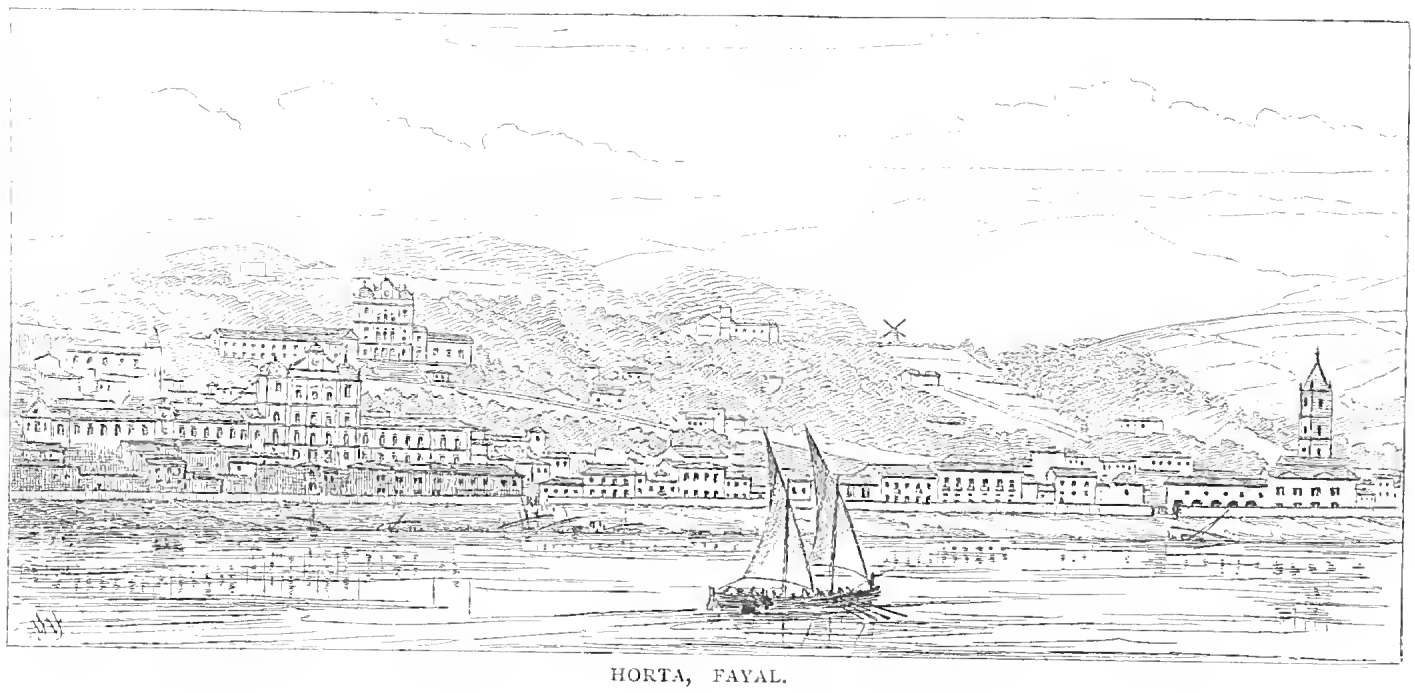
CASTELLO BRANCO, FAYAL.

The other extinct volcano stands at the western entrance to Horta Bay, and is connected with the land by a low isthmus, across which the traveller obtains the first glimpse of the well-known port of Fayal. It affords on a small scale an example of an occurrence frequently observed in volcanic regions, when one side of a volcano, having broken down, gives access to the sea, which, as it flows into the crater, transforms it into a basin, where boats and even large ships may find shelter from the stormy seas outside.



MONTE DA GUIA, FAYAL.

A great disappointment was in store for us. We had hardly rounded Guia Head and anchored in the beautiful Bay of Horta, when, on communicating with the shore, we learned that the island had been ravaged by small-pox for several months. So the excursions planned



HORTA, FAYAL.

during the days when the restless waves kept us prisoners within the wooden walls of the "Challenger" had to be given up; but we found some consolation in the sight of pretty Horta, with its palatial convents and background of wooded hills. The view from its streets of the great cone of Pico, rising just in front of the bay to a height of 7600 feet, must be magnificent; and one might readily be persuaded to take up quarters in the "Carmelitas" or at the "Collegio," and to spend some years in this Atlantic Eden. Excluded from it by this fell

epidemic, we took our course on the following day through the channel between Fayal and Pico, and, after another sail over the blue summer seas, arrived on the 4th July off Ponta Delgada, the capital of the island of San Miguel, and the commercial centre of the Azores.

SAN MIGUEL.

There is not much in the first view of this port to attract special attention: an old-fashioned fort commanding the harbour, whence proceeds the annual fleet of small vessels with supplies of oranges for England, and a few church towers of no particular style of architecture. What, perhaps, took us most by surprise, was to hear the sound of a steam-whistle and the jet of a locomotive proceeding from the works of the new breakwater then in process of construction.

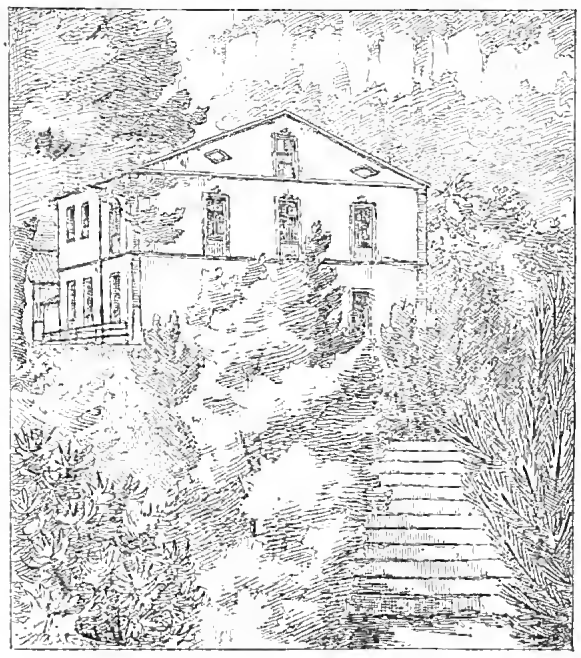
Ponta Delgada and its vicinity, however, can boast of several gardens laid out with all the skill of the modern horticulturist, and combining the products of almost every clime. Of late years some of the wealthier residents had made successful efforts to introduce trees

PONTA DELGADA, SAN MIGUEL.

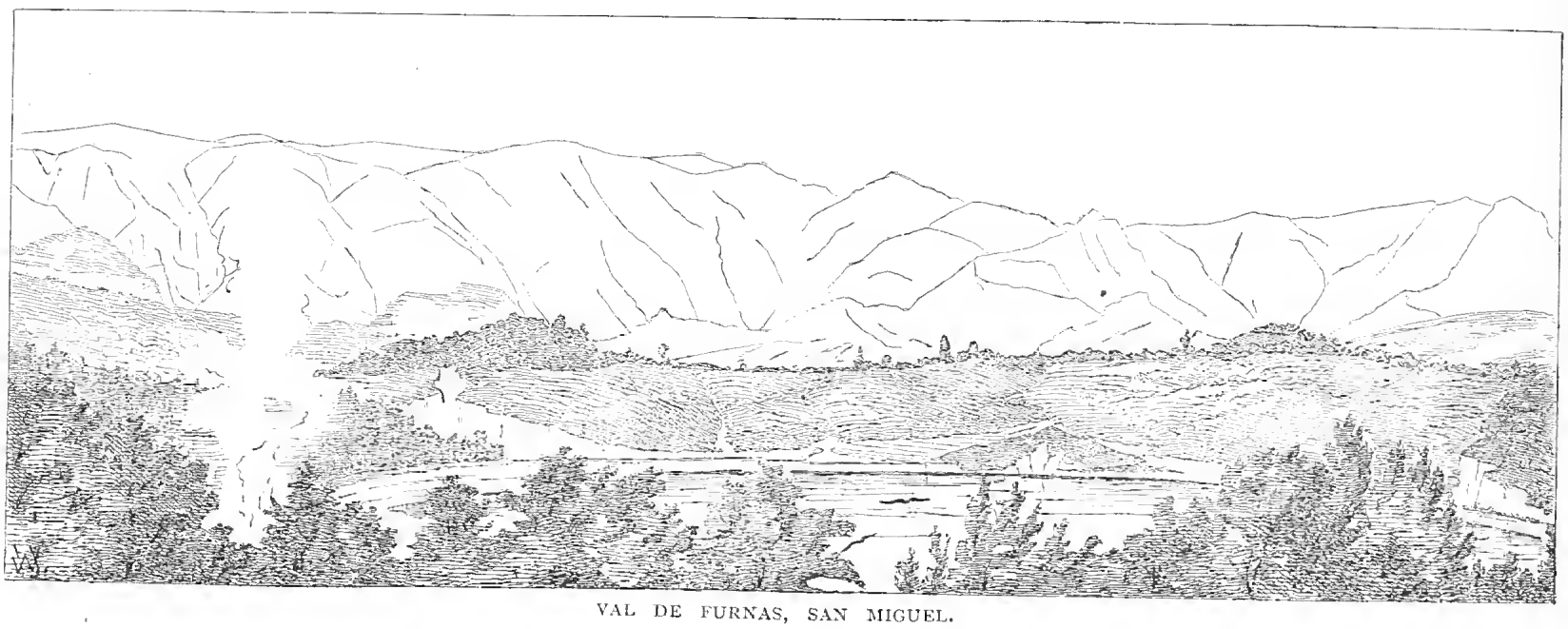
from Europe, America, and even from Australia and Japan, as the careless inhabitants of the island had almost stripped it of its native vegetation. Amongst recent introductions we noticed the Australian gum-tree, which seems to flourish in its new home. Behind the town rises a range of hills whose conical shape and occasionally eccentric outlines betray their volcanic origin. Although untold ages must have gone by since these islands rose from the sea, the date of the latest eruptions is too recent to encourage the comfortable hope that the ancient fires are extinct. In the year 1591 an earthquake, which lasted twelve days, destroyed the

town of Villa Franca, situated to eastward of Ponta Delgada; and eruptions are known to have occurred in the Azores as late as the year 1722.

The few days of our stay were spent in excursions to the two most interesting districts in the island, the Val de Furnas and the Caldeira de Sette Citades. Both are extensive areas of depression surrounded by the walls of ancient craters, and seem to have been formed by the collapse of volcanoes, whose place, once the scene of the most fearful convulsions, is now occupied by beautiful lakes and fertile fields. Furnas, situated about twenty-seven miles eastward of Ponta Delgada, is noted for its hot springs, frequently resorted to for their medicinal qualities. The valley has all the charm of Alpine scenery, and the view from Gren'a House, perched upon the wooded slopes which enclose the Lagoa das Furnas, is most picturesque. I remember a Sunday afternoon on the terrace in front of this hospitable mansion. As if in harmony with the day, Nature had put on her calmest mood. Not a breeze stirred the leaves, not a sound came up from the little world that lay at my feet. All around, the hills seemed to doze in the golden sunshine. Below, cattle were standing in the cool shallow water. Above, a pair of hawks (*azores*) balanced their pinions in the light summer air. The lake itself, as it wound round the leafy promontories, seemed to wander into the bays to right



GREN'A HOUSE, FURNAS.



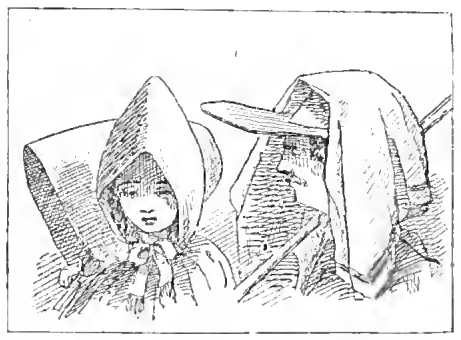
VAL DE FURNAS, SAN MIGUEL.

and left as if in search of cosy nooks under the shadow of the tall cliffs. On one side rose a tall column of steam from a boiling pool, to remind one of the volcanic giant who for the present is slumbering behind the magic screen of this smiling landscape. Furnas is only a week's sail from England. The climate seems perfect, the people kindly and hospitable, and there could not be a more charming retreat from the toil and worry of modern existence than a few months spent in this ancient crater of the Azores.

The Caldeira de Sette Citades possesses features even more remarkable than the Val de Furnas. As we stood on the brink of the precipice by which it is surrounded, and looked out upon the extensive prospect of lake and fertile valley spread out a thousand feet below, it was more like the creation of a fanciful dream than sober reality.

On our return from the Caldeira we were just in time to witness a religious procession. The whole population had gathered in the streets of Ponta Delgada to follow a sacred image and to pray for rain. Old and young, rich and poor, soldiers and civilians, the governor and the governed, all joined in this ceremony. The spectacle of an orderly multitude actuated by the same motive is always imposing; but to a traveller from northern latitudes, where sacred symbols are rarely seen in the streets, there was something novel and refreshing in the sight of a populace united in an act of public worship. The robes of the priests and lay-brethren, the rich canopies and silken standards, the smoking censers and jewelled crosses flashing in the rays of the afternoon sun—the whole procession, as it moved slowly through the streets amidst the low murmur of prayer and the clear notes of the singers, looked singularly impressive.

When we reached the landing-place, the "Challenger" was already moving in the offing, steam up; but a quick pull and a scramble up the ship's side soon restored us to the deck of our floating home. A few days previous to our departure, the expedition was honoured by a visit from His Excellency the Governor of the Azores.



HEAD-DRESSES AT SAN MIGUEL.

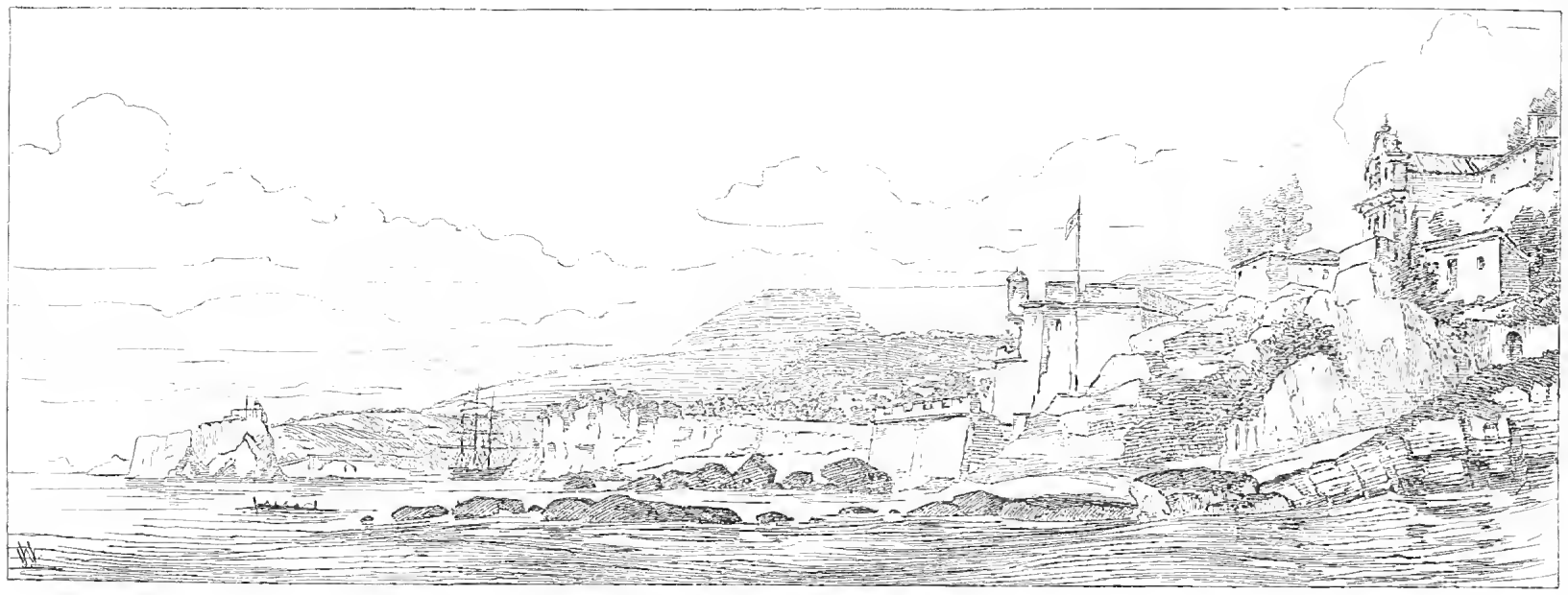
The costume, especially the head-dress, of the inhabitants is peculiar. The women wear a dark-blue cloak which descends to their feet, and to which is added an enormous hood almost completely concealing their features. The men cover their head with a round cap, having a peak projecting far over the face, and surmounted by a piece of cloth which falls over the neck and shoulders. Both head-dresses, though far from elegant, no doubt afford efficient protection against sun and rain.

MADEIRA.

The 10th of July was spent between San Miguel and Santa Maria, the most easterly island of the group, and the next and following days we were engaged in fathoming the broad and deep channel which flows between the latter and Madeira. The 16th found us a second time at anchor off the Loo Rock in the roads of Funchal, but alas! since our former visit the dreaded epidemic which had barred our landing at Horta had seized upon fair Madeira, and we were fain to content ourselves with a distant view of the flowery glens and mighty chasms which we had hoped to explore.

After receiving letters from home, we turned our face southwards on the 17th. On the 19th Palma once more rose in sight, but this time to the eastward; and on the 21st we dredged on the same bank—probably a south-westerly prolongation of the submarine plateau

which supports the Canaries—from which we had brought up the black coral and the twin-sponges five months before. Proceeding towards our next destination, the Cape de Verde Islands, we sailed for several days over seas of a decidedly green colour, in remarkable contrast with the deep-blue tint usually observed between the tropics. This circumstance cannot have escaped the attention of the Portuguese navigators who first explored these seas; and it has been suggested that both Cape Verde and the group of islands situated three hundred miles



THE ROADSTEAD OF FUNCHAL.

to westward of it owe their name not, as is generally stated, to a clump of baobab trees which crowns the summit of the cape, but to the seas of green water which mark the approach to the islands and the cape. Though we encountered these extensive green-coloured patches several hundred miles from the land, it is difficult not to associate them with the great rivers, the Senegal, the Gambia, and the Jeba, which on the neighbouring coast of Africa pour great volumes of fresh water into the Atlantic. The latter, being much lighter than the salt water of the tropical seas into which they flow, must float for a considerable time upon the surface of the ocean.

ST. VINCENT.

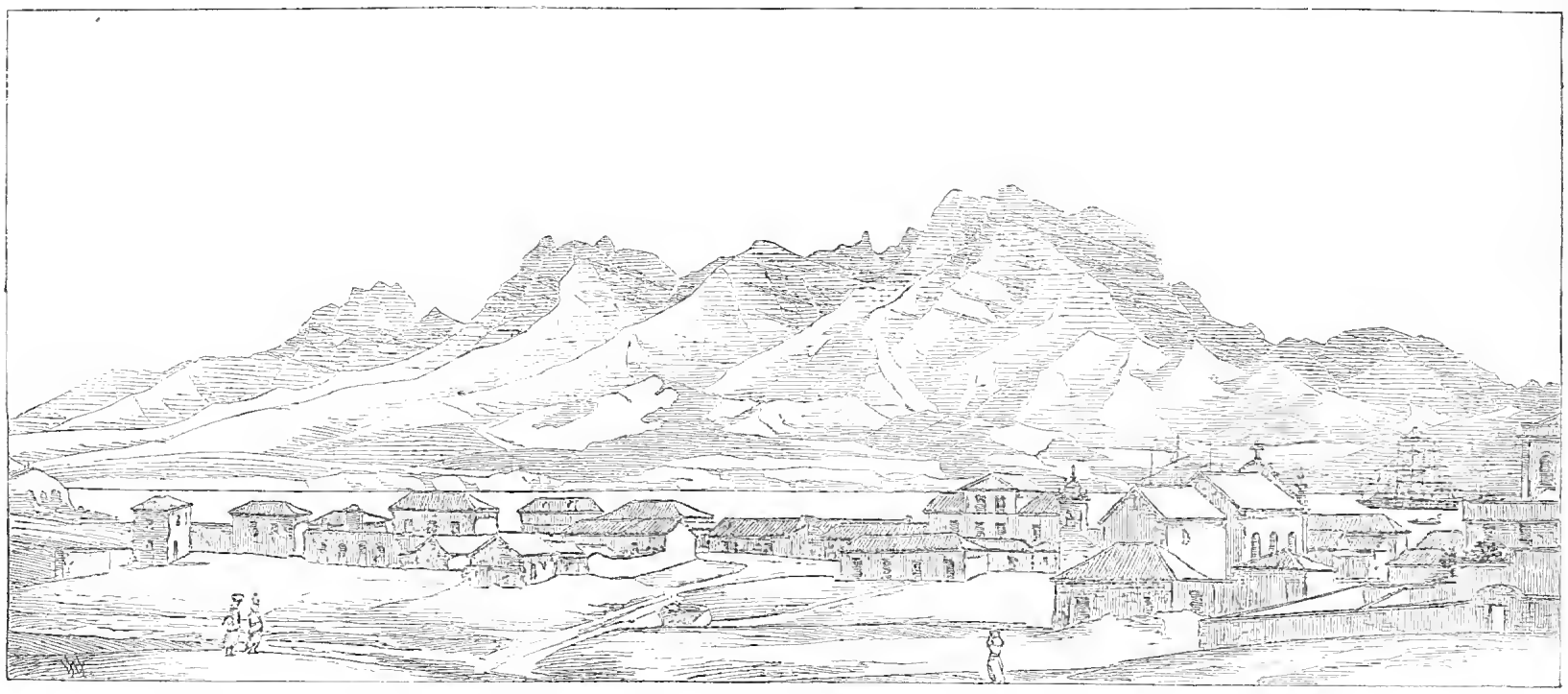
At dawn of the 27th the lofty mountains of St. Antonio and the serrated ridge of St. Vincent were visible from the deck. Apart from the natural gratification with which the traveller by sea hails the appearance of land, the sensation he experiences as he first discerns the faint outline, barely distinguishable among the clouds, which tells him that the long-wished-for port is near, is perhaps the most exquisite reward for the monotony, the countless discomforts, not to speak of the ever-present dangers, of life on board ship. This pale-grey image is to him a new land, a new combination of mountain and valley, of rock and river, of forest and open plain, clad in a new vegetation, enlivened by unknown forms of animal life, inhabited by fellow-men perchance of different race, speaking a strange tongue, having manners, customs, and traditions of their own. All this may be contained within the contours of the shadowy phantom that has just risen above the blue waves. In the present case such expectations

were but scantily realised, for the panorama which unfolded itself as the ship steamed up the channel between St. Antonio and St. Vincent was one for which we were hardly prepared. The islands seen in the morning resolved themselves into a chaotic mass of bare rocks and precipitous cliffs—in fact, confused heaps of volcanic rocks, mud, and ashes, without apparently the least trace of vegetation. At the inner extremity of a bay, the entrance to which is marked by a pyramidal rock, we noticed the masts of shipping, and behind them a cluster of red-roofed houses with whitened walls: this was Porto Grande, the well-known coaling station of St. Vincent, and port of call for steamers bound for the Cape of Good Hope and South America. The town consists of a custom-house, a coaling depôt, a town-hall—nearly completed at the time of our visit—a church, a military barrack, a few inns and shops, the residences of officials, and a few streets composed of the simple dwellings of the negroes. The latter are a strong race, with dark-brown complexion and occasionally pleasant features. The men are chiefly employed on the coaling wharf and barges; the women, some of them tall and good-looking, are for ever gathered in chattering groups about the wells, and, though poorly clad, are never without earrings and necklaces. As they carry their large water-jars upon their head, they walk perfectly upright, and their large eyes and well-shaped arms and wrists remind one of the female figures on the walls of the temples of Egypt. Sometimes a mother may be seen reposing on a mattress laid down on the shady side of the street, while her dark-skinned babes, unencumbered with garments, are playing about her. The boys congregate on the landing-stage, ever ready to dive for a copper, and with such dexterity that the coin has hardly time to reach the bottom before it is triumphantly seized between the teeth of the victorious plunger; or at times stroll along the beach, armed with a stone to hurl at some unwary crab.

NEGRESS AT ST. VINCENT.

Barren and desolate as appeared the hills which enclose the bay, the prospect seen from the ship was not without its peculiar beauty. At sunrise their wild and fantastic crests would stand out sharply defined upon the cloudless morning sky; at sunset their red and grey flanks would present the most exquisite gradations of tints, from the delicate purple of the distant mountain to the rich warm colour of the red hills overlooking the town. The lofty eminence behind Porto Grande is called the "Green Mountain," owing to a faint tinge of vegetation visible at a distance, and due to the moisture distilled by the clouds which the trade-wind piles up upon the eastern slopes of the island. On the south side of the bay rises Mount Washington, so named on account of a supposed resemblance in the profile of this time-worn range to the face of the illustrious republican. Upon the precipitous sides of this mountain, absolutely destitute of water and vegetation, perished one who had been sent out from England to join H.M.S. "Challenger" at this point. He was to have filled the place of the schoolmaster whose death occurred so suddenly on the day of our arrival at Bermudas. He had gone out for a walk over these sunburnt hills, whence he never returned. Long after, his remains were found in the direction of Mount Washington; but the immediate cause of his untimely death has never been ascertained.

The harbour of Porto Grande is occasionally crowded with shipping. During our stay there arrived a transport from home with troops for the Ashantee war, a steamer full of emigrants for South America, and another with even a greater number returning from that quarter, having failed to find the desired Eldorado. The island of St. Antonio rises just opposite to a height of 7400 feet; it is not less rugged than St. Vincent, but, possessing a more fertile soil, supplies its neighbour with fruits and vegetables. We left



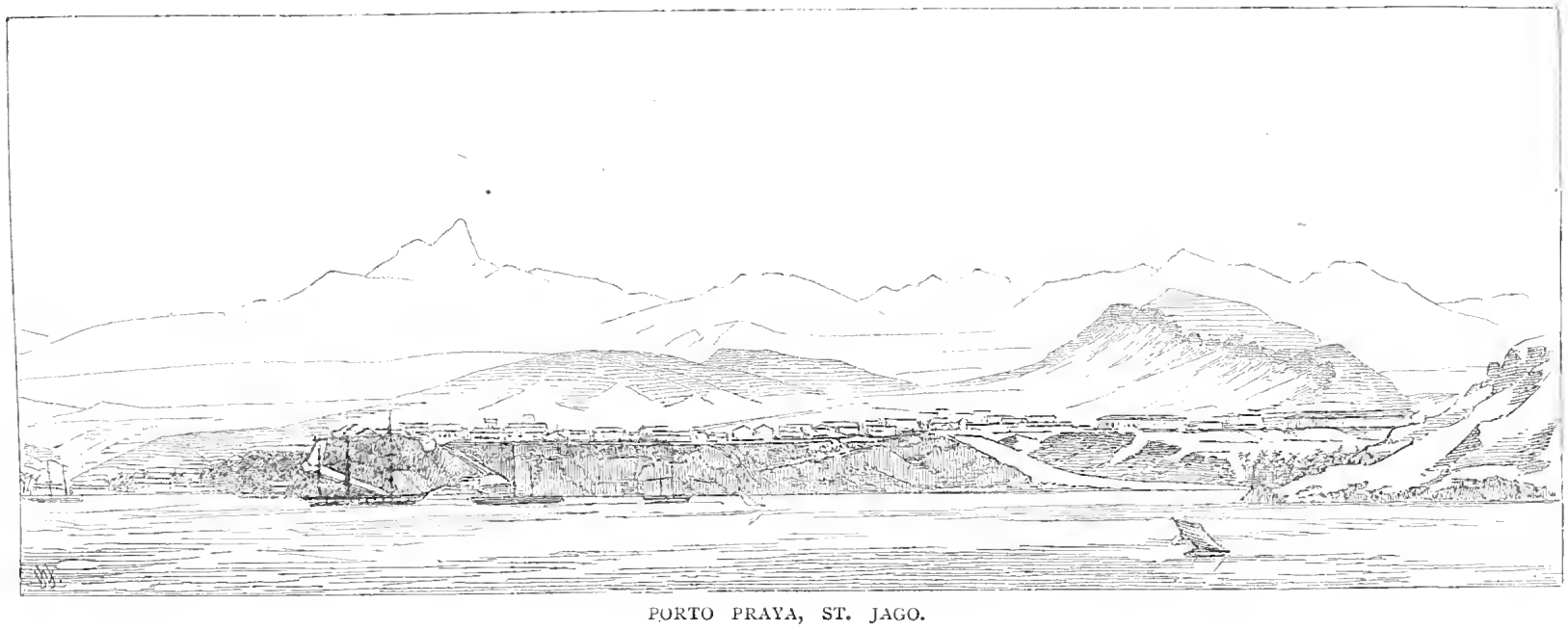
MOUNT WASHINGTON, PORTO GRANDE.

this port on the 5th of August for St. Jago, the largest of the Cape de Verde Islands, and the seat of Government. In the course of the 6th, as we were sailing through the sea enclosed by these islands, the high peaks of Fogo were for a short time visible above the clouds to the southward; and running down during the night along the east coast of St. Jago, we entered, early on the morning of the 7th, the narrow inlet which forms the harbour of Porto Praya.

ST. JAGO.

As we surveyed the basalt cliffs between which we lay at anchor, we had no difficulty in identifying the white stratum which attracted the attention of Mr., now Doctor, Darwin on the occasion of his visit to this port in H.M.S. "Beagle" in January, 1832. Although over forty feet above the present level of the sea, this stratum is composed of shells and other calcareous matter, which must have been deposited at a time when the volcanic foundation on which it rests was under water. Subsequently covered by a new flow of lava, and partly converted into limestone by heat, it now forms part of the cliffs which extend for miles along the sea-shore in the vicinity of Porto Praya. Far inland rises the steep cone of Mount St. Antonio, probably marking the site of the great volcano whence flowed the vast streams of lava which now form the gentle slopes of St. Jago. Geology has made us familiar with the gradual transformation of the surface of our planet during the past—a process still going on—and, as a consequence, we are perhaps inclined to underrate the length of time which, geologically

speaking, must have elapsed since the most recent changes—such, for example, as those which may be studied in the cliffs of Porto Praya. The considerable and successive alterations of level of which they bear evidence, as well as the effects of denudation everywhere visible on the island, and which have even effaced the ancient craters whence the lava streams



PORTO PRAYA, ST. JAGO.

proceeded, show that the time required to form the harbour where the "Challenger" lay sheltered can never be measured by the limited scale of years at the command of our imagination.

The capital of the Cape de Verde Islands is situated on a projecting bluff, isolated from the surrounding hills by a ravine which, with its grove of palm-trees, joins the harbour on both sides of the town. Beyond stretches the same desert of stones and sand and barren hills with which St. Vincent had made us acquainted. Some districts, however, which enjoy the advantage of a running stream, permit the cultivation of the cocoa-palm, the sugar-cane, and other products of a tropical climate. An excursion was made to one of these oases, occupied by the village of Trinidad, a few hours' ride from Porto Praya. The road leads through a stony valley, with a patch here and there of almost leafless shrubs. A short distance from the town stands a baobab tree, mentioned by former travellers, and said to be more than a thousand years old. Its trunk measures forty-two feet in circumference, and it is the last survivor of the trees which, according to tradition, at one time adorned the neighbourhood of Porto Praya. Another of these patriarchs of vegetation stands in the village of Trinidad. We noticed on this occasion several flocks of guinea-fowl, but, as in Dr. Darwin's time, they proved too wary for our sportsmen; also a kingfisher, with bright blue and yellow plumage.

H.M.S. "Challenger" sailed from Porto Praya on the 9th August. Her cruise along the African coast was marked by several magnificent displays of phosphorescence. One evening the ship traversed what was literally a sea of light, almost dazzling to the eye. We found that the light proceeded from an animal known to the naturalist under the name of *Pyrosoma*. It consists of a semi-transparent cylindrical mass, slightly tapering towards one end, about one inch in diameter, and from three to four inches long. On a subsequent

occasion, when at the Antipodes, specimens of the same were fished up two inches in diameter and nine and a-half inches long. Yet, large as they are, how many would be required to cover the square miles of sea which we have seen transformed into a mass of floating light? These weird but beautiful manifestations of the countless hosts which inhabit the ocean, literally as well as figuratively, help to brighten many a quiet evening hour during a long

BAOBAB TREE NEAR PORTO PRAYA.

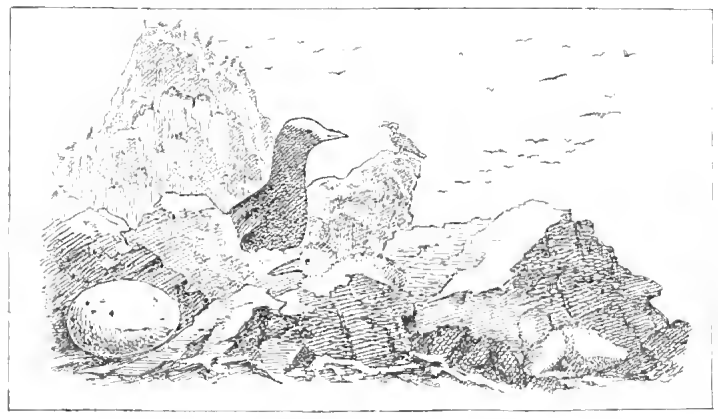
cruise. They are certainly more common and more brilliant in the vicinity of land, and I have often seen the water falling from our oars like molten gold or silver. Many of the specimens brought up in the course of our dredgings were enveloped in light; and the idea has even been suggested that this faculty of phosphorescence, found in most of the inhabitants of the deep, may be intended to compensate for the absence of solar light in the abysses of the ocean.

During the 16th, 17th, and 18th, when in the latitude of Sierra Leone, our progress southwards was delayed by bad weather. On the 21st, and in lat. 3° N., we fell in with the expected South-east Trades, and, favoured by this welcome breeze, were able to shape our course westwards and along the Equator for St. Paul Rocks.

ST. PAUL ROCKS.

These solitary rocks, placed at about one-third of the distance between Cape S. Roque in South America and Cape Palmas in Africa, were already known to us from the descriptions of former visitors—Captain Fitzroy and Dr. Darwin in 1832, and Sir James Ross in 1839; but when they first came in sight in the afternoon of August 17th, we were surprised to find them appear but a small speck upon the ocean, barely rising above the white crest of the waves which perpetually dash up against their sides. The highest rock, remarkable for its pure white colour, rises only sixty feet above the sea-level. Merchant-vessels usually give these rocks a wide berth; but our men found a bottle with a paper stating that on July 19th, 1872, Captain Park had landed from the ship "Ann Millicent" of Liverpool, bound from London to Colombo. Birds and crabs divide the ownership of St. Paul Rocks. The former may be

counted by thousands, and when rising in the air they form a perfect cloud of moving pinions. They belong chiefly to two species—the "booby" and the "noddy;" and, as they are seldom disturbed by their fellow-biped "man," are without fear, scarcely, indeed, move out of the way of an intruder. The crabs are more timid or more wary, and at our approach hastily flung themselves down the crevices, their shelly armour rattling against the rocks. The sea all around swarmed with fish, amongst which sharks were conspicuous. Besides the additions we were able to make to the fauna of St. Paul Rocks as already known, the soundings of the "Challenger" have thrown some light upon the physical structure of this interesting spot. St. Paul Rocks form the summit of a mountain which rises abruptly from a depth of about two miles. The foundation of this mountain is a submarine plateau which, after running eastwards along the Equator, turns south and connects itself with Ascension Island. The steep incline of the mountain may be



BIRDS AT ST. PAUL ROCKS.

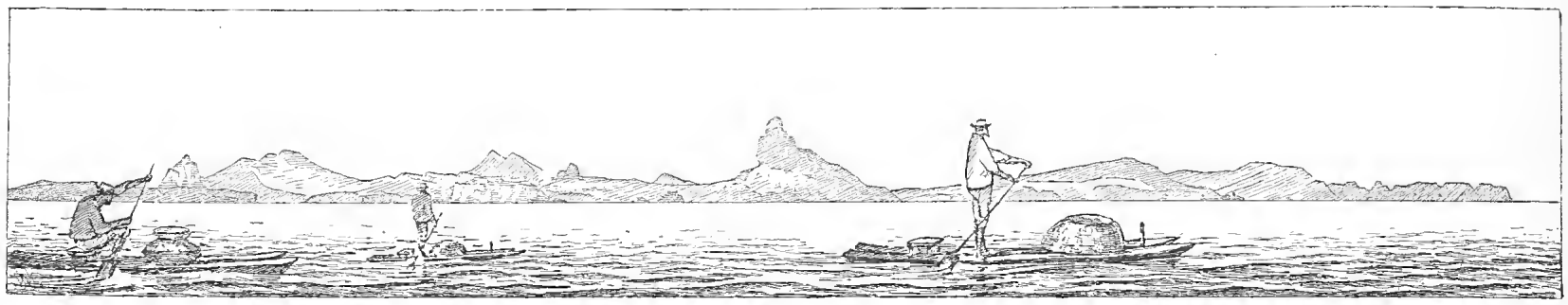
ST. PAUL ROCKS.

guessed from the fact that, while the ship was secured to the rocks about seventy yards distant, the soundings at her bows gave one hundred and four fathoms. There is always a strong current from the east, and the waves as they dash in between the rocks fall in foaming cascades into the central basin. When we landed, the sun was just setting behind the ship, and as it went down into the sea, a flaming disc, threw wonderful tints of rose-colour on the wild fantastic scene.

FERNANDO NORONHA.

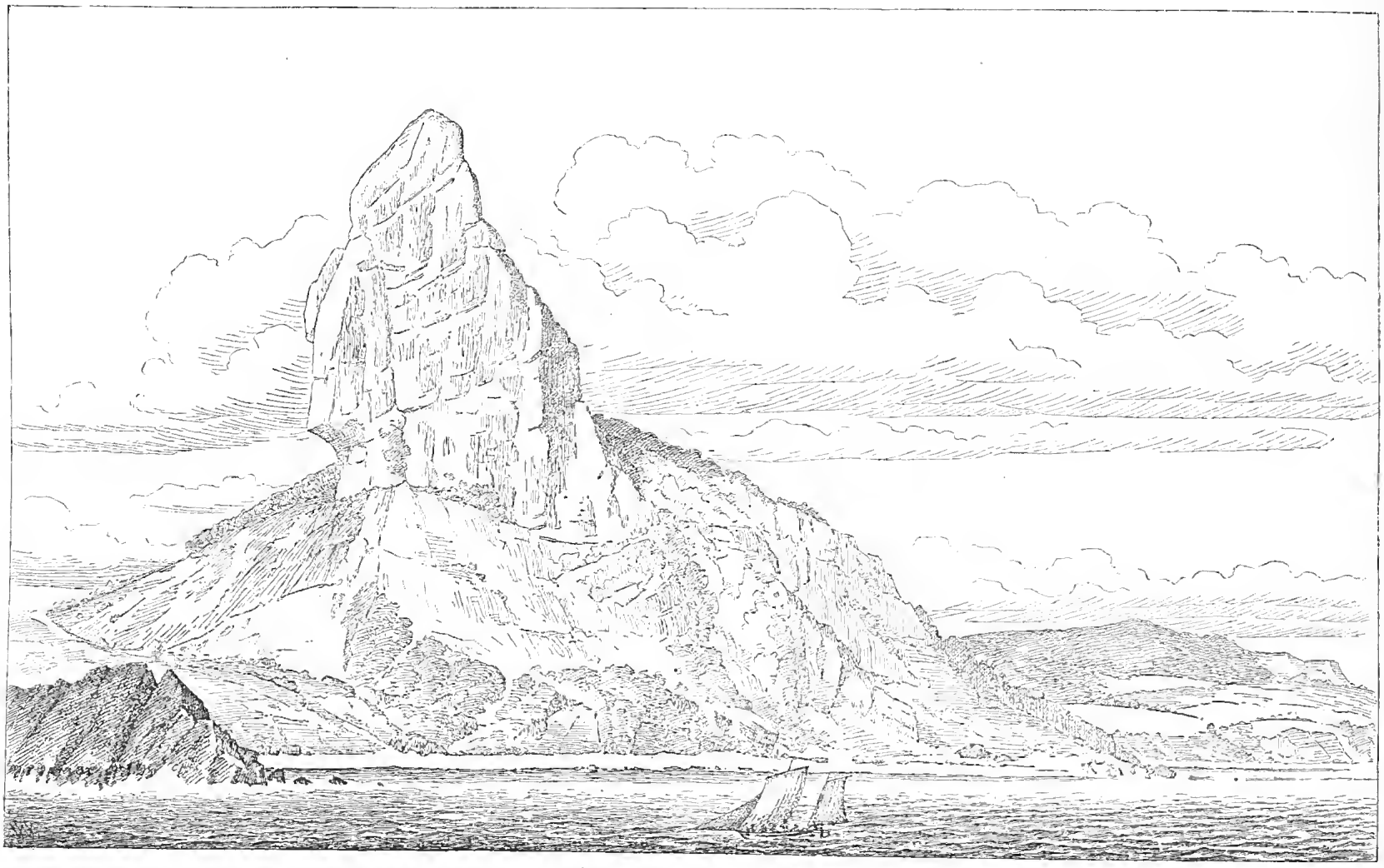
The Equator was crossed for the first time, near the meridian of 30° W. long., in the course of August 30th, and a short run of two days brought us, on the morning of September 1st, in sight of the island of Fernando Noronha. The enormous boulder which, rising to a height of 1000 feet above the sea, forms the most elevated point, could be made out from a great distance, while the general aspect of the island, with several other peaks and conical hills scattered over its surface, is very singular. Dr. Darwin, who visited this place on February 20th, 1832, ascribes the "formation of this great boulder to an injection of melted rock into

yielding strata, which thus had formed the moulds for these gigantic obelisks," left bare through the subsequent removal of these strata by denudation. The island is a dependency of Brazil, and is used by the authorities as a penal settlement for the worst criminals. The latter are allowed to live in separate huts, to cultivate the ground, and even to marry. They



CATAMARANS.

also go out fishing upon frail craft called "catamarans," consisting of two wooden logs fastened together and pointed at one end. As these are almost level with the water, we were at first puzzled by the distant appearance of men who looked as if they were walking upon the surface of the sea. The criminals, with the soldiers and officials appointed to watch over them, are the sole population of the island. A fort is perched upon the top of a steep rock to the

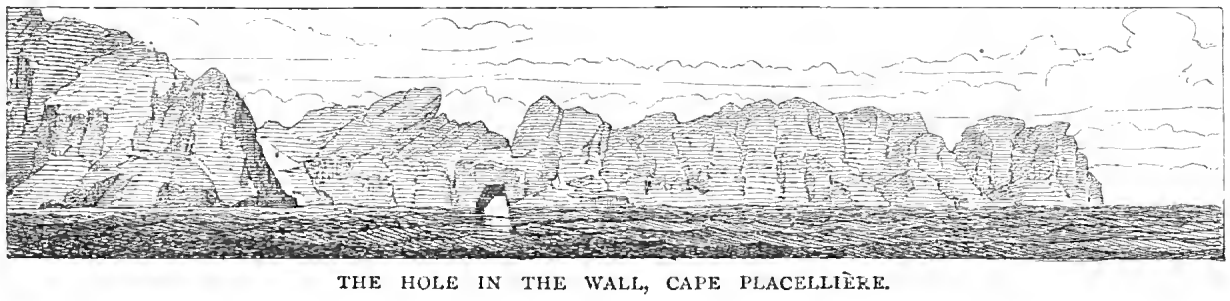


FERNANDO NORONHA.

left of the great boulder. The Governor, on being applied to on the day of our arrival for permission to explore the island, first granted it, but withdrew it the next morning—a great disappointment to us all, weary as we were of pacing the smooth decks day after day. But His Excellency may be excused if he hesitated to allow a swarm of lively sailors and

naturalists, armed with sporting guns, nets, geological hammers, and other instruments of destruction, to roam over his domain, which was virtually a strictly-guarded state prison. One of the boats conveying surveying-officers on shore was upset in the surf, but happily no one was drowned, and the chronometers, sextants, &c., were fished up by native divers.

Leaving Fernando Noronha to future explorers who may be fortunate enough to find its Governor in more complaisant mood, we started on September 3rd for the neighbouring coast of South America. While lingering on the south-west to take soundings, we obtained another view of the strange-looking island, with its rocky steeples of Nature's building. The precipitous ridge which terminates in Cape Placellière has been completely perforated by the action of the waves, thus forming a tunnel, through which the sea at times must rush with terrific force, and known to sailors as the "Hole in the Wall."



THE HOLE IN THE WALL, CAPE PLACELLIÈRE.

After an interlude of stormy weather, the coast of Brazil was seen for the first time on the 6th, some distance to the southward of Cape S. Roque. Now the breeze which had sped our good ship across the Atlantic began to fail, so that a whole week was consumed in covering the distance which separated us from Bahia. During much of this time the coast was visible from our deck; Pernambuco was made out with the help of telescopes, and a day was spent in dredging off the mouth of the Rio S. Francisco. The general appearance of the land was flat, only rising a few hundred feet above the sea-level, and it seemed to be composed of a succession of hill-ranges, rolling towards the interior, wave after wave, until lost in the blue distance. Here and there could be seen a grove of palms, or the white walls of a building, or the opening of a river. Moving along this coast day after day conveyed a good idea of the immensity of a continent the extent of which a native of the promontory called Europe finds it difficult to realise. How can he who has sailed up to Richmond on the Thames, or to Paris on the Seine, or between the historic banks of the Rhine, or even down the Danube to the Black Sea, form a conception of rivers whose course is measured by thousands of miles? and yet the continent of South America contains not one, but more than half-a-dozen of such mighty streams.

The "Challenger's" approach to Bahia was hailed at once by the hugest and by the frailest of living creatures. While two whales were disporting themselves close to the ship, leaping in their frolics almost clean out of the water, a swarm of butterflies settled on our yards and deck. We had burned our last stone of coal, and with the help of the slenderest of breezes, which sprung up just at the right time, we drifted, in the afternoon of September 14th, up to our anchorage in the beautiful Bahia de Todos os Santos.

BAHIA.

The fame of the broad, lake-like sheet of water spread out before us has so far eclipsed that of the great commercial city built upon its northern shore as to have imposed its name upon the latter, originally called San Salvador, but now more generally known under the name of Bahia. The town stretches along the steep slopes of a promontory placed between the bay in the south and a river running into the sea to the north. The lower town, with its wharfs, warehouses, and shops, might be mistaken for a commercial emporium in Europe, but for the gangs of stalwart negroes, who carry or propel their loads along the streets to the sound of a monotonous chant. The upper town still retains the characteristics of a

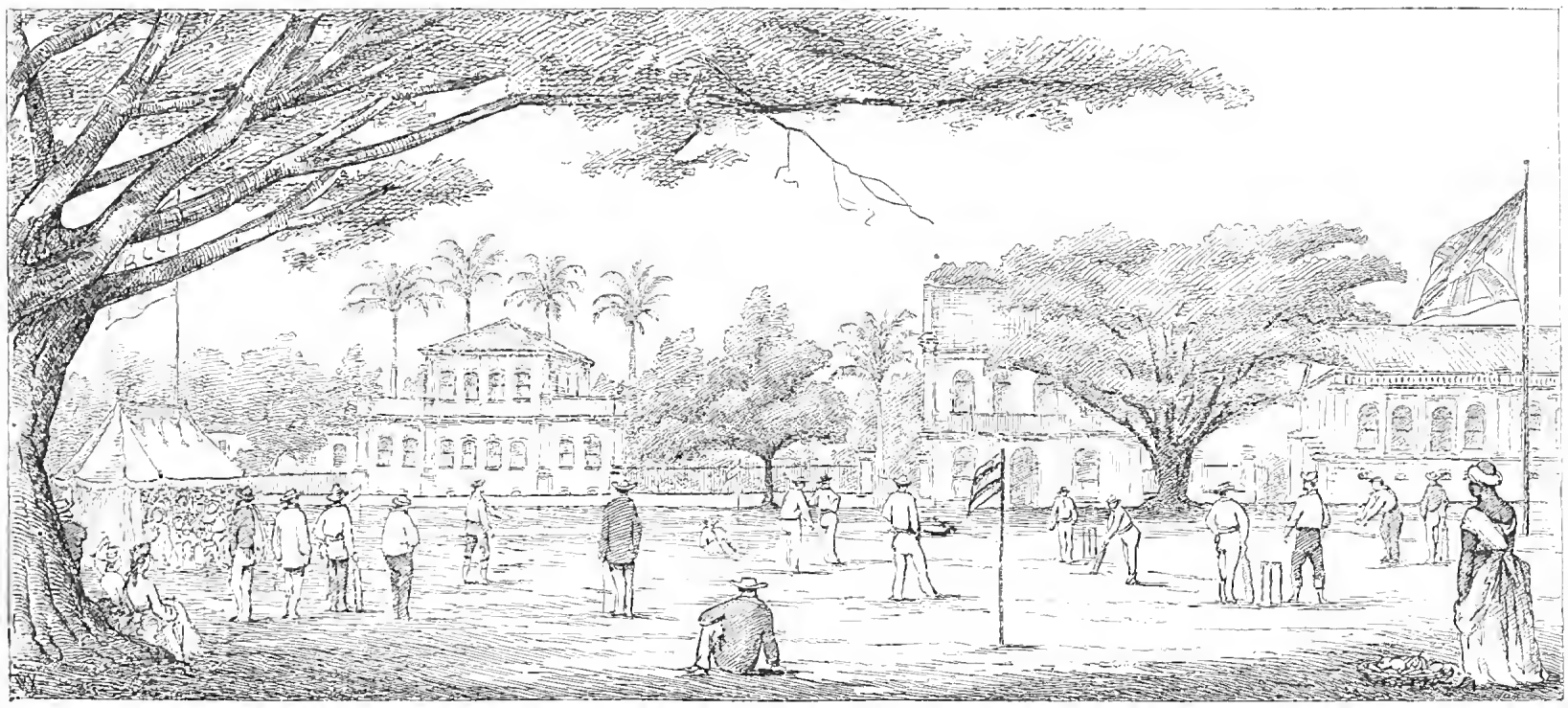
PIEDADE, SAN SALVADOR.

Spanish city—the iron-barred windows and balconies, the numerous churches and convents, and in the silent streets the long-robed priest and veiled señorita going to mass. About three or four o'clock in the afternoon, the merchants of Bahia, who keep early hours, are seen hurrying home to dinner, carried up the steep streets which lead to the upper town in curtained sedan-chairs borne by negroes in livery. Of course we, who had for weeks and months past inhaled the bracing sea-air, disdained such an effeminate mode of progression; but the sallow complexions of the occupants of the chairs told but too well of the fever-breeding climate of Brazil. European enterprise has endowed Bahia with tramways and railway communication with the interior—conveniences doubly appreciated by those who live under a vertical sun. The wealth and grandeur of the flora of Brazil, which never fail to rouse the enthusiasm of

the lover of nature, are manifest at every turn in the surroundings of Bahia; and the traveller only accustomed to the modest sylvan beauties of northern lands finds himself face to face with the splendours of the tropical forest. No longer, as in colder climes, bestowing her bounties with jealous hand—often wholly withholding the long-desired boon,

> "Nature here
> Wantoned as in her prime, and played at will
> Her virgin fancies, pouring forth more sweet,
> Wild above rule or art, enormous bliss."

The English residents and the authorities of San Salvador were making preparations for a ball in honour of the "Challenger" Expedition, when a case of disease occurred amongst our crew, and was pronounced by the doctors to be the much-dreaded yellow fever. Preparations were made for immediate departure, and thus the pleasant social relations which

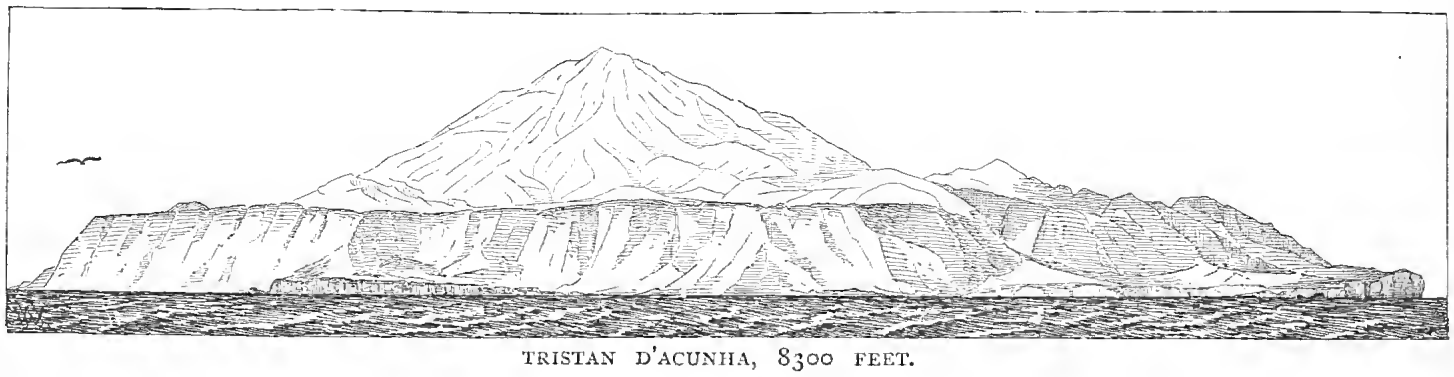


CAMPO GRANDE, SAN SALVADOR.

had been established with the inhabitants and with the officers of the U.S.S. "Lancaster," anchored close beside us, came to an abrupt termination. During our stay, however, the amateurs of cricket on board and on shore had succeeded in arranging several matches. These came off on the Campo Grande, a fine open space surrounded by villas, and situated in the fashionable suburb which overlooks the bay to the eastward.

In the afternoon of the 25th September, H.M.S. "Challenger" once more resumed her course over the blue waters. Every effort was made with sail and steam to reach cooler latitudes with as little delay as possible. The patient first attacked had been transferred to the hospital on shore; but, another suspicious case having presented itself, a temporary hospital was rigged on the after-deck, fully exposed to the breeze. It is well known how long the germs of yellow fever will linger on board a vessel once attacked. Happily the man recovered shortly after our departure, and we were not sorry to feel that the spectre of disease and death—whose presence is more awful in the little world between decks than elsewhere

—had vanished, together with the burning skies of the tropics. An intended exploration of the little-known group of Trinidad Island and Martin Vaz Rocks, situated on the 20th parallel, had to give way to the necessities of the moment; but we found time to verify the great depth (three miles) of the oceanic valley which closely follows the coast of South America from the mouth of the Rio de la Plata to Cape S. Roque. When in about lat. 30° S., Father Neptune gave us a severe shaking, leading us some seventy miles out of our course. This happened on the 6th and 7th of October. At daybreak of the 14th I was called on deck to look at a snow-clad pyramid which rose out of the sea to the southward. It was the peak of

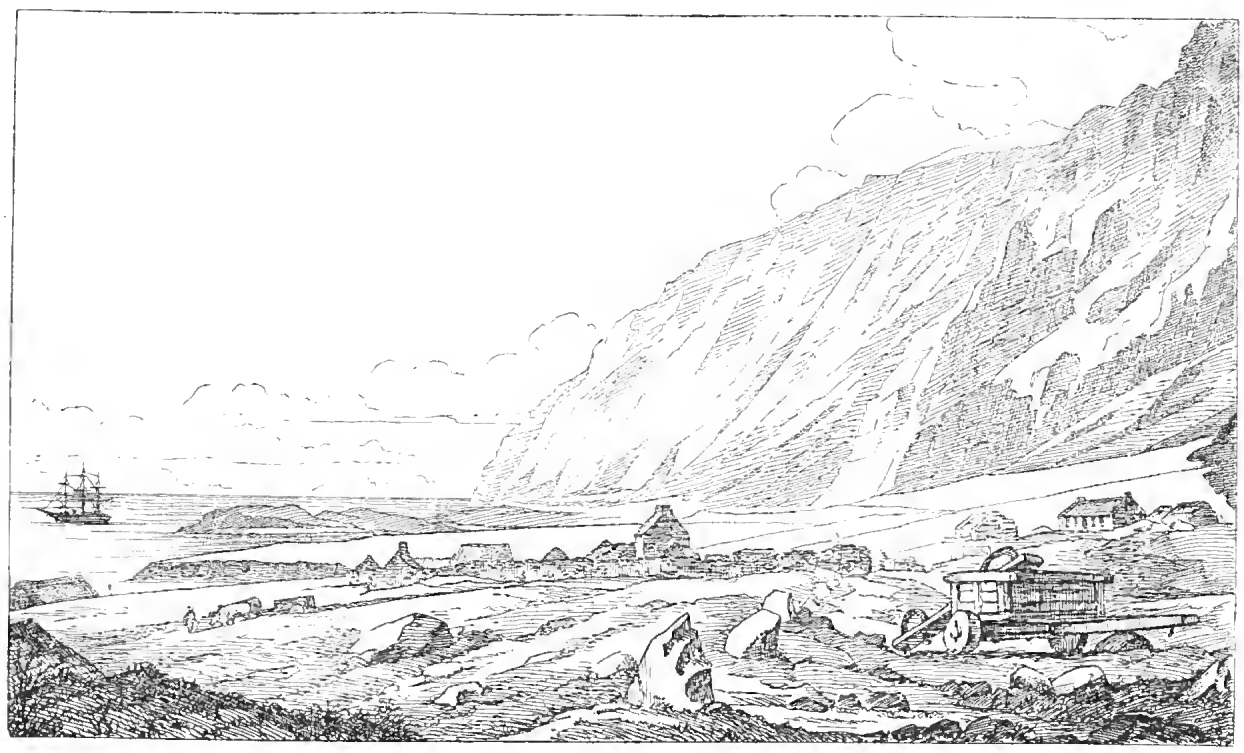


TRISTAN D'ACUNHA, 8300 FEET.

Tristan d'Acunha, then fifty miles distant. Whilst admiring this famous landmark of the mariner in the South Atlantic, I became aware of a sudden change in the climate. During our several cruises from one hemisphere to the other—the "Challenger" crossed the Equator six times—we had frequent opportunities of observing the rapid transition from a warm to a cold climate, and *vice versa*. It seems that the atmosphere, like the ocean, is divided by its currents into more or less sharply-defined areas of high and low temperature; and just as in the one case a few hours' sail may carry a ship from the warm waters of an equatorial current into the cold stream of an Arctic current, so does a day's journey often transport a traveller from the genial domain of equatorial breezes into the stormy kingdom of polar winds. The sailor who yesterday was basking on the forecastle in white jacket, straw hat, and bare feet, to-day is seen coming down the ladder in dark garments, dripping sou'-wester, and heavy boots. His craft, which but a few hours ago was gently gliding through the waters, with studding-sails spread out like the wings of a white albatross, now lies a helpless hulk in the trough of the sea, vainly struggling against the billows under double-reefed topsails.

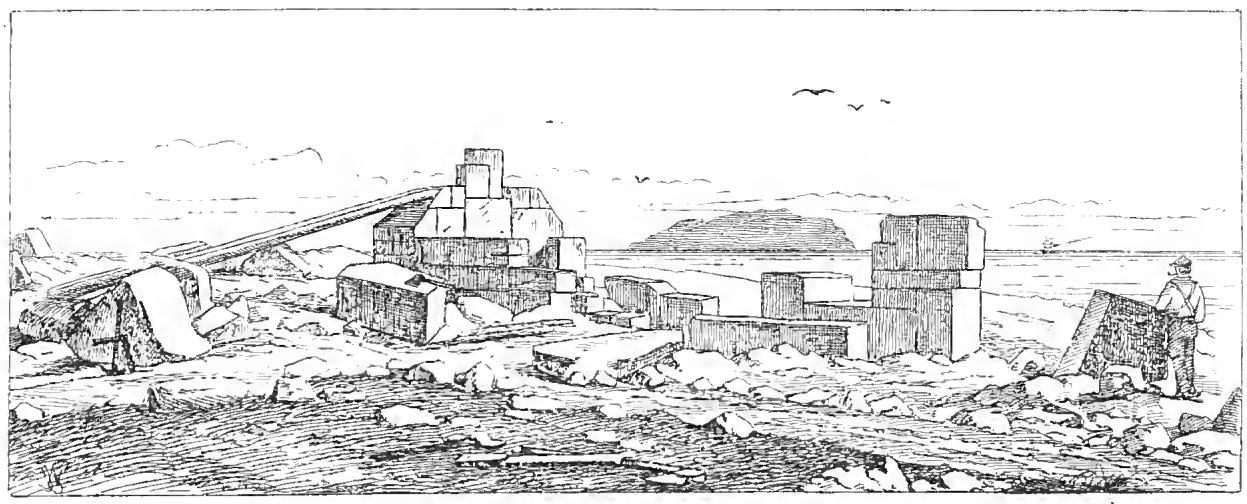
On the 15th October, H.M.S. "Challenger" arrived off the settlement of Edinburgh, so called in memory of the visit of H.R.H. the Duke of Edinburgh in the "Galatea" in August, 1867. It occupies the north-west corner of the almost hexagonal island, and is built upon a narrow ledge apparently formed by the *débris* accumulated at the foot of the table-land which, at a height of 2000 feet, supports the volcanic cone of Tristan d'Acunha. The colony boasts of about a dozen huts, with from sixty to seventy inhabitants, and was founded, as may be remembered, by a soldier who formed part of the English garrison stationed here at the time of Napoleon's exile in St. Helena. Some of the men and women are half-caste. They rear cattle, sheep, and poultry, grow a few vegetables, and exchange these productions for other commodities with whalers and traders who occasionally call at the island. A waterfall which pours over the cliff in front of the settlement affords an abundant

supply of fresh water. The place has an aspect of utter desolation, which one of my companions has graphically described in the following words:—"Ten or twelve poor-looking cottages, built of rough trachyte, low-roofed, and thatched with tussock grass, marked off separately or in twos and threes by low stone walls; one or two small patches of cultivation between the houses and the sea; a primitive cart, or box on wooden wheels, with a large-



EDINBURGH, TRISTAN D'ACUNHA.

boned quiet-looking bullock standing near; a flock of geese picking the scanty grass and cackling; a few woe-begone fowls sheltering from the wind under an old cart; near, a clump of furze, thin and starved by the cold, but still showing a few scanty yellow flowers; a few timid children gazing out of the doorways—is all that greets the stranger as he passes through the settlement."



HOUSE-BUILDING AT TRISTAN D'ACUNHA (INACCESSIBLE ISLAND IN THE DISTANCE).

In the absence of timber and mortar, the islanders resort to a primitive style of architecture, which recalls the cyclopean walls of our prehistoric ancestors. Selecting from amongst the numerous coarse-grained boulders which have rolled down from the cliffs such as are most suitable in size, they shape them with mason's tools, and moving them along an inclined plane, composed haply of the mast of some shipwrecked vessel, they fit them into

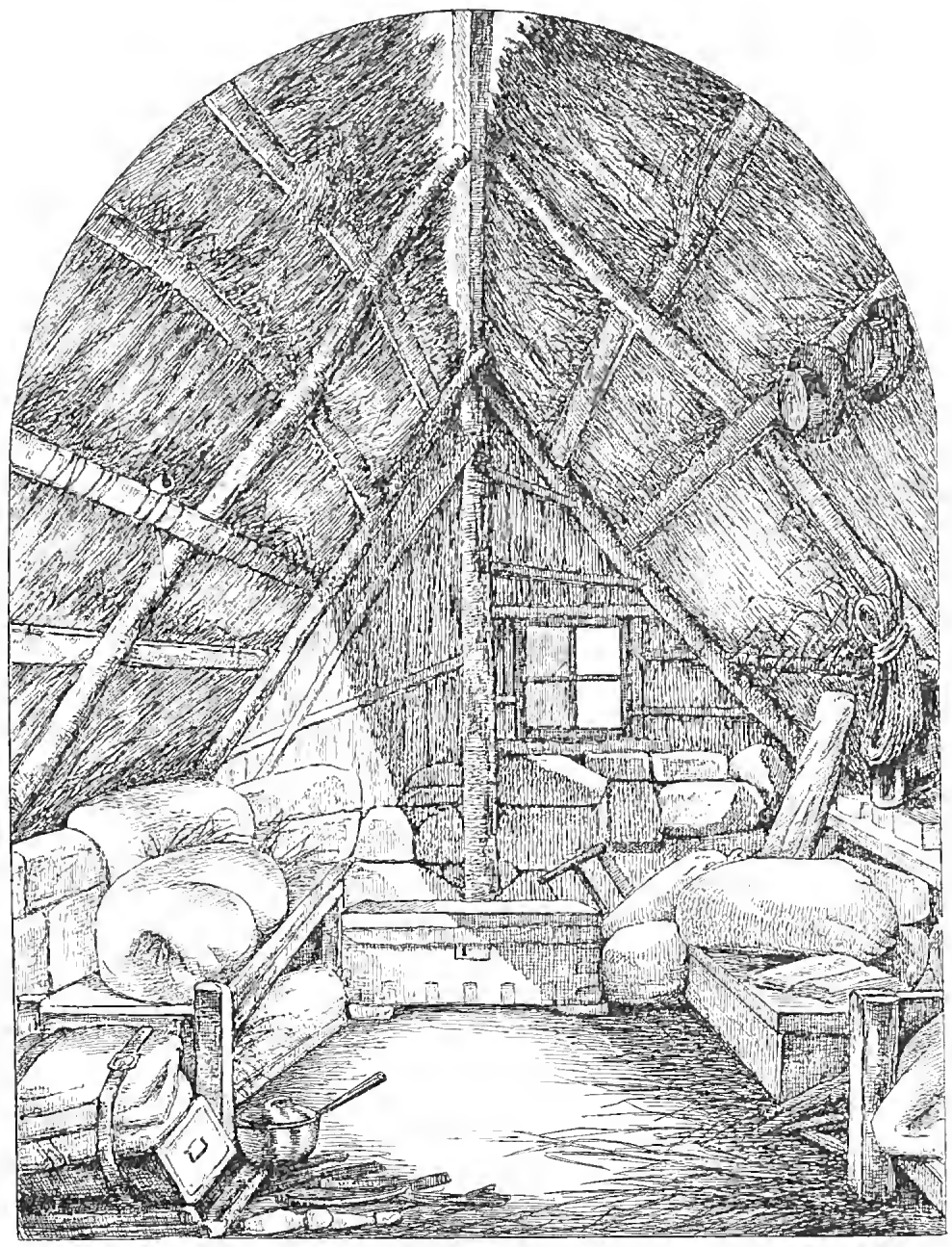
their destined places without mortar or any binding material whatever. A wall, several feet thick and built after this fashion, shelters the hut on the weather side.

The group of Tristan d'Acunha includes Inaccessible Island, situated about twenty nautical miles to the south-west of the former, and Nightingale Island, about eleven miles to the south-east of the latter. The position of these islands being but vaguely marked in the charts, it was intended, weather permitting, to make a survey. We had learned from the men at Edinburgh that two Germans were living on Inaccessible Island, but had not been communicated with for many months. So we started off in the afternoon of the 15th, and early next morning found ourselves close to the island. The two solitary dwellers had no doubt sighted the ship long before our arrival, and had lighted a fire to attract our attention. They proved to be two brothers, named Frederick and Gustav Stoltenhoff. The elder brother, Frederick, had served as second lieutenant in the Franco-German war, and had taken part in the siege of Metz and Thionville; the younger, an ex-pupil of the German Seamen's School at Hamburg, had landed in 1870 on Tristan d'Acunha with the crew of a ship lost by fire about three hundred miles to the north-west, and during his stay had heard of the capture of 1700 seals at Nightingale Island in 1869. Upon his return to Europe he persuaded his brother to join him in a seal-hunting expedition, in the hope of realising a handsome sum by the venture. Having heard a favourable report of Inaccessible Island, they decided upon trying their fortunes there, and, shipping on board an American whaler, were landed at their destination in November, 1871. Their stock-in-trade consisted of an old whale-boat bought at St. Helena, a few guns, some tools and ammunition, and a stock of provisions. The speculation turned out a complete failure, owing to a series of unforeseen disasters. Shortly after landing, the boat, which was too heavy for two men to handle, came to grief in the surf. They only succeeded in killing about a score of seals during the first season. In April, 1872, the tussock grass, by which they had been enabled to ascend the cliff close to the hut which they had built, caught fire, and thus their means of killing goats and wild pigs, chief articles of food, was cut off. With the exception of a few visits from passing vessels and from the settlers of Tristan d'Acunha —whose treatment of them, by-the-bye, seems to have been anything but generous—the brothers were wholly dependent on themselves for the means of existence, and were occasionally reduced to the brink of starvation.

HUT OF THE BROTHERS STOLTENHOFF ON INACCESSIBLE ISLAND.

In order to ascend the cliff, 1200 feet high, after the burning of the grass, they were

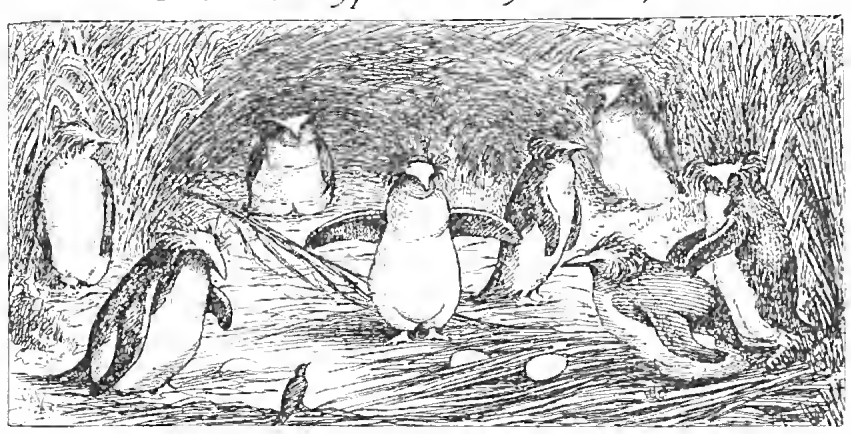
obliged first to swim round a point, and then the top was only reached after an hour and a half's hard work with hands and feet, and, at times, teeth. To obtain a supply of provisions, one of them had to spend days and sometimes weeks on the summit of the island, where a hut and a cave afforded him shelter. When a pig was killed, the hide with the fat attached was rolled up and thrown over the cliff. The brothers saw each other almost every day, and were able, unless prevented by a high wind or the roar of the surf, to hold a sort of conversation. After a time their guns burst, and their knives were lost in the high grass, but they contrived to manufacture new knives from a saw by placing the latter in a fire, cutting off pieces with a chisel, hardening the iron, and fixing it in a handle. Happily they never required medicine; and they replaced worn boots and shoes by moccasins. They had fixed the hut—the second or third erection since their arrival—on the spot where we found them on account of a waterfall, which, descending close by from a height of many hundred feet, furnished an abundant supply of excellent water. Although for many months past the brothers had not seen a human being, and had been living chiefly on the eggs of penguins fried in pig's fat, they looked none the worse for their long privations, and were only one day out in their reckoning, an error which, as they believed, occurred soon after their landing. They fortunately possessed a few books, which, as may be imagined, we found in a well-thumbed condition. The interior of their abode afforded a good idea of the dwelling of a real Robinson Crusoe, and, truly, Inaccessible Island, with its precipitous cliffs and wandering goats, has some points of resemblance to Juan Fernandez, the whilom abode of Alexander Selkirk. The walls of the hut were built up of loose stones to a height of about four feet, and supported a slender framework of wooden beams covered in with dry grass. Standing at the little doorway we saw the roughly-constructed bedsteads, one on each side; placed against the wall opposite, a trunk whose original covering of leather had been stripped to make shoes; stuck in the



INTERIOR OF THE HUT OF THE BROTHERS STOLTENHOFF.

rafters, a tobacco pipe which had not been lighted for many months; on a shelf a few smoke-dried books, and on the floor tools, billets of firewood, and a saucepan. The sun looked pleasantly in at the little window in the gable-end. Half-an-hour after the above sketch was taken, the result of so much labour, the scene of so much manly endurance, was a heap of ashes.

A short distance beyond the hut was the large "rookery"—if one may use the term—of penguins, whose downy feathers helped to rest the wearied limbs of the exiles, and whose eggs were their principal means of sustaining life. The bird, which annually visits these islands for the sake of breeding, is the crested penguin, known to the naturalist under the name of *Eudyptes chrysocoma*, and we are indebted to the two brothers for close observations of an animal which there are but rare opportunities of seeing in its native haunts. It stands about eighteen inches high, and is white-breasted, the back being of a dark slaty grey. The bill is red, the eyes crimson, and a streak of yellow runs backwards from each eye, terminating on the side of the head in a narrow tuft of feathers, connected behind by a black tuft. The wings—unfit for flight, but powerful aids in swimming—when at rest, hang down droopingly like the empty sleeves of a dress coat; and this, in combination with the upright position, gives the bird a ludicrous resemblance to an old waiter dressed in second-hand garments. The feet are webbed, flat-toed, and black on the under surface. Frederick Stoltenhoff gives the following account of the habits of this remarkable denizen of the southern hemisphere. The language lacks that precision of style essential to the professed naturalist; but probably this account of the bird will be found most interesting in the observer's own words:—



CRESTED PENGUINS AT INACCESSIBLE ISLAND.

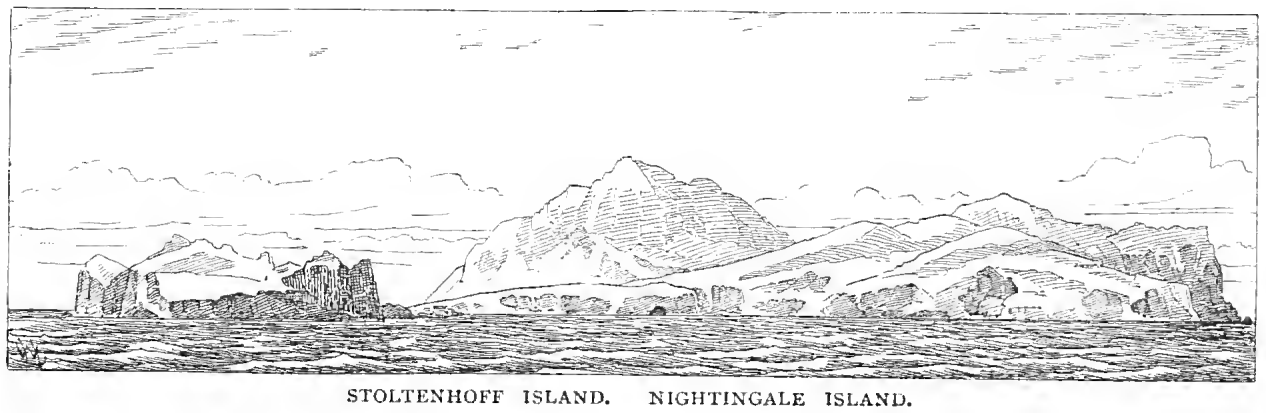
"The largest breeding-ground of bi-crested penguins is found on the beach at the north side of the island, and there are several smaller grounds in other parts. So far as I have learned, the bi-crested is the only description of penguin found on these islands. The males commenced to arrive in small numbers in the last week of July, first singly or in small bodies, and then in larger numbers; all in good condition, and very fat. They came ashore daily for a fortnight, and then a couple of days intervened during which there appeared to be no arrivals. After landing, the males first lay about the shore and tussock grass, asleep nearly all the time. They then commenced preparing nests for the females. As a rule, these nests were built with the decayed stalks of the tussock grass on the ground. The nests were round in shape, and some of them reached as high as five or six inches—the generality being from two to three inches in height, and about a foot in diameter. Other birds were employed in scraping a round hole in the ground about an inch deep and four or five inches in diameter. This was done by the male; lying on its belly, scratching the ground with its strong feet, and then turning in all directions, a circular shape was given to the hole. After

the interval of a couple of days, on the 12th or 13th August, the females came ashore in bodies of six or seven, and the instant they landed made their way into the tussock grass, this being probably their pairing-time. Fighting was now incessantly going on amongst the birds. None of the penguins at this time ever went out to sea, although a few of them appeared occasionally to wash in the surf. A fortnight later the female commenced laying her eggs, never leaving the shore. Not more than three were laid; the rule seemed to be two. Both male and female assisted in keeping the eggs warm, and the female plucked out feathers to make a hatching-spot in which to cover the eggs. The change of sitter was made with great care, the two birds sidling up to one another so closely that the egg was visible for a moment only when the change was made. The hatching occupies about six weeks. It is a peculiar circumstance that the penguins leave their eggs exposed a couple of days before sitting. One or other of the parents frequently went to sea for a short time in search of food, which was transferred to the beaks of the young birds. In December, young and old left for the water, and almost all disappeared for a fortnight; at the end of this time the moulting season commenced. They now spread themselves about more than usually, and some might be seen in what would appear inaccessible spots. They remained ashore until the middle of April, when all took their departure. This event took place at night on both the years we spent on the island; in the evening the penguins were with us, the next morning all were gone, except two or three who seemed to suffer from some disease. I have passed many hours in studying their habits, and have been struck with the evident joy evinced at the return ashore of a mate, both flapping their wings, and caressing each other in an unmistakable manner. After landing on the beach, they are careful to remain a time on the stones cleaning and drying their feathers before joining their companions. In bad weather, with a heavy surf, this landing is no easy matter; the penguins watch for a heavy breaker and endeavour to land in it, avoiding the crest, and if taken off by the backwash, they dive at the moment the next wave breaks, and are carried ashore by it. I have been unable to distinguish any difference in their cry, which appears to be always in the same note. When relieved from sitting on the eggs, the penguin goes into the water with the greatest satisfaction, and may be seen rolling over and cleaning itself, using both wings and feet for this purpose. When procuring food for their young, they enter the water and disappear immediately on their errand. They appear to be very fond of drinking fresh water, gathering the drops from their feathers with their beak during rain; they also drink salt water. When procuring food, they nearly always work in parties; I have seldom seen single penguins at such times, either landing or going afloat. There is no difference in size between the male and female penguins, but the former have a stronger beak. The roads apparently left clear for highways are really only water-courses. There are always main entrances to the rookery; but on these, nests are to be found. The birds invariably travel by the same roads to and from the water, although the rookery may extend a very long distance on either side. Penguin eggs are palatable."

Besides penguins, the island is frequented by the albatross, the molly-mawk, the pieu,

the sea-hen, a blue petrel, terns, noddies, night-birds, thrushes, canaries, and blackbirds. In all, thirteen varieties of birds were observed on Inaccessible Island. No reptiles, lizards, or snakes were seen, the only four-footed animals being pigs. Goats, which were formerly found here, are now extinct. Of trees there is but one sort, always in leaf, growing erect in sheltered spots, but in exposed places creeping along the ground.

Having made a circuit of the island for the purpose of surveying and dredging, the "Challenger," with the brothers Stoltenhoff on board, who had asked for a passage to the Cape, proceeded towards Nightingale Island, where is heard no sound more harmonious than the squeaking grunt of the penguin. There is present here the same combination of high cliffs as in the sister-island, but the whole is nearly cut in two by a sharp depression. The valley thus formed is covered with tussock grass, and seems one huge rookery of penguins. To penetrate through this grass, which grows to a height of from six to eight feet, is by no means easy, and the difficulty is increased by the number of penguins disturbed at every step. These, most reluctant to quit their nests, drive their sharp bills into the legs of the intruder with a clamour that is absolutely terrifying. The exploring party experienced the greatest difficulty in finding their way back to the beach. One of the two dogs that had been brought ashore lost his way in the grass, and had to be left behind. He probably perished soon afterwards, driven to madness by the yelling, red-eyed creatures amongst which his unlucky lot was cast.



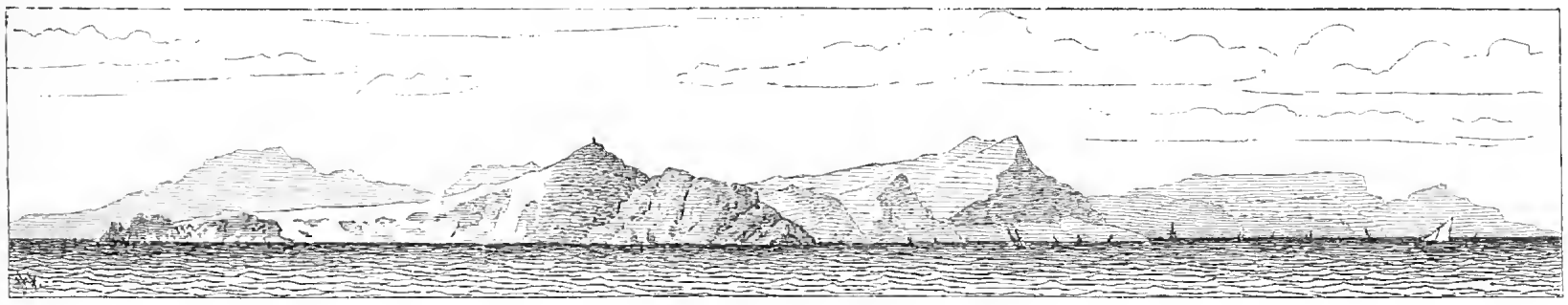
STOLTENHOFF ISLAND. NIGHTINGALE ISLAND.

The survey of the island was completed on the 18th, and, after a last glance at the snowy peak of Tristan, now and then visible between the shifting clouds, we shaped our course eastwards for the Cape of Good Hope. The group we had just left behind rises from a submarine plateau which, as subsequent soundings tend to prove, connects itself with the plateaux of Ascension Island, St. Paul Rocks, the Azores, and Iceland—all centres of volcanic disturbances, some extinct, some still active. Together, these plateaux constitute a submerged area of elevation which traverses the whole Atlantic from north to south, and is flanked on either side by an oceanic valley with an average depth of from three to four miles.

Assisted by the westerly winds, we made rapid progress towards the shores of Africa. On the morning of the 28th October the crests of the Cape Peninsula, amongst which was conspicuous the level top of Table Mountain, lay before us, and shortly after noon we rounded the Cape which but four hundred years ago divided two worlds unknown to each other.

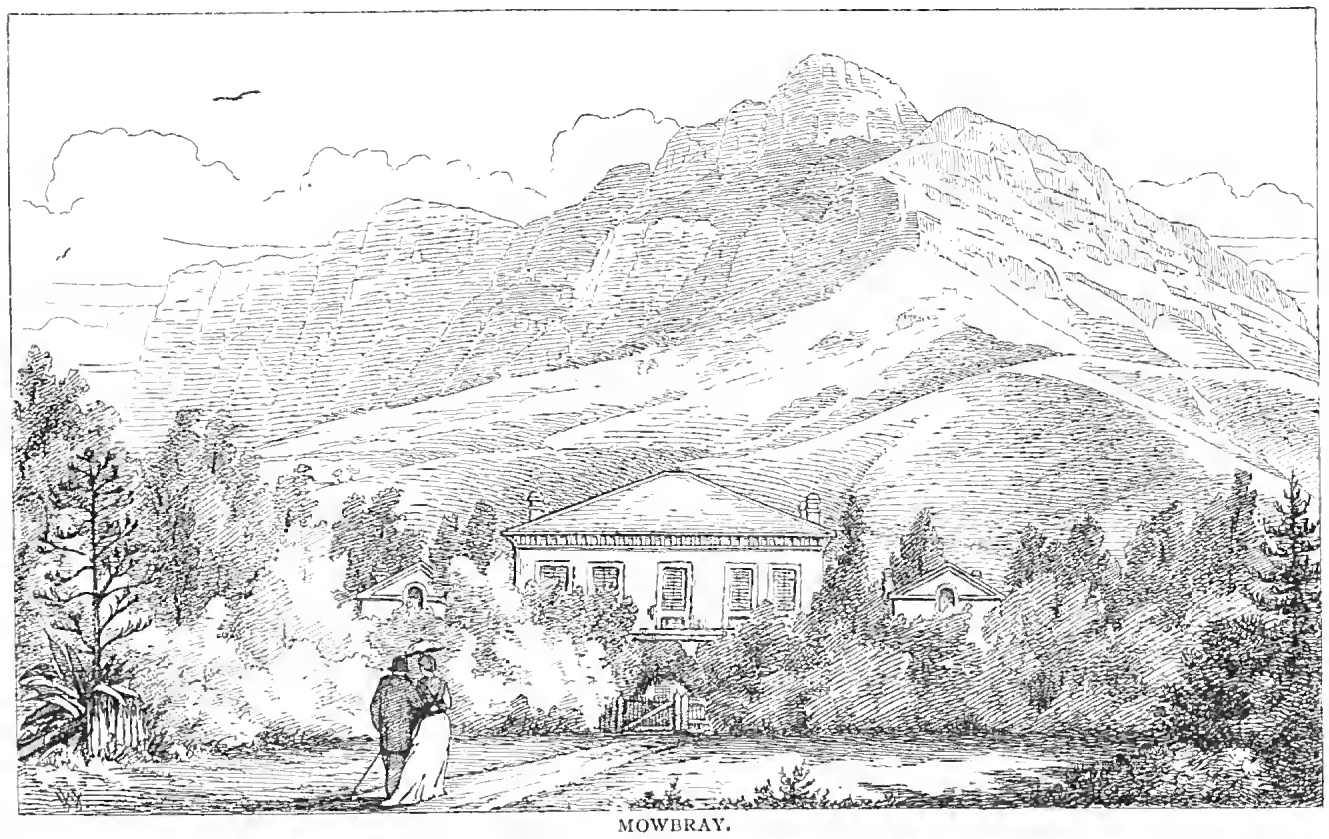
At three p.m. on the 28th October, H.M.S. "Challenger" anchored in Simons Bay.

The stony mountain crests and white sandhills which overlook the bay showed that we were once more upon the confines of Africa. We found here H.M.S. "Flora," H.M.S. "Rattlesnake," just returned from the scene of the Ashantee war, and a Dutch war-vessel, the "Djambi." To our surprise we were put into quarantine, and for the second and happily the last time the ominous yellow flag waved from our foremast. When, however, on the second day, it was



THE CAPE OF GOOD HOPE.

ascertained that no case of fever had occurred on board since our departure from Bahia, we were released. Leaving our good ship stripped of yards and topmasts, and prepared to undergo a thorough overhauling previous to her next cruise towards the south polar regions, we lost no time in starting for Capetown. The road—if a mere track over the sands can be so called—runs for a distance of about eight miles along the shore of False Bay. After rounding Muisenberg, one enters upon the broad level isthmus connecting the peninsula of the Cape

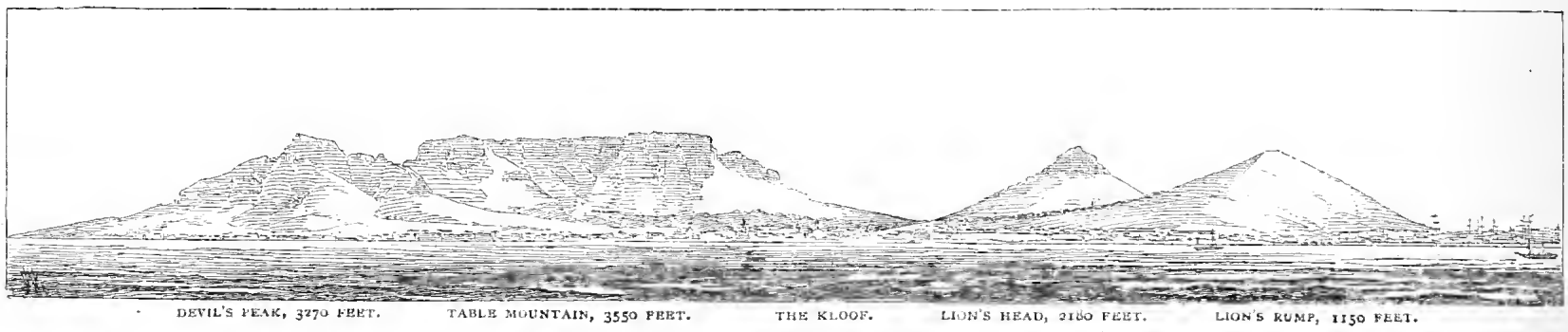


MOWBRAY.

with the mainland. At every step vegetation becomes more abundant; soon the far-famed vineyards of Constantia are passed on the left, and a drive of a few miles brings us to Wynberg, the present terminus of a short railway which joins the latter to Capetown. Too short a time has elapsed since this colony passed under British rule to have effaced the numerous traces of its original founders. While the names which meet the traveller's eye as he journeys up to Capetown remind him of the nation which preceded England as mistress of the seas, the

trim, park-like scenery on both sides of the line recalls the Dutchman's passion for trees and flowers, urging him to transform what was once a desert into a paradise of pine woods and blooming gardens, shady avenues and charming villas. The whole district from Wynberg to Mowbray is admirably laid out, sheltered by tall pine trees, and traversed in all directions by excellent carriage roads. Now and then, as a gateway is passed, one catches sight of a country house in the midst of its tastefully-cultivated grounds, while above the whole scene tower the vertical crags of Table Mountain and Devil's Peak. A small rivulet, which, after flowing past the Observatory, finds its way into Table Bay, divides this district from more open ground occupied by windmills and farm-houses, and gradually descending into the plain of the isthmus.

Capetown possesses few buildings of architectural pretensions. Its streets, amongst



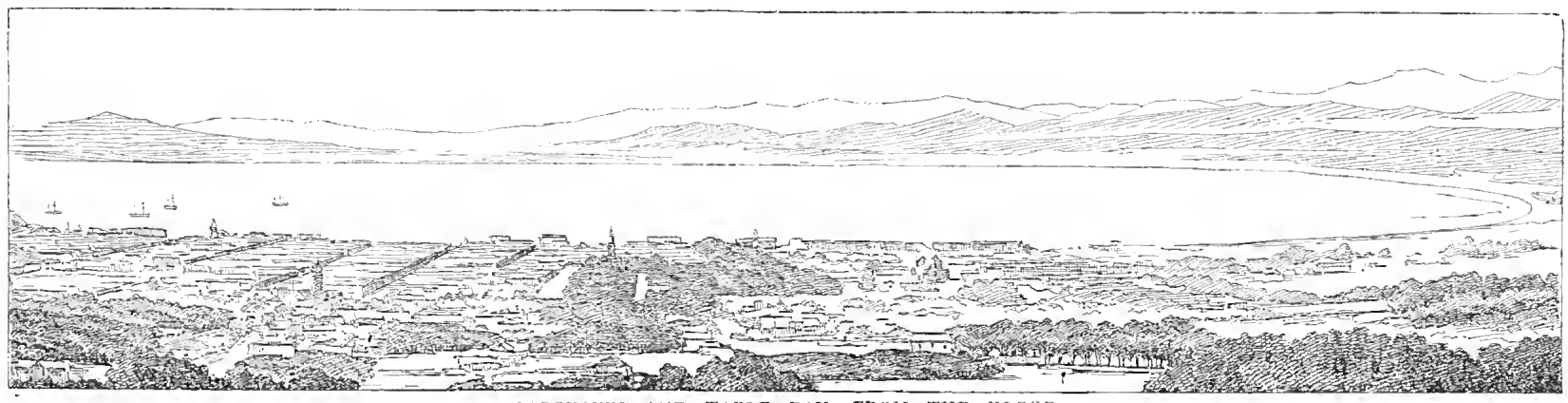
CAPETOWN, FROM THE DECK OF H.M.S. "CHALLENGER."

which St. George's Street is the finest, are regularly laid out at right angles to each other, but do not seem to be kept in good order and the general impression on the stranger is a sense of heat and dust. These shortcomings, however, are scarcely noticed amidst the attractions of the surrounding scenery. The aspect of the town, as seen from the deck of a ship anchored in the bay, is striking in the extreme. On the right hand rises the hill which derives its name from a resemblance to the figure of a couching lion; in front, Table Mountain, whose stupendous cliffs meet the eye at every turn; and to the left, the time-worn crest of Devil's Peak. The ascent of Table Mountain is a task by no means free from danger, and should not be undertaken without the assistance of a guide. The pedestrian may suddenly find himself surrounded by clouds which constantly gather about the summit, and may experience some difficulty in finding his way back. The appearance so familiar to the Capetown people under the name of the "table-cloth" is very remarkable. The vapours condensed by the cold southerly winds are dissolved as they come in contact with the warmer air on the northern side of the mountain, and thus present the curious spectacle of a bank of clouds perpetually tumbling in the shape of a misty cascade over the level edge of Table Mountain, and literally vanishing into air.

A favourite promenade and drive of the residents of Capetown is the Kloof Road. This crosses the saddle between the Lion's Head and Table Mountain, and, descending to the sea-shore on the other side, leads back into the town after making the circuit of the Signal Hill.

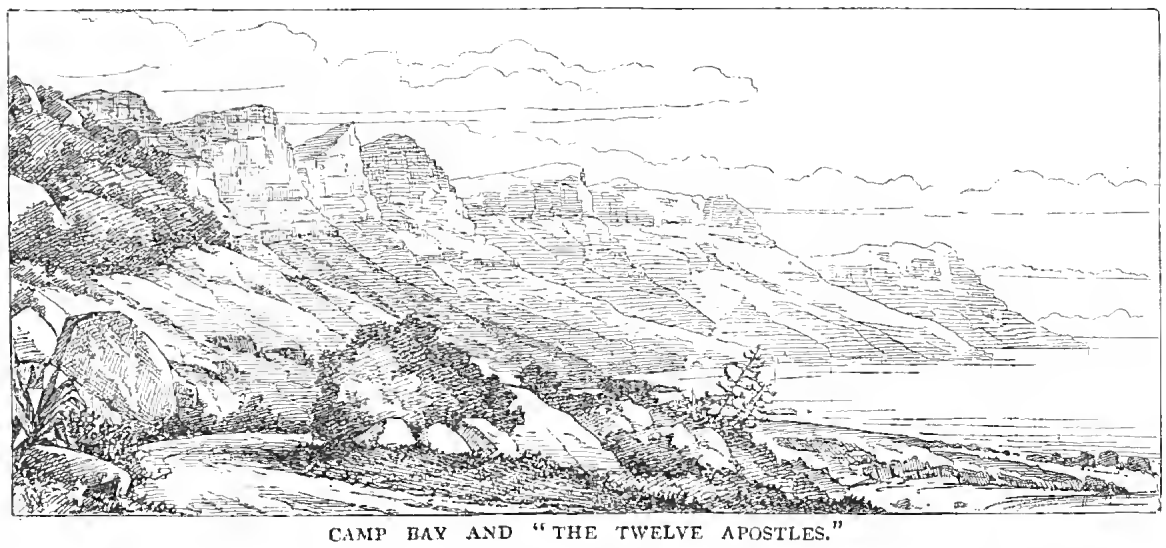
On days of sunshine, which in this happy climate are the rule, not the exception, the prospect from the Kloof over Capetown and its blue bay is very fine, while the rocky pyramid of Lion's Head on the left is an object not less remarkable. After crossing the ridge, we

look down upon Camp Bay, hemmed in by a range of lofty cliffs, which have been called "The Twelve Apostles." Ranged in orderly fashion, but all differing in shape, they form the western side of the square platform which supports Table Mountain, and in silent grandeur face the Atlantic, whose huge rollers break into foam at their feet. This quiet little bay, where wave and cliff made resounding music long ages before the first line of man's history was written, is one of those pages in Nature's book that one would not willingly forget.



CAPETOWN AND TABLE BAY, FROM THE KLOOF.

Capetown possesses a Botanical Garden, a Museum, and a Public Library, all centered in a spot close to St. George's Church. In the gardens stands a characteristic statue of Sir George Grey—sometime Governor and Commander-in-Chief at the Cape—to whose enlightened patronage the existence of the above institutions is mainly due. A fine avenue of pines divides the Botanical Gardens from the grounds of Government House. If the exterior of the Governor's residence fails to indicate the abode of the ruler of an important



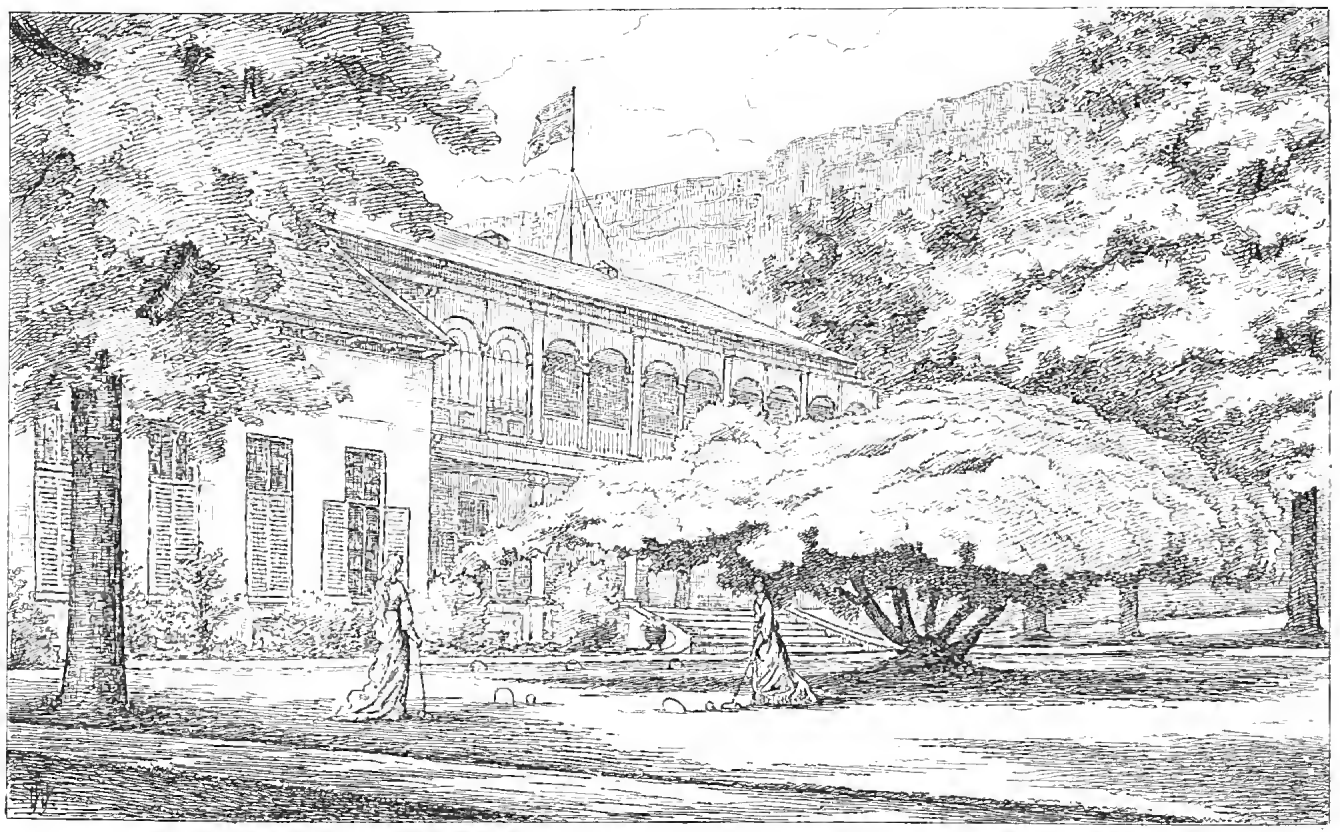
CAMP BAY AND "THE TWELVE APOSTLES."

colony, its interior has been the scene of many a notable gathering, in which British hospitality was prominent even amidst a society remarkable for the generous reception it offers to visitors.

About three miles to the eastward of Capetown, at the foot of Devil's Peak, is situated the Astronomical Observatory, occuping a slight eminence in the angle between two railways, one leading to Wynberg, the other to the foot of the rugged barrier which the traveller has to cross on his way to the interior of Capeland. Here, beneath a sky more favourable to observations than that usually seen in Northern Europe, many important investigations in astronomical science are successfully pursued.

By the commencement of December the "Challenger" had nearly completed her outfit,

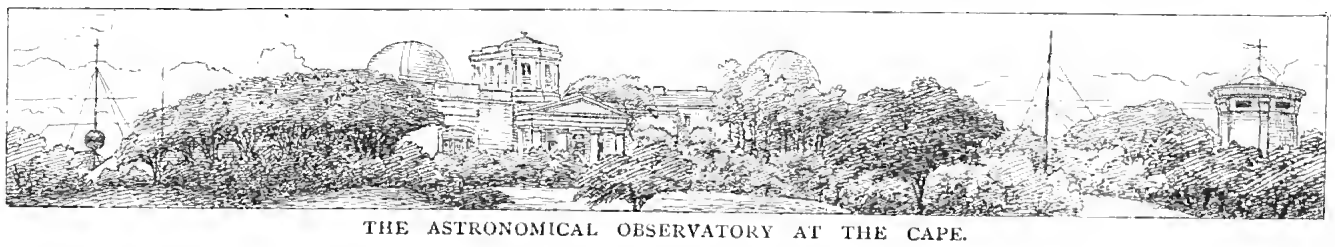
and, once more afloat in all the pride of fresh paint and new sails, was brought round to Table Bay. Her arrival was the signal for a series of festivities, receptions, balls, &c., to which the prospect of spending the next three months upon the stormy and ice-bound waters of the Southern Ocean gave additional zest. This was a farewell to civilised life in its



GOVERNMENT HOUSE, CAPETOWN.

most attractive form; but before setting out upon our cruise, we had to return to Simons Bay to take in coal and other necessaries for our voyage.

Some observations on the temperature of the water revealed the curious fact that Simons Bay, as well as the whole of False Bay, are alternately occupied by currents of warm and cold water according as the wind blows from a southerly or a northerly quarter. The warm current is probably a branch of the Agulhas Current, while the cold water must be a portion of the Antarctic Current, which is known to flow from the Southern Ocean towards the Cape. On calm nights the water in the bay was phosphorescent. Looking down from the deck, the



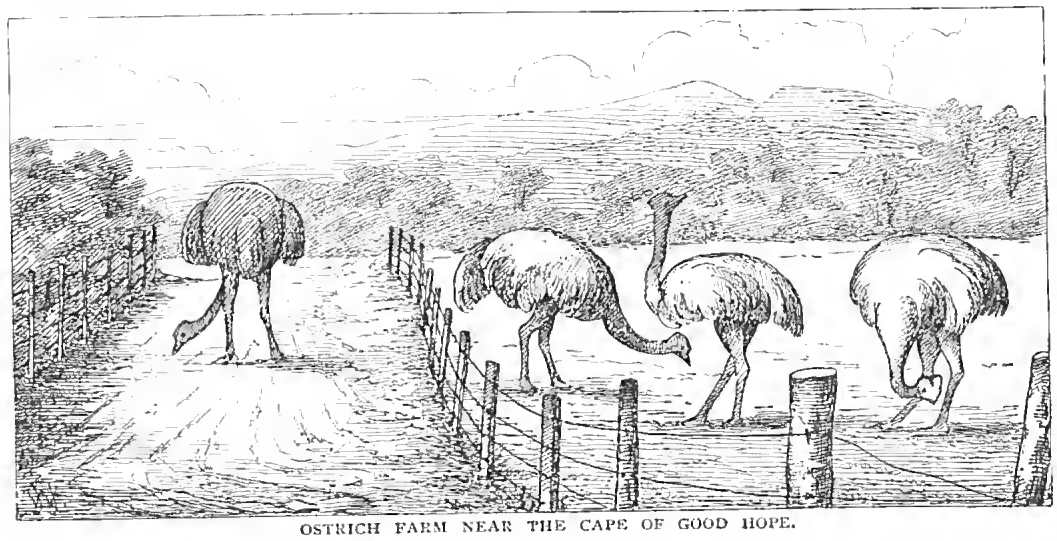
THE ASTRONOMICAL OBSERVATORY AT THE CAPE.

fish collected about the ship could be easily traced by the long trail of light left behind them, and as they turned from side to side their bodies shone like polished silver. The catching and curing of fish, which are very abundant in False Bay, seem to be the staple industry of the few villages on its shores. During the time of our visit, the wide space of water between Cape Hangklip and the Cape of Good Hope was generally crowded with fishing-boats eagerly pursuing their trade. Another branch of industry carried on in this part of the world, and one which possesses greater novelty for the visitor from Europe, is

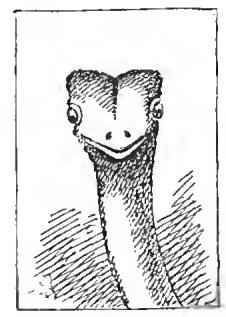
that of ostrich farming. An excursion was made by our party to one of these farms, kept by an enterprising Scotchman, and situated only a few miles from the Cape, at the foot of the Vasco de Gama Hill. We landed in Buffalo Bay, and, following the rough track which

SIMONS BAY.

leads uphill from the beach, soon came in sight of the farm-house. The first object which met our eye was one of the gaunt, long and strong-legged fowls leisurely striding about the farm-yard. Familiar as one is with the shape and size of an ostrich, its appearance at first sight is nevertheless a little startling, and it is necessary, as it were, to adjust one's mental focus to the fact that the huge creature before us is a bird. In a fenced-in meadow we saw half-a-dozen more of these animals. It appears they are by no means a kind of "cattle" easily managed; for they are far from timid, and, when enraged, may break the leg or arm of a man with one stroke of their powerful claws. The head of an ostrich, with its broad bill and large eyes, has a most remarkable appearance when seen in front. One of the birds, named Jacob, who seemed to be somewhat of a favourite, was honoured by having his portrait taken; but during the "sitting" he made a snatch at the sketch-book as if objecting to the process. We understand that several of these ostrich farms exist in the colony, and the much-prized feathers form an important item in the export trade of Capetown.



OSTRICH FARM NEAR THE CAPE OF GOOD HOPE.



Upon the beach, a short distance to the southward of Simonstown, are some extensive shell-mounds, probably marking the site of a former native camp. No doubt this bay, with its abundant supplies of food, has been frequented at all times by the aborigines of the southern extremity of Africa. Large numbers of stone implements have been found in the locality, amongst them flint flakes and spherical perforated stones of various sizes, the use of which has not yet been ascertained; also stones with a smooth

polished base, such as are used by painters grinding colours, and which may have been employed to crush seeds.

Amongst the ethnological curiosities of the Cape are the descendants of a number of Malay families, which, we were told, were exiled to this colony by their Dutch conquerors. The Orientals still wear the broad-brimmed conical hat and the high wooden pattens—to them, no doubt, sacred symbols of their race and of their long-lost fatherland. Some of them earn a livelihood in the capacity of coachmen, and a driver surmounted by the pagoda-hat seems to be the necessary complement of a fashionable "turn-out" at the Cape.

MALAY.

Simonstown, surrounded as it is by bare rocks and sand-hills, offers but slight temptation to the lover of scenery. The only picturesque spot is a glen at the back of the town. It is traversed by a brook whose bed is strewn with huge boulders, and ends abruptly at the foot of a fine waterfall. Upon the plateau above the fall the geranium may be seen growing wild in tall patches. Its bright scarlet flowers and green leaves form with the white and grey rocks a very attractive combination of colours. The profusion of wild flowers met with at every step redeems the desolate aspect of these mountains; and it would almost seem as if, in the lapse of time, the flowers had quitted the sunburnt plains of the continent, and had taken refuge upon the Cape Peninsula that they might inhale the moist Atlantic breezes.

READING A LETTER FROM HOME.

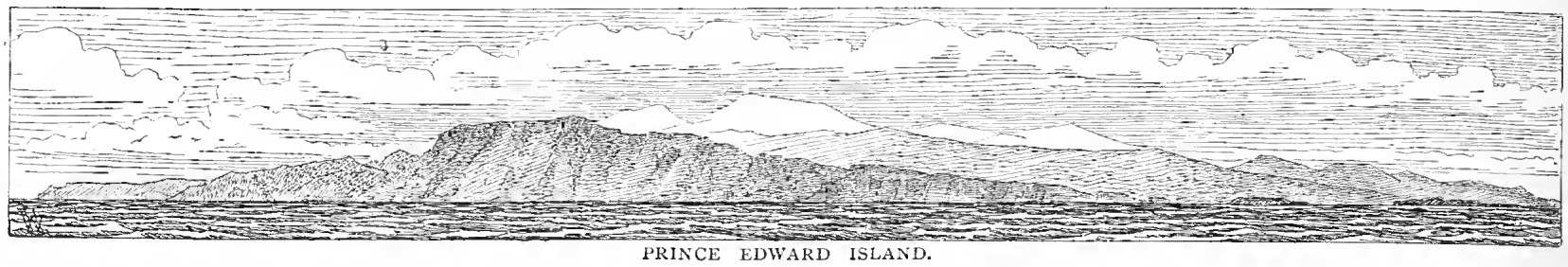
CHAPTER IV.—FROM CAPE OF GOOD HOPE TO SYDNEY.

THE SOUTHERN OCEAN.

THE "Challenger" left her anchorage in Simons Bay on the morning of the 17th December. The stormy latitudes we were about to enter gave but little hope that we should be able to carry on sounding and dredging operations with the regularity to which we had been accustomed. The first few days after our departure, however, were unusually fine, and, while the dredge reaped a rich harvest at the bottom of the sea, we succeeded in making an interesting series of observations on the great current from the Indian Ocean known as the Agulhas or Cape Current. We had traversed a patch of cold water of a temperature of 13° C. just outside False Bay. From that hour—10 a.m. on the 17th—the temperature of the sea-surface steadily increased, until, between 1 and 2 a.m. on the 19th, it suddenly rose from 19°.4 C. to 22°.2 C., attaining a maximum of 22°.8 C. at noon of the same day. This temperature was found to extend to a depth of over twenty fathoms. With the exception of a narrow streak of colder water, the surface-temperature continued at 22°.2 C. until 2 a.m. on the 21st, when it began to fall, and at midnight of the same day it was as low as 13°.9 C. The course run, between the hour we had entered this body of warm water on the 19th, and the time of our crossing its southern limit on the 21st, measured about 250 miles. Thus we had discovered at a distance of 200 miles to the south-east of the Cape an accumulation of warm water 250 miles broad, over 120 feet in depth, and of a temperature nearly 10° C. higher than that of the surface-water in the vicinity of the Cape. This mass of warm water is no doubt due to the current which is known to flow in a south-westerly direction along the east coast of Madagascar and South Africa.

Stormy weather, rain, and heavy seas set in on the 21st—the anniversary of our departure from Portsmouth—and put an end to our experiments for a time. On the 24th, the temperature of sea and air had fallen to 6° C., while everything on board told of a ship bound for the wintry regions of the Antarctic. Black chimney-tops protruded their crooked

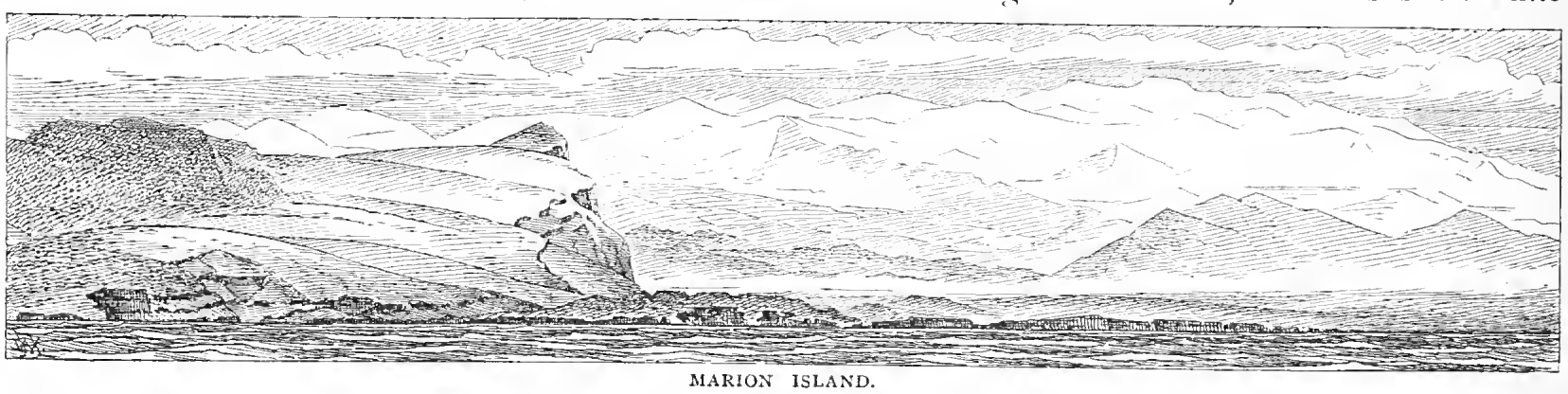
nozzles amidst the erst trim appurtenances of the gallant "Challenger;" and light-hearted Jack, who revels in scanty clothing and bare feet, now strode the wet, slippery deck in heavy jacket and capacious sea-boots. Christmas Day was a counterpart of its dismal predecessor spent in the inhospitable Bay of Biscay. In the afternoon, however, the clouds lifted, and we



PRINCE EDWARD ISLAND.

saw land before us—Prince Edward Island on the left, Marion Island on the right, their snow-covered summits just visible between sea and cloud.

On the following morning we proceeded along the northern shore of Marion Island. A singular-looking rock, which, dimly seen through the mist, might be mistaken for a ship under full sail, rises from the sea near the north-western extremity. We stopped opposite a point where a valley descends to the sea. The bottom of this valley is covered with a chaotic mass of rocks, and presents the appearance of an old lava-current. Nothing could exceed the desolate aspect of the island—near the water's edge a line of dark-brown cliffs alternating with patches of green turf; above, a confused heap of snow-covered hills, their conical shape betraying a volcanic origin. The grassy slopes were dotted with white spots, which at first sight suggested the presence of sheep, but on nearer inspection turned out to be large white albatrosses sitting on their nests. This magnificent bird, with its snow-white



MARION ISLAND.

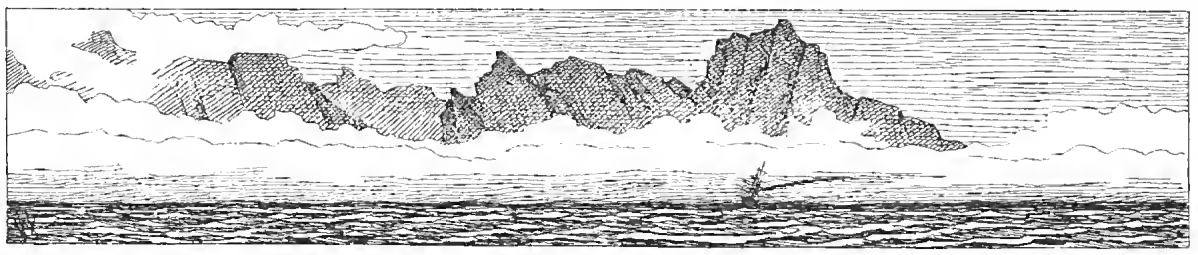
plumage, hooked bill, and sparkling hazel eyes, might be called the eagle of the ocean. It generally measures over ten feet from tip to tip of wing, and weighs about twenty pounds. We had often admired its graceful flight, as day after day it followed in the wake of our ship; yet it seems, in spite of, or rather because of, its large wings, to experience some difficulty both when alighting and when getting under way. Before settling down upon the water, it dips its feet into the waves in order to arrest its motion, and a little time elapses ere the mighty pinions are folded up and packed out of sight one wonders where, for now the noble bird looks very like an over-grown goose. On land, at the moment when the albatross touches the ground, the momentum of the body is such that the bird turns completely over on its back, while to rise on the wing it has to run a distance of some hundred yards. Frederick Stoltenhoff remarked that the albatross avoids the tussock grass

or places whence it would be difficult to rise, and thinks this is the reason why none of the birds visit Tristan d'Acunha and Nightingale Island, although a number of them, about two hundred pairs, annually visit Inaccessible Island, only a few miles distant. This circumstance also accounts for the preference given to Marion Island as a resort for breeding purposes. Its bare slopes, only covered with a kind of short grass, are easy of access; while its soil, ever kept moist by the melting snows, affords materials for nest-building. Our exploring party succeeded in landing, after clambering over the slippery rocks covered with kelp which bind the shore, and wading knee-deep in the swampy soil. The low ground and the slopes of the hills were, if one may so style it, a vast breeding-warren of albatrosses, petrels, and penguins. Of the last named, two varieties were observed—the large king penguin, and a smaller yellow-crested kind, resembling the one met with at the Tristan d'Acunha group.

December the 27th was passed sounding and dredging to the east of Prince Edward Island. The dredge on this occasion brought up numerous beautiful specimens of polyzoa and coral. In the evening the "Challenger" made sail for the Crozet Islands, distant about 500 miles. The next day—the weather being remarkably fine—was one of those enjoyable days which compensate the sailor for the miseries and hardships endured "when the stormy winds do blow." A constant source of interest and amusement is found in watching the sports and occasional fights amongst the numerous birds which in these latitudes accompany the ship night and day—albatross, tern, petrel, Cape pigeon, Mother Carey's chicken, and others. Indeed, the abundance of sea-birds in the higher latitudes contrasts remarkably with their almost total absence between the tropics, where often many days pass without a bird coming in sight. To judge by the rich hauls secured by the dredge or trawl during our cruise in the Southern Ocean, the same contrast seems to exist with regard to the deep-sea fauna.

In the course of the 28th we also passed some sea-weed, and observed some patches of discoloured sea of a greyish-blue tint. The 29th was distinguished by one of the most successful hauls made up to this date, as regards the number, variety, novelty, and perfection of the specimens found in the trawl. In the morning of this day, when about 200 miles from the Crozets, the sea was observed to be of a dark-blue colour; in the afternoon it returned to its normal greenish complexion. The results of the trawling on the 30th, in a depth of 1600 fathoms, were even more surprising than those obtained on the previous day in 1375 fathoms. Several species hitherto unknown to the naturalist were found among the specimens brought up from the bottom. Late in the afternoon, land was sighted on the port bow. It was Hog Island, the most westerly of the Crozet group; but we were not destined to see much of these islands. At daybreak a thick mist obscured the land, and we passed the last day of the year 1873 and the first day of 1874 in endeavouring to keep clear of the dangerous coasts and scattered rocks as yet but imperfectly laid down in the charts. On both days the dark pinnacles of the Penguin Islands, also called the Inaccessible Islands, were for a moment visible through the mist and rain. Having thus got an idea of

our whereabouts, we shaped our course for Possession Island. About noon on the 2nd of January the weather cleared up a little, and the hill-tops of the island we were in search of appeared from time to time above the dense fog. Later in the afternoon, a long stretch of rock-bound coast, the southernmost part of Possession Island, suddenly emerged from the misty horizon. We steered for Navire Bay, an inlet on the east coast, with the intention of landing; but hardly had we looked into the bay and caught a glimpse of the hills and sloping terraces, when a heavy bank of mist, like a solid white wall, was seen moving down upon us from the north-east, compelling us to seek safety in the open. We had observed on shore a hut, a boat, and some casks, which showed that the bay is occasionally visited by whalers, and we fired a gun in case anyone within hearing should require assistance, but there was no response. Just as we were getting under way, the misty wall on our left divided, and we saw before us, rising into the blue sky and lighted up by the setting sun, the stupendous rocks of East Island. According to the chart, the summits of this island attain a height of 4000

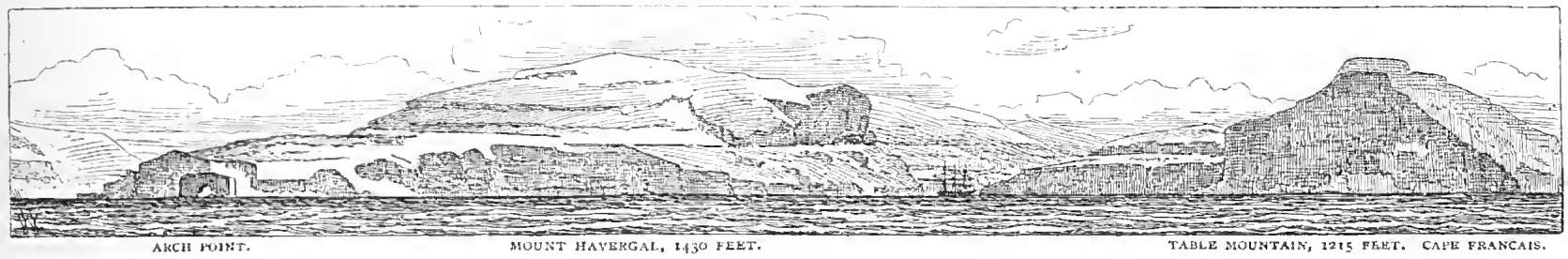


EAST ISLAND.

feet above the sea-level. It seemed as if Nature would fain display one of her grandest effects before our departure, for a few minutes later the misty curtain closed in, reminding us of the crowning tableau which the scenic artist at home reserves for the end of the spectacle. We spent another day in the vicinity of these inhospitable islands, which lie right in the track of vessels bound for Australia, and in the afternoon of the 3rd made sail for our next destination. Merrily bowling along before a strong north-westerly breeze, we only occupied three days in traversing the 700 miles which separated us from Kerguelen Land; but the rolling ship considerably interfered with our usual occupations. Though the chair was lashed to the table, its occupant found himself, together with his writing and drawing materials, suddenly transferred more than once from one side of the deck to the other. The "Challenger" in a heavy sea was one of the liveliest of ships, rolling frequently through an arc of from 30° to 40°—from 15° to 20° on each side—at the rate of five rolls per minute. In this manner the gallant ship made her way through the southern seas, scattering the foaming waves right and left, amidst frequent squalls and showers of rain, snow, and hail, until, in the evening of the 6th, Bligh's Cap was sighted—a solitary rock, posted in the north-west as the most advanced sentinel of the mountainous host which bears the name of Kerguelen. More fortunate than other navigators, who have had to wait days and weeks for a chance of approaching these storm-beaten islands, we were able to make land on the following day, only standing off during the night. At daybreak, the Cloudy Islands were in sight about twelve miles to the south-west. Soon after, Cape Français was visible, and at breakfast-time we were safely anchored in the smooth waters of Christmas Harbour.

KERGUELEN.

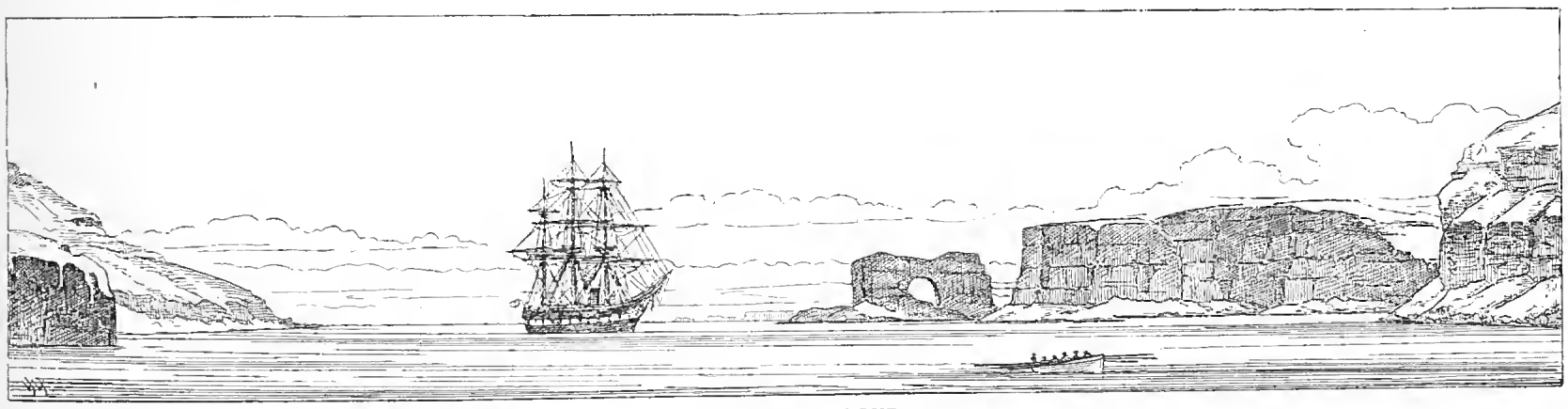
Christmas Harbour, since its discovery by Captain Cook, has given shelter to almost every scientific exploring expedition sent into the Southern and Antarctic Oceans. It was visited by Sir James Ross in 1840, during the voyage which resulted in the finding of what may truly be called the Antarctic Continent, known as Victoria Land; and more recently, in 1874, by two expeditions, one English, the other German, sent to Kerguelen to observe the transit of Venus. Cook, not aware of the previous discovery of the island in 1772 by the French navigator Kerguelen—who believed he had found the at that time much talked-of



CHRISTMAS HARBOUR, FROM THE SEA.

Southern Continent—gave it the name of Desolation Island—a designation we found still in use among the American whalers we met during our cruise. But the name of Kerguelen Land, in honour of its first discoverer, has of late been more frequently used—a substitution the more desirable, as there exists another Island of Desolation, of larger extent, and with decidedly superior claims to this uninviting name, in Magellan Straits.

The scenery of Kerguelen is composed of very unpromising materials—water, patches of kelp, bare rocks, mountains covered with snow and ice, and terraces rising one above the other, destitute of any trace of tree or shrub; yet these elements frequently combine into landscapes of weird beauty and savage grandeur, reminding the traveller of the fiords of



CHRISTMAS HARBOUR.

Norway and the west coast of Scotland. A thick carpet of moss, of a rich green colour, especially under the rays of the sun, conceals as it were the utter nakedness of the land, and gives a delusive appearance of vegetation.

Our present anchorage is one of the most remarkable sites in this as yet little known land. On the north side of the harbour, Cape Français rears its almost vertical cliffs many hundred feet above the sea. On the south side stands Nature's prototype of the stately arch which in classic lands records imperial and warlike triumphs, and behind rises the massive

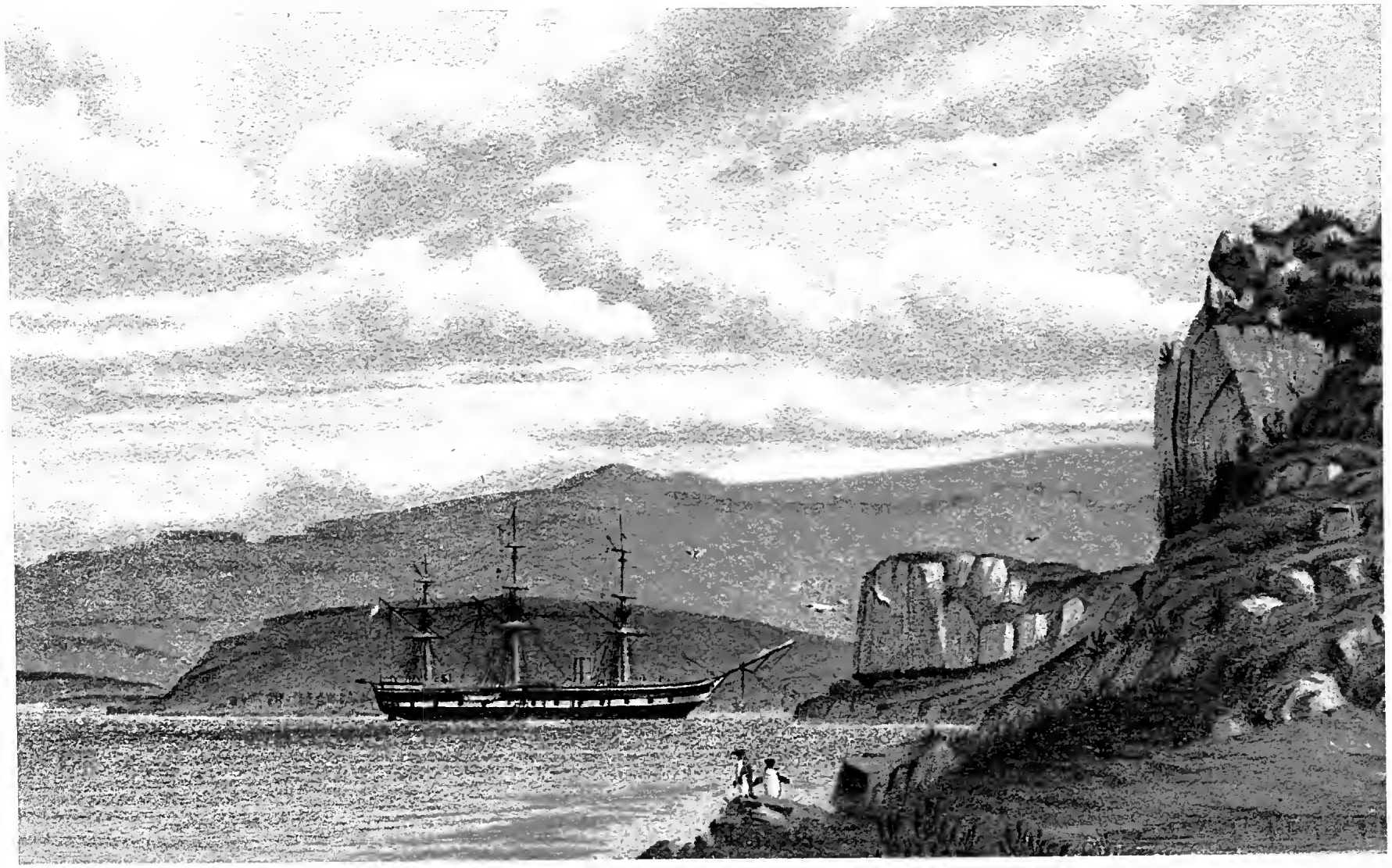
promontory to which it originally belonged. Further up the harbour, an enormous boulder overhangs the narrow sheet of water, apparently threatening to fall down at any moment and block it up. A gently-sloping beach, the site of Sir James Ross's magnetic observatory, closes in the harbour towards the west. This is the favourite resort of the penguin, whose numerous hosts are for ever marching up and down the black-sanded beach, now presenting their white-breasted fronts, now wheeling round as if by word of command, and looking like so many black-coated pygmies. A rivulet carves its winding course through the sands, and near this spot we found a sea-elephant and its young basking in the sun. The poor creatures, despite their large expressive eyes and angry snorts, fell victims to the zeal of our naturalists. Following the banks of this little river, we arrived at a small lake in possession of numerous flocks of sea-birds. A scramble over the rocks at the further end of the lake brought us to the edge of a precipice not much less than a thousand feet high, and here we found ourselves on the brink of a deep chasm, an inlet of the sea, which penetrates the island from the side opposite to Christmas Harbour. Far below, the birds,

"That winged the midway air,
Showed scarce so gross as beetles;"

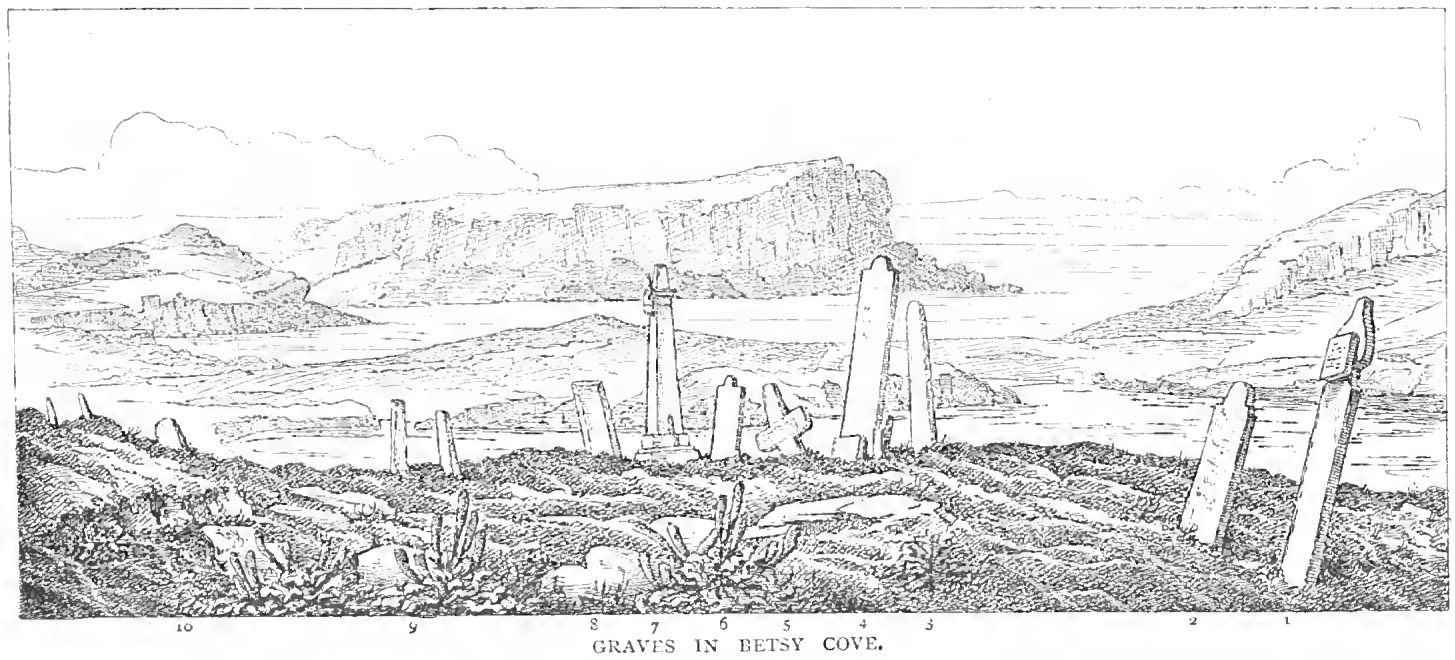
and from the bottom came the sound of the roaring and foaming waves, busy at their never-ending work of gradual destruction. Just in the offing we could see Rolland Island, one of the Cloudy group, very appropriately so called, since only at intervals do they emerge from the misty veil behind which they lie hidden.

One of the principal objects for which the "Challenger" had been ordered to visit Kerguelen was to ascertain the most eligible stations for the intended observations of the transit of Venus. On this account, our stay in this pleasant and interesting harbour was cut short, and at dawn of the following day, the 8th January, we were on our way southwards. During the day we were mostly in sight of the numerous forelands which jut out from the deeply-indented east coast of Kerguelen. Behind them were visible from time to time mountain ranges covered with snow, and glaciers sloping to the sea. In the course of the afternoon Kent Island was identified, and then we saw before us the remarkable cluster of mountains situated between Royal Sound and Betsy Cove, and which may fairly be called the Kerguelen Alps. We recognised the Chimney Top Mountain on the left, and Mount Campbell on the right, both so styled and used as landmarks by earlier navigators, chiefly whalers. In the subsequent survey made by the officers of H.M.S. "Challenger," the principal summits received well-known names, such as Mount Lyell, Mount Hooker, Mount Crozier, and others. The last-named eminence rises to 3250 feet, and its snow-covered peak is the monarch of the whole group. Before sunset we were at anchor in Betsy Cove.

Betsy Cove is separated by steep rocky promontories from Accessible Bay in the east and Cascade Reach in the west—the three inlets forming the landward branches of a wide bay which opens towards the north, while to the south rise the heights already referred to as the Kerguelen Alps.



The first object which caught the eye on looking over the ship's side was impressive, if not startling. It was a graveyard studded with wooden monuments. On subsequent inspection these turned out to have been erected by whalers in memory of comrades, some of whom seemed to have been buried on the spot, others having perished at sea while



GRAVES IN BETSY COVE.

engaged in their dangerous work. Nothing is more touching than to come thus, in some deserted island, upon the last traces of men who have found a lonely grave far from home and kindred. The wooden tablets bear the following inscriptions :—

1. In memory of FRANCISCO OLIVER, died July 29, 1851, aged 50 years. Bark "Alert."
2. In memory of JOHN MURRAY, who died on board the ship "Julius Cæsar," of New London, Feb. 4, 1851. Aged 35 years.
3. In memory of PETER TAFF, who died December, 1850, aged 22. S.P. "Julius Cæsar," W.L., E.M., M.S.R.
4. In memory of NATHANIEL MORE, an American, who died March 23rd, 1850. Æ. 50.
   HENRY HEWET, GEORGE DOBSON, who were drowned while fastened to a whale.
5. MARK SIMONS, died on board "Corinthian," December, 1852. 32 years.
6. In memory of JOHN BATISE DE SANT, who died on board bark "Hannah Brewster," Sept. 25, 1853. Æ. 21 years 3 m.
7. In memory of W. MACKEY, late of Blaurens, who departed this life July 19/56. Aged 26 years.
8. In memory of JAMES SKINNER, 2d mate of Bk. "Dove," who was drowned off Desolation Island, March 29, 1860, while fast to a whale. Æ. 21 years. Also JOHN LEONARD and JOSEPH PENA, seamen, lost at same time.

9, 10, and 11 have no inscriptions.

It is a custom honourable to "Jack's" good feelings—never more conspicuous than in the hour of difficulty or danger—to repair and replace, when opportunity serves, monuments which may have become dilapidated in the lapse of time. The bottle tied to memorial No. 7 contains a record of the visit of the "Challenger's" men.

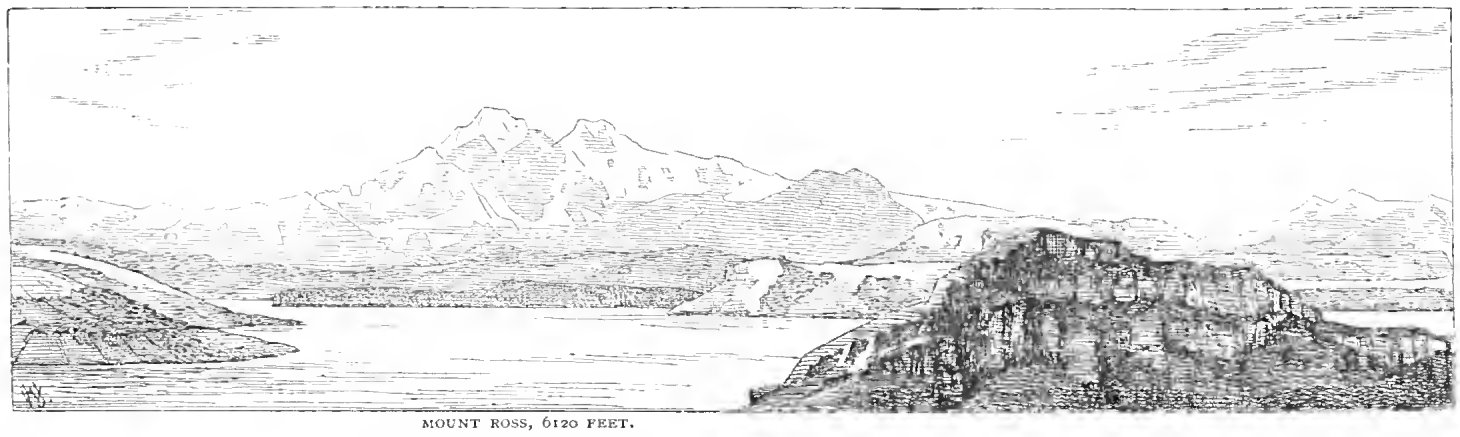
The hills and valleys around Betsy Cove were soon in possession of our surveyors and naturalists, our sportsmen meanwhile making good bags of wild-fowl. Amongst the latter a kind of wild duck, the flesh of which tastes somewhat like that of widgeon, was killed in great numbers, and proved a very acceptable addition to our bill of fare. It is said to feed

principally upon the seeds of the Kerguelen cabbage, the only vegetable found on this island, with the exception of a sort of water-cress, which can be used as human food. Our men collected the cabbage in boatfuls, and seemed to relish it very much. The specimen placed on the officers' table did not meet with the same approbation, being rather bitter to the taste. As furnishing a supply of fresh vegetable food to a ship's crew, deprived perhaps for months of that indispensable article of diet, the Kerguelen cabbage is priceless. In the hope of adding a useful plant to our kitchen-garden, a quantity of seed, carefully gathered and packed, was sent home; but the experiments made in the Royal Botanic Gardens in Kew and in Edinburgh do not seem to have afforded any satisfactory result; nor is this surprising, as the conditions of soil and of climate in Kerguelen are not easily found elsewhere. The massive seed-stalks of this remarkable plant, protruding in large numbers from the carpet of green moss, form a characteristic feature in the landscape of this island.

Kerguelen has recently attracted the notice of meteorologists as possessing the lowest range of annual variation of temperature, that is to say, as enjoying the most uniform climate in the world—no doubt due to its great distance from any large continent, a circumstance which imparts to its climate the uniformity of oceanic temperatures. The "Challenger's" visit, which took place in the summer of this hemisphere, was remarkably favoured by fine weather, although during her several cruises along the east and south coasts of the island she was certain to find herself surrounded by stormy seas as soon as she left the kindly shelter of the shore. Even here, sudden squalls are not unfrequent. One of these, which occurred early on the 12th, nearly drove our ship on the rocks. At 2 p.m. on this day the thermometer in the shade rose to 14°.4 C. (58° F.)—the temperature registered a year before on the same day and at the same hour in the river Tagus.

In the evening of the 13th a small schooner under sail quietly slipped past us into the bay. This was an American whaler, the "Emma Jane," from New London, U.S. Accustomed as one is to associate with ocean voyages ships of large tonnage, it is a little surprising to see the small craft in which these hardy sailors venture to navigate the roughest and most inhospitable seas. The arrival of the schooner was quite an event, as we had not seen a new face for nearly a month. We became indebted to her captain for much valuable information about the Heard and Macdonald Islands, which we intended to visit, and for a copy of a chart of Kerguelen—one of those rough manuscript charts compiled by whalers. The storm-beaten west coast of Kerguelen has not yet been surveyed. It appears, from the outlines of the whaler's chart, that this coast is as deeply indented by bays and inlets as the east and south coasts; and that the mainland of Kerguelen is almost divided into separate islands by fiords, which in some places approach so near to each other that a boat may be dragged across the narrow and level isthmus. A volcano is shown to exist upon the west coast in about long. 69° E., lat. 49° 30′ S., as well as several hot springs in that and other parts of the island. The remarkable and, from a geological point of view, highly interesting features of Kerguelen Land would justify the expense of a complete survey.

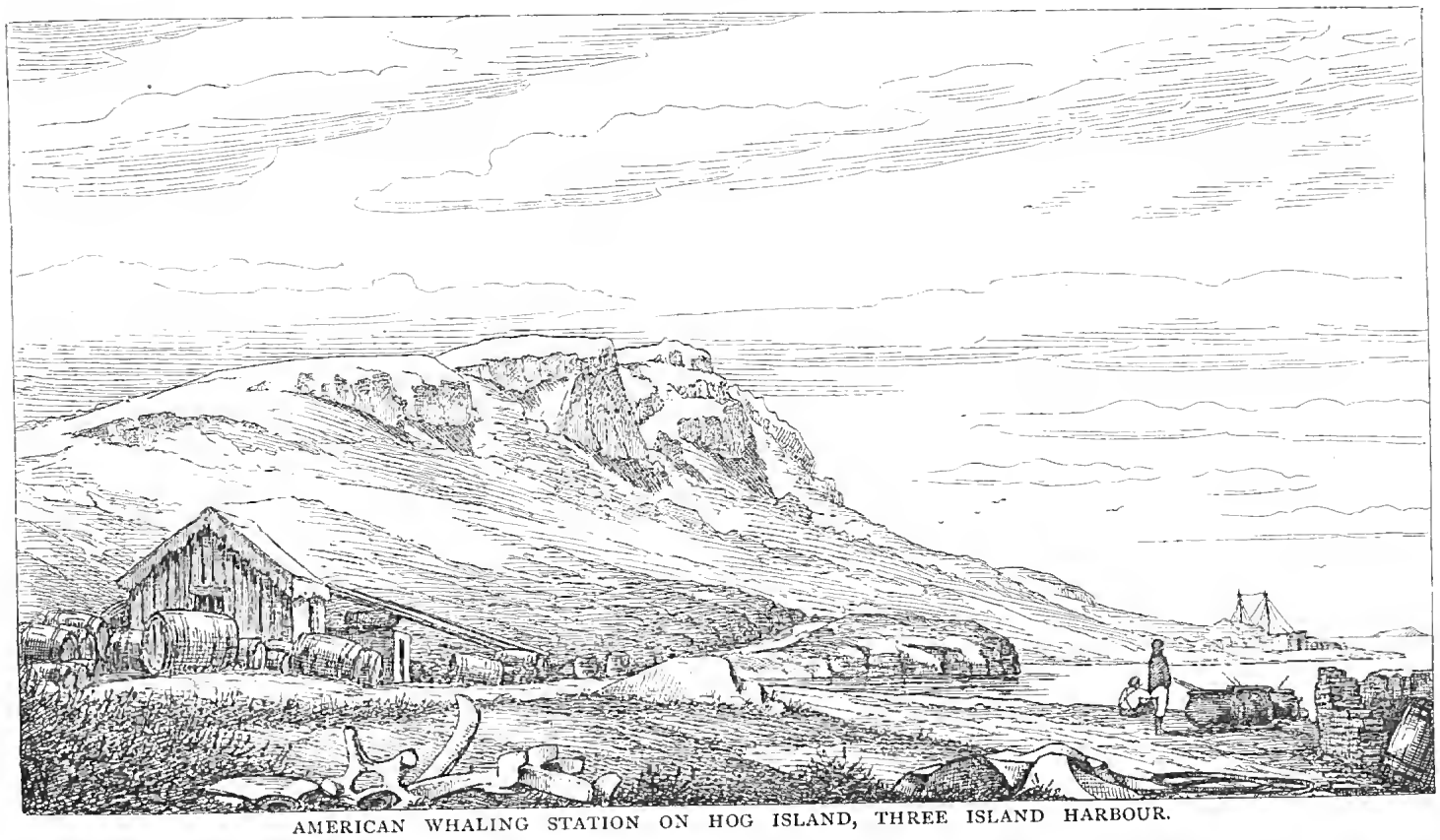
On the 16th the "Challenger" left Betsy Cove, with the intention of returning to Christmas Harbour. A gale which sprang up in the afternoon made any further progress towards the north impossible. It was therefore decided that we should run south and visit Royal Sound, where none of Her Majesty's ships had called since its discovery by Captain



MOUNT ROSS, 6120 FEET.

ROYAL SOUND.

Cook. On the following day the gale abated, and towards 7 a.m. the land, hitherto obscured by mist, was once more visible in the shape of Mount Peeper, one of the curious conical hills that rise from the wide plain forming the eastern extremity of Kerguelen. At noon we were off the Prince of Wales Foreland at the entrance of Royal Sound. The magnificent basin which now lay before us forms an inlet about twenty miles long, with an average width of ten miles, and is only separated by a narrow isthmus from Hillsborough Bay in the north,

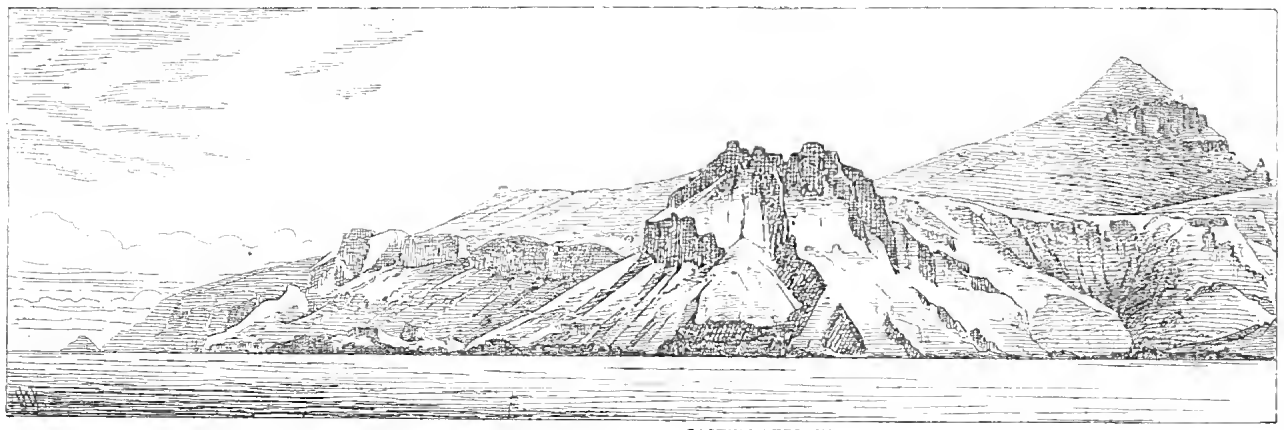


AMERICAN WHALING STATION ON HOG ISLAND, THREE ISLAND HARBOUR.

and Swains Bay to the westward. Its surface is studded with islands almost innumerable, and its horizon fringed with imposing mountain-ranges, whose snows the short summer of these regions is unable wholly to melt. We dropped anchor in Three Island Harbour, which is, as its name implies, a portion of the sound enclosed by three islands. We found here another whaling schooner, and a regular whaling station on one of the islands, with

huts for the men, large iron pots for boiling down the blubber, and casks for stowing the oil. Surrounded by the romantic scenery of Royal Sound, the lot of these men seemed quite enviable.

The "Challenger" here spent three days in the usual occupations of surveying sounding, dredging, and exploring. The weather was very fine, and the splendour of the sunsets more than repaid the discomforts of a voyage from Europe. In the various surveys of portions of the east and south coasts of Kerguelen, the surveying officers of H.M.S. "Challenger" did their colleagues of the naval and civilian staffs the honour of attaching their names to various mountains, islands, bays, &c., thus added to the topography of the world. In this manner the writer of these pages became—so far as nomenclature goes—the owner of a mountain or hill in Kerguelen. It is only 1260 feet high, but its conical summit forms a useful landmark at the entrance to Royal Sound. It overlooks a



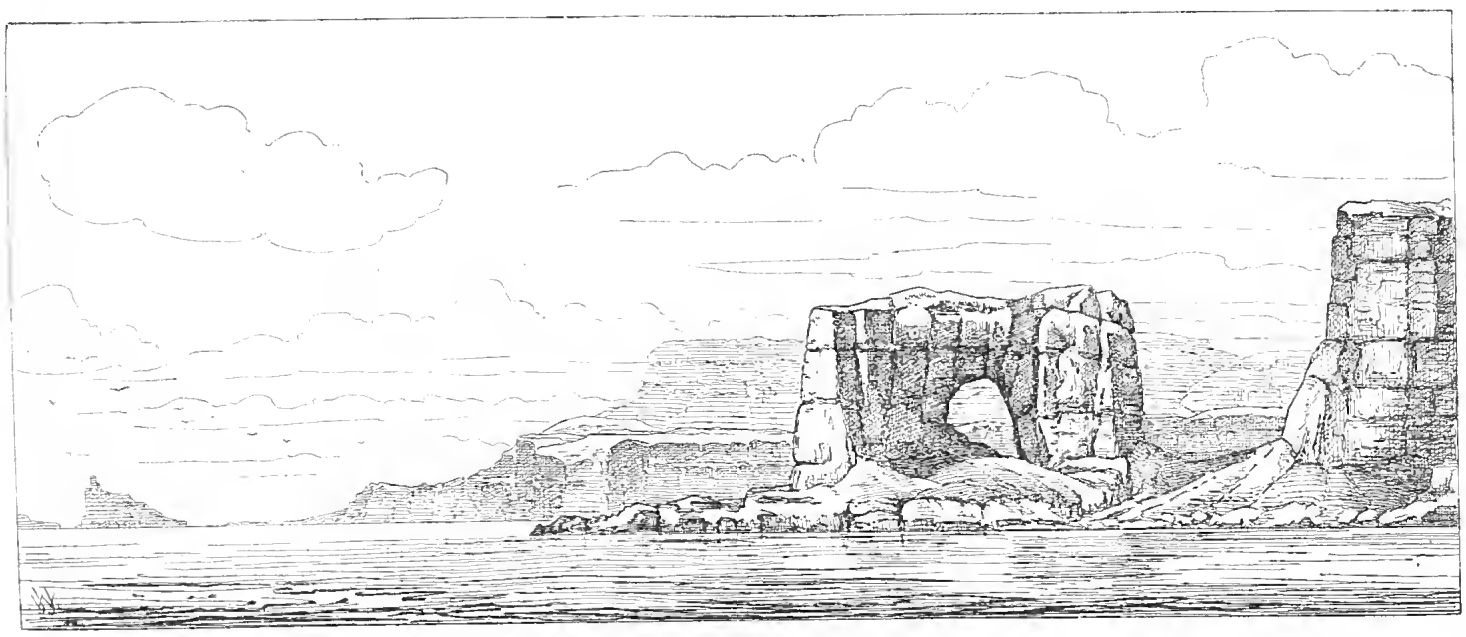
SOUTHERN ENTRANCE TO ROYAL SOUND.

promontory which, from its shape when seen at a distance, the whalers have called Cat's Ears, but on nearer inspection it assumes the appearance of a hill crowned by the ruins of some ancient castle, and this illusion is especially noticeable when the spot is lighted up by the rays of the setting sun.

On the 18th, 19th, and 20th of January, the thermometer in the shade rose to about 14° C. in the warmest, and fell to about 5° C. in the coldest part of the day. In the course of the 20th the "Challenger" left Three Island Harbour, and early on the 21st she steamed out of Royal Sound, shaping her course towards Cape George. This cape is the most southerly point of Kerguelen reached by Captain Cook, and is formed of an enormous pyramidal rock which has got detached from the cliff immediately behind it. The state of the weather did not permit an attempt to pass the cape, so we took shelter in Greenland Harbour, an inlet which opens between Cape George and Cape Maclear, and whose upper end almost communicates with Royal Sound. On the 22nd we commenced our return cruise to Christmas Harbour, passing the entrance of Royal Sound and rounding Cape Digby, the eastern extremity of the island. The next day the "Challenger" received her first serious damage. In the midst of a furious gale a heavy sea struck the ship, split one of the ports, and carried away some of the gear near the bows. After sheltering in Cascade Reach on the 24th, revisiting Betsy Cove on the 25th—where we observed the pair of goats we had landed during our former stay—we proceeded along the east coast. On the 27th and 28th

we once more fell in with our acquaintance of Betsy Cove, the "Emma Jane," in the company of another schooner, near Howes Island. On the 29th we steamed through Aldrich Channel, which separates the latter island from its western neighbour. This passage was until then supposed to be impracticable for large vessels; it bears the name of one of the "Challenger's" lieutenants, since better known as the discoverer of the most northern extremity of America. The same day found us back amongst the petrels and penguins of Christmas Harbour. The numerous flocks of birds which frequent this place justifies the name of Bird (Oiseau) Harbour, which, according to some charts, has been bestowed upon it by French navigators.

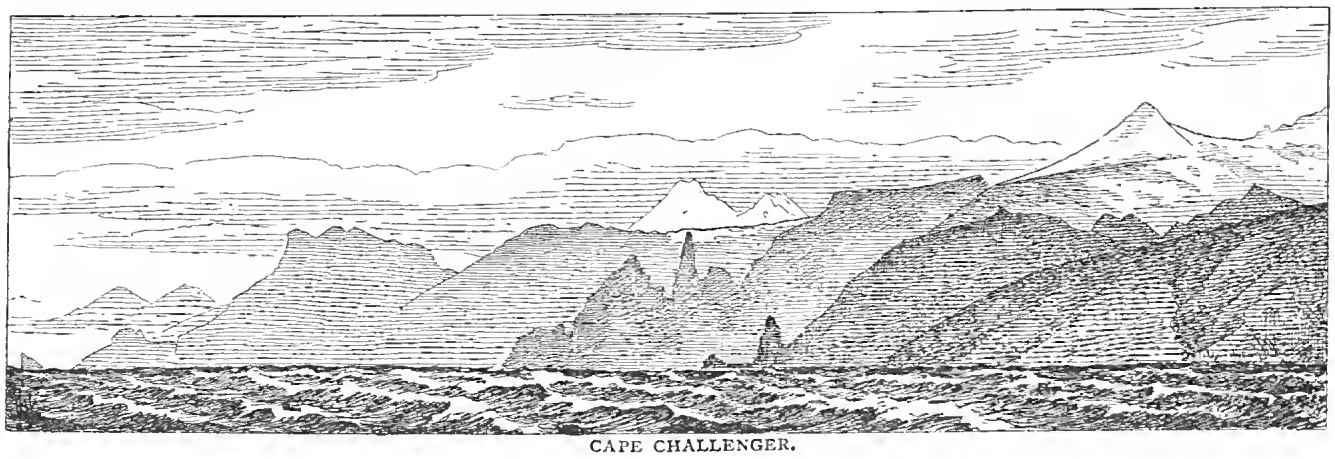
The following day, January 30th, was devoted to the examination of a vein of coal and a deposit of fossil wood discovered at the time of Sir James Ross's visit, and situated on the south side of the outer and wider part of the harbour, under the promontory which ends with the arch already mentioned. The existence of these traces of an ancient tree-vegetation,



NATURAL ARCH IN CHRISTMAS HARBOUR.

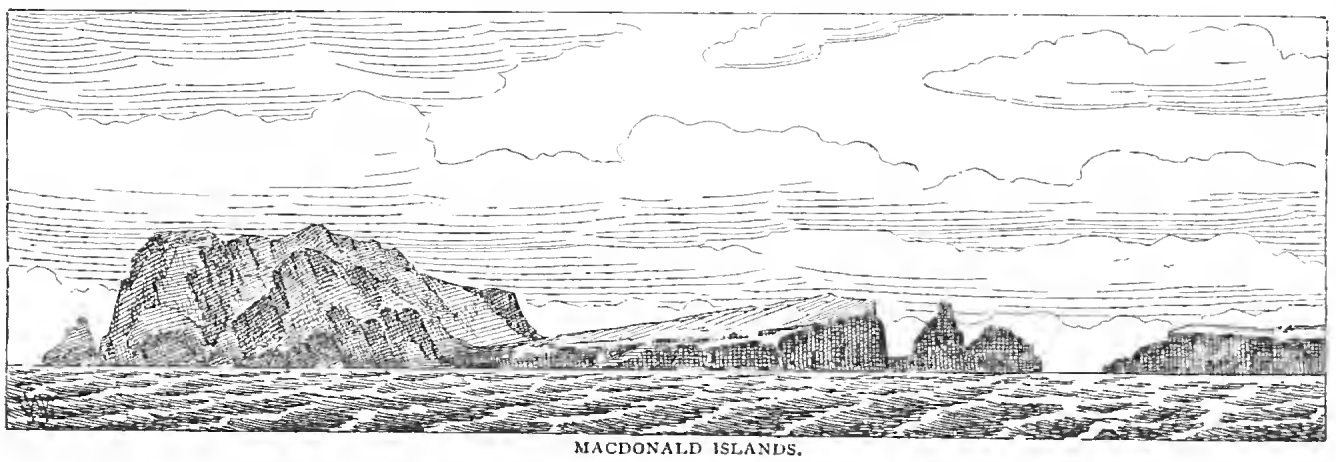
buried under more than a hundred feet of rock, and upon an island now totally destitute of tree or shrub, is one of those interesting but perplexing problems which remain to the geologist to solve. While these investigations were carried on on one side of the harbour, the sailors were building a cairn on the opposite side, wherein to deposit the "Challenger's" report on the most eligible sites for the contemplated Transit of Venus observations. Both Betsy Cove and Royal Sound offered facilities for the temporary sojourn of the members of a scientific expedition, and for the erection of astronomical observatories. As events have shown, the British expedition selected a site at the northern end of Royal Sound and at the foot of Mount Crozier, while the German expedition established itself near Betsy Cove. On the 31st our ship set out on her second and last cruise down the east coast of Kerguelen, and on the morning of February 1st she was once more off the entrance of Royal Sound. After passing Cape George we sighted what turned out to be the southern end of Kerguelen —lat. 49° 44′ S., long. 70° 5′ E. This point we called Cape Challenger. It is distinguished by several rocks, the highest of which has, when seen from the eastward, a striking resemblance to a gigantic seated figure looking out to sea—a sort of Antarctic Memnon. The coast-line

to westward of Cape Challenger presented an extraordinary combination of steep promontories and rocky pinnacles rising to heights of over a thousand feet, above which the forked summits of Mount Ross are seen towering into the sky. If haply it were the custom to name newly-discovered countries from observation of their most characteristic feature, Kerguelen should be called the Land of Forked Mountains, for the island presents numerous examples of mountain-tops split into two conical summits of nearly equal size. The frequent occurrence of such dual summits is probably connected with the structure of the rock-formation composing the higher mountains of Kerguelen. This formation differs in every respect from the material —evidently of more recent origin—which constitutes the terraced hills that form a no less conspicuous feature of the island between Christmas Harbour and Royal Sound.



CAPE CHALLENGER.

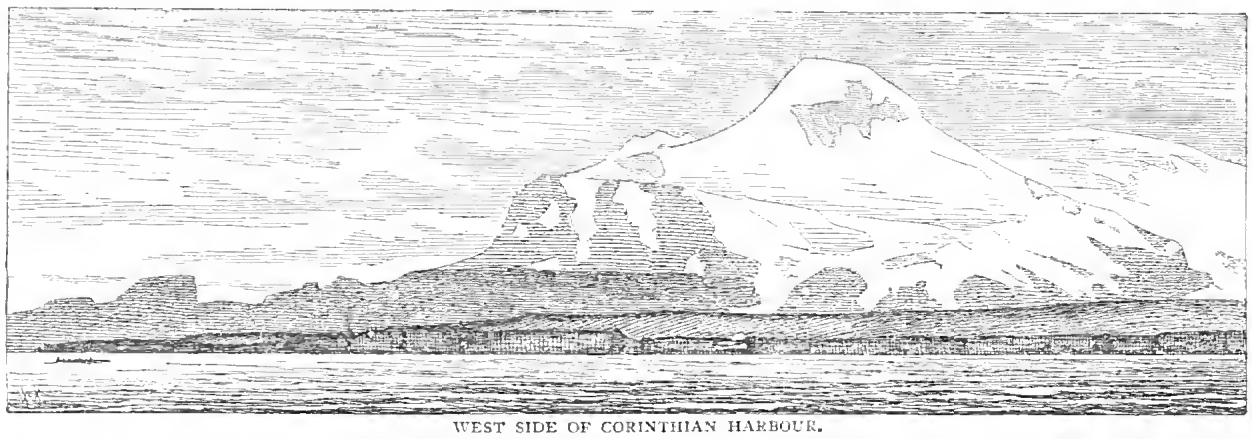
At sunset we took our last farewell of this remarkable island, its serrated hill ranges then sharply defined against the bright evening sky. The impressions left on our minds by this barren, deserted land were nevertheless as pleasant and lasting, in some respects even more so, than those made by countries more favoured by nature. Kerguelen, to us, had the charm of a land as yet untouched by the hand of man. Free to roam about, a veritable king of the earth, the traveller, the sportsman, or the explorer enjoys here the rare opportunity of watching Nature in her own various moods, provided always that he has secured a safe retreat to the deck of a ship stored with the comforts of civilised life. If by chance he should be left behind in the wilderness, the erewhile attractive smile of the savage beauty soon turns to a cruel frown, and he falls a victim to exposure, starvation, or accidental injury.



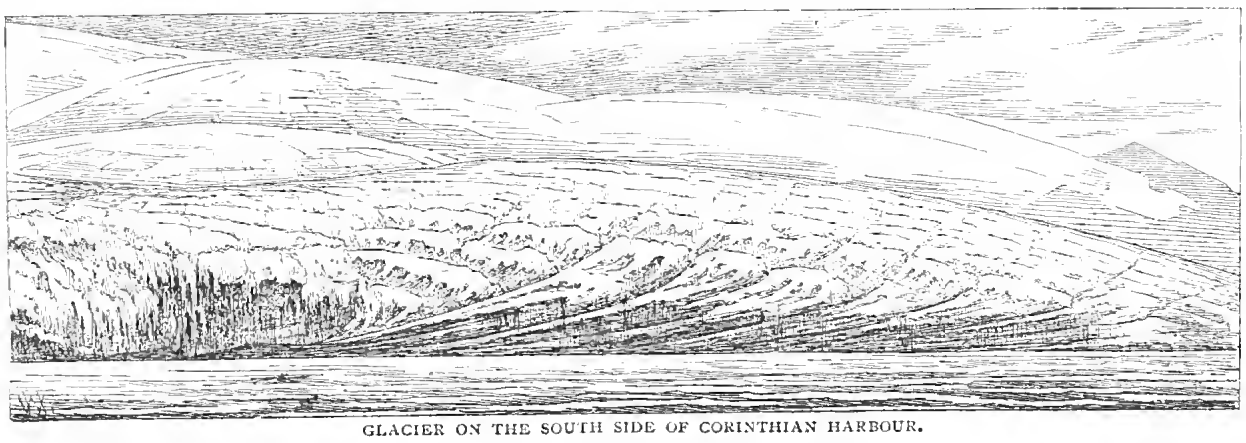
MACDONALD ISLANDS.

The "Challenger's" course was now direct for the regions of the South Pole. The portion of the Southern Ocean between Kerguelen and Macdonald Islands forms a portion of the shortest track from England to Melbourne on the principle of "great circle sailing," and some of the earliest quick passages recorded were made by this route. After approaching Tristan d'Acunha, the track follows the 50th parallel for the greater portion of the distance between the Cape and Melbourne; but the frequent danger of meeting icebergs, together with the misty and stormy weather almost constant in this latitude, compels ships to make a safer, hough a little longer passage, nearer to the 40th parallel. The islands we next intended

to visit were only approximately laid down in the charts, and required to be approached with caution. Delayed by stormy weather and a dense fog, land was not sighted until the morning of the 6th. The day before, two whales had come close to the ship. Heard Island, or Young Island, is the largest of a small group stretching from east to west, of which the rocks bearing the name of Macdonald Island and Meyer Rock form the western end. The "Challenger" passed to the northward of these. About noon Heard Island came in sight, and a few hours after we were anchored in Corinthian Bay, on the north coast. According to the sketch-chart obtained from the whalers, Heard or Young Island is shaped like a lizard, with a total length of about twenty miles. The bent tail—so to speak—forms its south-eastern, the head its north-western end, while Corinthian Bay and West Bay, on the opposite side, enclose the neck. The approach to Corinthian Bay is marked by Red Island—so called from its intense earthy-red colour, so characteristic of volcanic regions—and the entrance of the bay is distinguished by huge basaltic towers, bearing the name of Roger's Head, the vertical sides of which consist of curiously distorted columns bent in the form of a fan. The harbour itself presents a picture of awe-inspiring desolation, and the whole scene, "skarfed in rugged folds of ice," involuntarily recalls the ninth circle of Dante's *Inferno.* Nature here seems to pronounce that emphatic and visible "No" which she opposes to the ambitious attempts of man to penetrate a portion of the earth for which he is physically unfitted. To westward rises a mountain several thousand feet high, clad in a mantle of ice; to southward, an enormous glacier rolls its frozen billows down to the sea; while beyond the light-green waters of the bay appears the line of black threatening rocks of the isthmus. The glacier displays in a conspicuous manner the more or less regular arrangement of longitudinal and transverse crevasses common to these lazily-flowing rivers of ice. The hummocks between them, crested with recently fallen snow, are equally remarkable.



WEST SIDE OF CORINTHIAN HARBOUR.



GLACIER ON THE SOUTH SIDE OF CORINTHIAN HARBOUR.

This grim scene, from which all life seemed to be banished, was inhabited at the time of our visit by a party of whalers, whose dark *silhouettes* could be seen upon the low basaltic ledge before us. With some difficulty a landing was effected, and the men communicated with. They were living in hermetically-closed houses, sunk in the ground for protection

against the cold and the howling gales which sweep with resistless force across the isthmus. Happily it was in our power to contribute to the comfort of these poor fellows. Most of the leaders were Americans, the party working under them being Portuguese from the Cape de Verde Islands. The position of Corinthian Harbour is in lat. 53° 6′ S., long. 73° 24′ E.

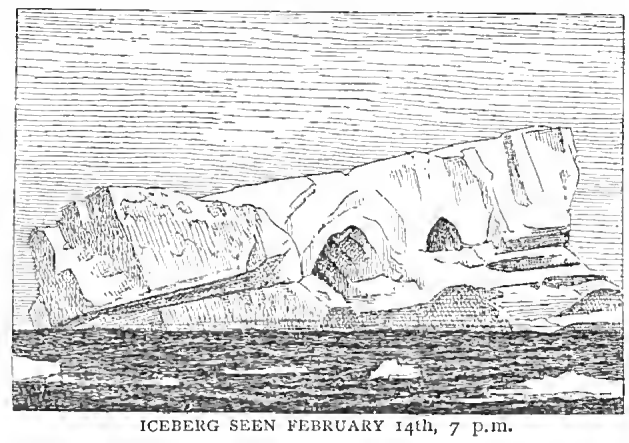
Signs of an approaching gale compelled us to hasten our departure. We left at daybreak on the 7th. The gale overtook us in the course of the afternoon, and put an end to our soundings and dredgings. The results of the latter showed the bottom of the sea to be teeming with animal life. A fall of snow which occurred on this day heralded our approach to the Antarctic regions. The 10th of February found us at a distance of 1800 miles from the South Pole, toiling through showers of snow and sleet. From time to time a whale would disport itself close to us, while the wake of the ship was alive with albatrosses, Cape pigeons, terns, and the pretty Mother Carey's chickens. We had been for some days on the look-out for icebergs, but hitherto none had appeared above the horizon, though we had just crossed the 60th parallel. A few hours after midnight, however, on the morning of the 11th, a message came from the officer of the watch that an iceberg was in sight. There was a rush on deck, and then, far away to the east, we could see a floating silvery mass just visible in the first rays of dawn. The iceberg was one of those large flat pieces with vertical cave-worn sides and covered with recent snow, which after a few days gathered in large numbers around the ship. Its length was about 700 yards, and its height above the water over 200 feet. Before the end of the day several bergs were sighted, also pieces of drift-ice, and their number increased as we came nearer and nearer to the Antarctic Circle. Late in the evening of the 13th five icebergs were visible from the deck, and the ship ran through a mass of small loose pieces called, by adepts in "iceology," wash-ice. The loud vibrating noise which they made as they scraped along the ship's side, within a few inches of the sleeper's head in his cabin, was by no means a comfortable sound, and one could not but recall Coleridge's verses :—

> "The ice was here, the ice was there,
> The ice was all around :
> It cracked and growled, and roared and howled,
> Like noises in a swound!"

However, I had such comfort as could be found in the thought that I had not killed an albatross "with my cross-bow;" and as for my companions who had slain the poor bird with more deadly weapons, I could but murmur, "Absit omen!"

At 5 a.m. on the 14th February fifteen bergs could be counted from the deck, and an hour afterwards pack-ice was observed for the first time towards the south-east. The sounding on this day indicated a depth of 1675 fathoms. Later in the evening we passed an iceberg of a very remarkable shape, and which afforded an instructive example of the process by which these huge masses are gradually reduced in volume until they finally disappear in the warmer currents of lower latitudes. Its sides were pierced with caves, the shape of which

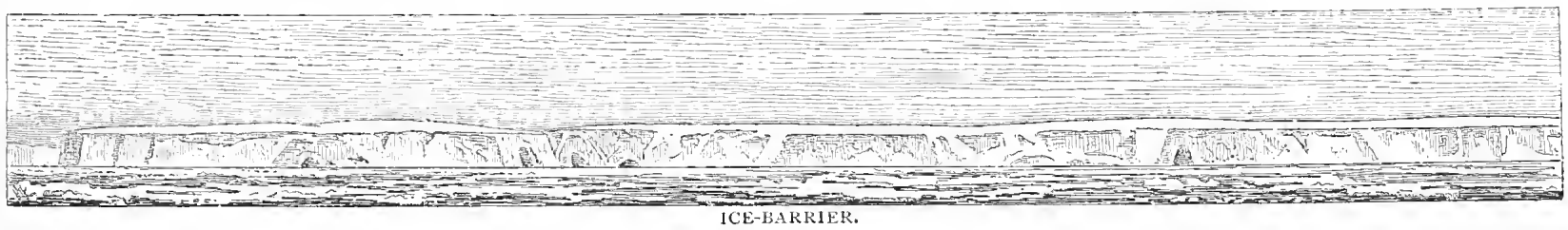
resembled the deep porches of a Gothic cathedral, and reflected lights of the purest imaginable blue. An overhanging mass on one side of the berg showed the undermining action of the warmer sea water. After some time, such a mass breaks off by its own weight, the fracture presenting almost always the appearance of a smooth vertical wall of ice. The separation will necessarily affect the equilibrium of the floating berg; the side whence the fragment fell, being lighter, will rise out of the water, and the line of flotation will be altered, the former line now forming an angle with the surface of the sea, as seen in the sketch. Hence the successive beaches frequently observed upon the flanks of the bergs.



ICEBERG SEEN FEBRUARY 14th, 7 p.m.

THE ICE-BARRIER.

On the 15th a chain of icebergs and pack-ice was seen to extend over a large portion of the horizon (from W.S.W. to N.W. by N., by compass); but the grandest sight was reserved for the 16th, the day on which we reached the most southerly point of our cruise. On this day we had probably reached what former navigators in the Antarctic have called the Ice-barrier—that is to say, an apparently uninterrupted accumulation of icebergs extending over many miles, and forming an immense wall of ice rising to from 100 to 200 feet above the sea-level. The experience of the succeeding days of our cruise, during which we skirted the limits of pack-ice extending eastward, combined with the facts ascertained by former explorers,



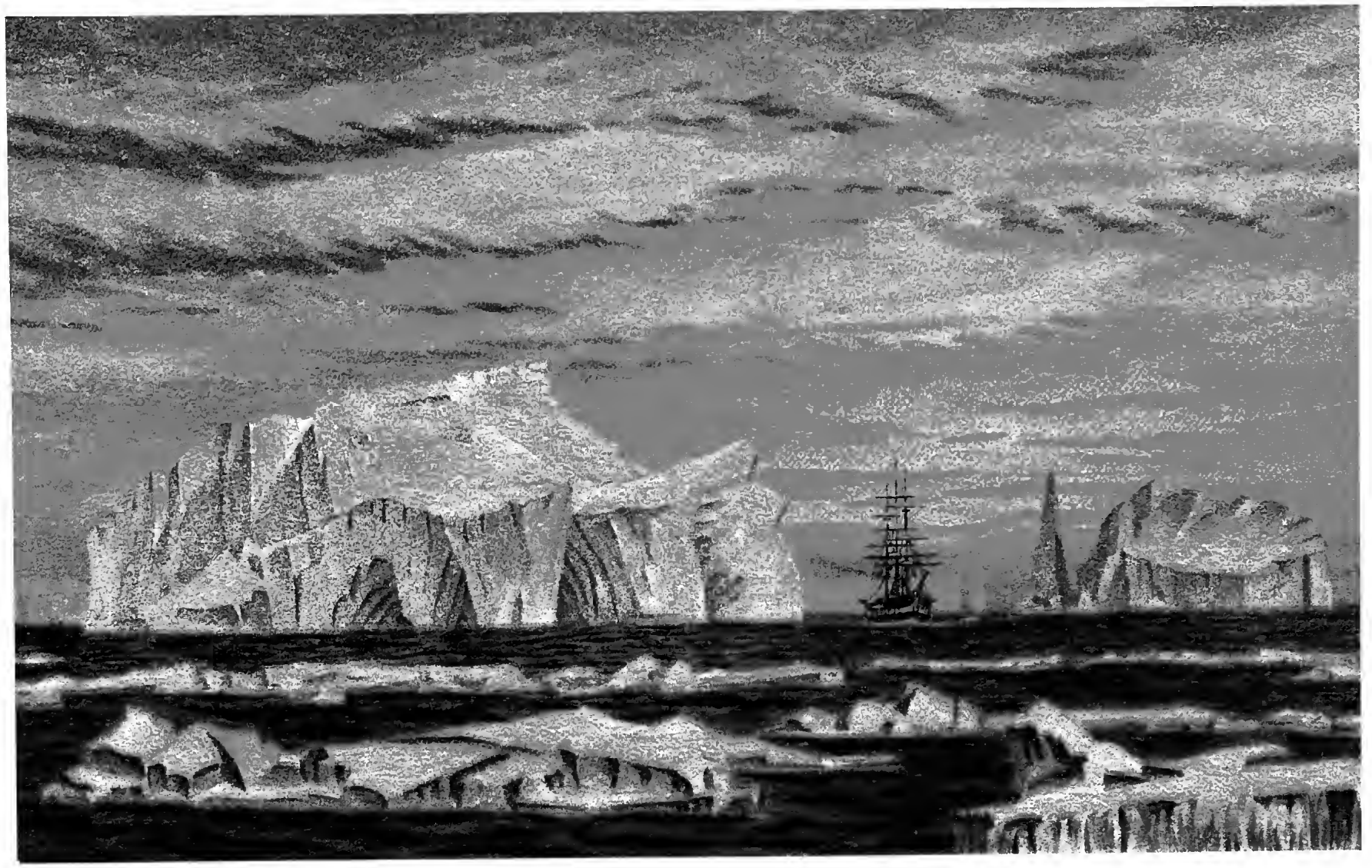
ICE-BARRIER.

showed that such a barrier of ice seems to extend with little or no interruption from our position on the 16th, near the meridian of 80° long. E., along the Antarctic Circle as far as long. 170° E., where the wide opening occurs by which Sir James Ross was enabled to penetrate to the foot of Mount Erebus and Mount Terror. It seemed almost as if we had a similar opening before us, for towards the south-west the sea was quite free of ice. Shortly after noon we crossed the Antarctic Circle, and proceeded as far as lat. 66° 40′ S., long. 78° 22′ E. —just 1400 nautical miles from the South Pole. Sir James Ross had reduced this distance to little over 700 miles. To a sailor accustomed to runs of from 200 to 300 miles per day, such distances appear almost trifling; but they are immense when the space to be travelled over is beset with mountains of ice, and the temperature such as to render life next to impossible. Perhaps on a future day some daring navigator or enterprising whaler will try this opening between the meridians of long. 70° and 80° S., and succeed in emulating if not surpassing the achievement of Sir James Ross. If the "Challenger's" mission had permitted it, and if we had found ourselves on board a smaller and handier craft, a good steamer and

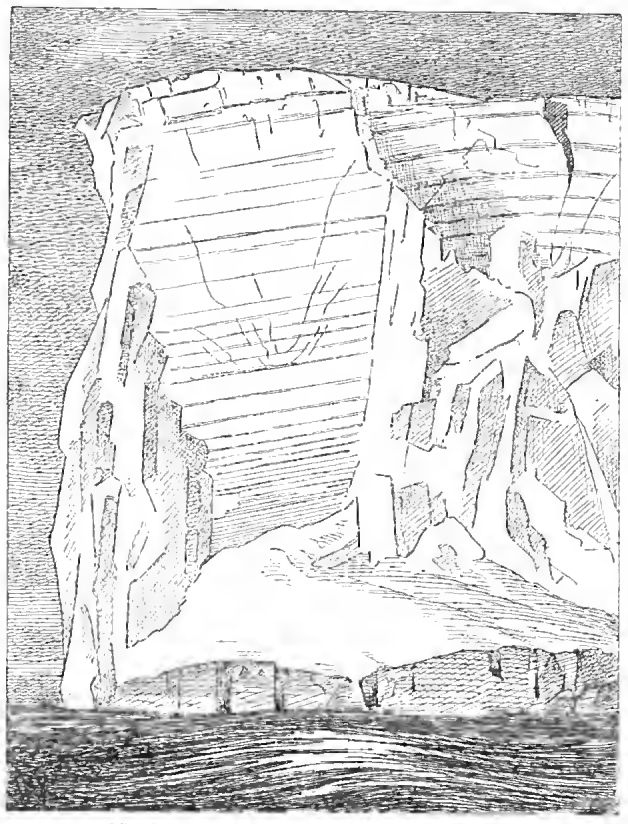
sailer, sufficiently strengthened to resist the shock of ice, there was not a man on board who would not have voluntered to proceed further. It was with unanimous regret that we turned our back upon the South Pole. The day was one of broad sunshine, and the scene around us full of life. The steam of whales could be seen rising afar off between the icebergs; a shoal of grampus ploughed the sunlit waves; the sooty albatross, the snow birds, Cape pigeons, prion, puffinaria, fluttered about the ship, and on a piece of ice a company of penguins came sailing past. Later in the day we counted seventy large icebergs scattered about the horizon, and the crimson rays of the setting sun transformed them into so many islands of incandescent metal. Such was our last day in the Antarctic regions. We were soon to experience the dark side of life in these marvellous latitudes, whose terrors are not inferior to their splendour; and but for the watchful care and promptitude of our experienced captain, officers, and men, H.M.S. "Challenger" would never have returned to tell the tale of her southern cruise.

On the 17th February the ship commenced her eastward cruise along the edge of the pack-ice. At times the horizon was clear of icebergs; now and then some would come in sight, chiefly to starboard. A remarkable change was observed in the colour of the water, which during part of the afternoon turned from blue to an olive-green. On the following day the pack-ice was visible to southward, and the number of bergs considerable. The temperature of the air fell to $-4°.7$ C.—the lowest experienced up to this date. On the 19th we obtained a sounding in 1800 fathoms. At 6 p.m. forty icebergs were visible from the deck, and the day ended with a snowstorm. February 20th was not distinguished by any notable occurrence. The water was of a deep-blue colour, moving at the rate of about three-quarter miles in a north-westerly direction, and about sunset the number of bergs had increased to sixty-nine. The 21st was passed in navigating between these snow-white floating islands, sculptured by sea and weather into the semblance of feudal castles, of bridges supported by gigantic arches and buttresses, of fairy caves illumined by blue lights. The beauty of the sunset this day was beyond words to describe—a gorgeous yet delicate and ethereal display of colour, which left the most fantastic imaginings of a Doré far in the shade.

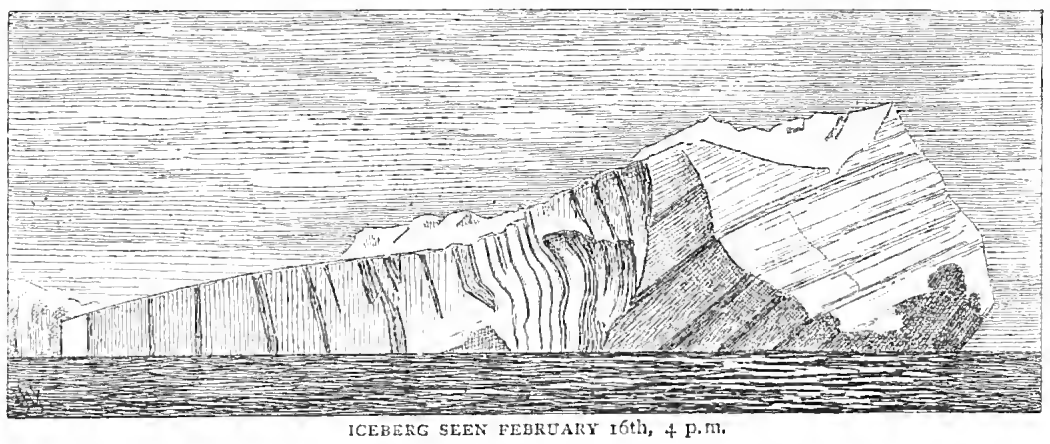
It may be useful to mention here that the term "iceberg," when applied to Antarctic formations, is not correct. By ice we generally understand a more or less transparent substance, the result of the solidification of water by cold. Now these enormous floating masses which, for want of a better name, have been termed icebergs, are not, at least as regards that portion which rises out of the water, composed of ice, but of snow. They are the product of a gradual accumulation of snow, and, to judge by their dimensions, must have occupied many years in their formation. The masses thus formed are absolutely opaque, and of a dazzling white colour, like that of clouds when under the light of the sun. It is this which causes the exquisite play of colour we had such frequent occasions to admire, for, like the clouds, these "snowbergs" reflect every hue of day, from the infinitely delicate and silvery greys of the dawn to the deep crimson and golden orange of the sunset; while under the



dark clouds of a stormy day, their dead white walls and inky-black crevices, their icy-cold breath wafted by the gale, make the spectator shudder. A snowy cliff sketched on this day affords a good illustration of the manner in which the bergs were originally built up by successive accumulations of snow. The white mass is seen to be traversed by a series of delicate blue lines, sometimes hardly visible, sometimes increasing to a blue band of the same tint as that of the more strongly-defined caves. These lines form successive sets or layers, in which the distance between the bands is seen to diminish from top to bottom. This rhythmical arrangement, evidently the expression of a mathematical formula, affords a clue to their origin. While the intervals between them decrease from the top to the bottom in the several strata of snow of which the berg seems to be composed, the bands in the lower strata are so close together as to form almost a single layer, of a bluish and more transparent, in fact a more ice-like substance. What we behold is the gradual transformation of snow into ice owing to the partial melting of the former through the heat developed by the pressure of the overlying strata, and the subsequent freezing of the partially melted snow. The effect of these delicate blue lines upon the face of the cliff is admirable, and imparts an additional beauty to the mass. That the density of the different layers of a berg increases rapidly from the top towards the bottom, may be concluded not only from the rapidly increasing number of blue bands, but also from the manner in which the cracks visible upon the face of the cliff, as sketched above, are suddenly arrested by an evidently harder layer. A remarkable example of a berg in which strata of snow are seen alternating with strata of ice—in this case the bands were rather of a dark-green colour—was observed on the 16th. The vast fragment had every appearance of having formed part of the submerged foundation of a berg. In this case the irregular arrangement of the bands of ice seems to be the effect of lateral pressure resulting from the concussion of contending masses.



ICE-CLIFF SKETCHED FEBRUARY 21st, 4 p.m.

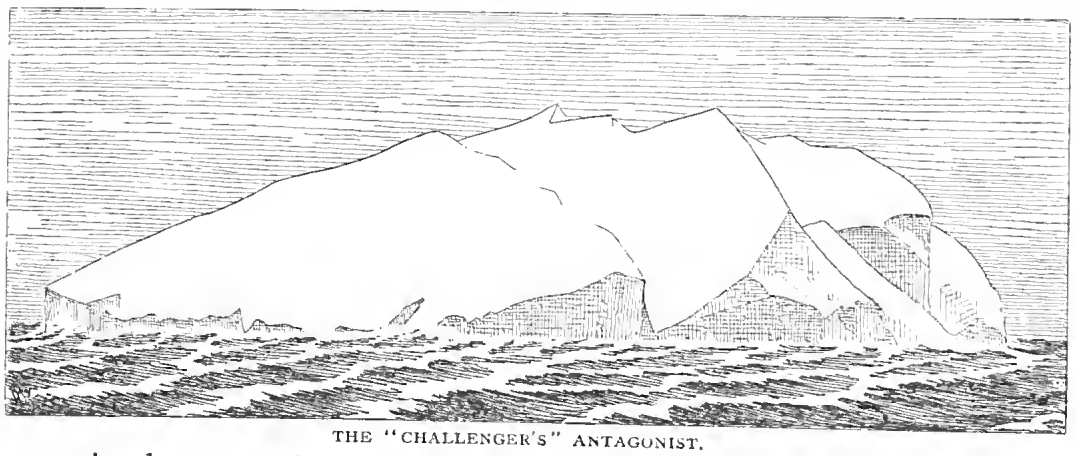


ICEBERG SEEN FEBRUARY 16th, 4 p.m.

The general impression produced upon the Antarctic explorer by these floating masses of ice, which are known to strew the whole Southern Ocean from the Antarctic Circle down to the 40th parallel—some of them have been seen in the immediate vicinity of the Cape of Good Hope—is, comparatively speaking, that of great antiquity. Sir James Ross estimates

that an interval of from thirty to forty years may elapse between the moment when one of these bergs breaks off from its parent mass in the Antarctic, and the hour when its last fragments disappear in the warm floods of the Equatorial currents. The same distinguished navigator mentions the identification of an iceberg which he had encountered the year before. The disintegration of the enormous accumulations of ice which occupy nearly the whole space enclosed by the Antarctic Circle, and represent the sum total of the annual precipitation over this vast area, is no doubt due to the influence of the warm currents which flow into that region. The separate icebergs must float for a long time in the vicinity of the Antarctic Circle, where the low temperature of the air and of the water prevents any rapid diminution of their volume. In fact, as we had frequent opportunity of observing, while thus floating about, their volume is actually increased by new additions of snow. It was easy to distinguish these newly-added layers from the more compact strata of the original mass. There is a striking contrast between the Arctic and Antarctic regions as regards the disposal of the masses of snow and ice annually accumulating. While the ice of the South Pole finds a ready outlet through the Southern Ocean, by which it is surrounded on all sides, that of the North Pole accumulates in an almost land-locked basin, and, as is well known, can only reach lower latitudes through the comparatively narrow channels off the east and west coasts of Greenland. It seems, therefore, highly probable that the greater portion of the Arctic Ocean is covered with an accumulation of ice of very ancient date—a conclusion bórne out by the experience of the latest explorers. The ice which barred their further progress towards the Pole was but a portion of the enormous ice-field which surrounds the latter. Perpetually forming and re-forming, divided by occasional areas of open water, the Arctic ice drifts about from year to year within the narrow limits of the Arctic Basin without an adequate outlet towards the south.

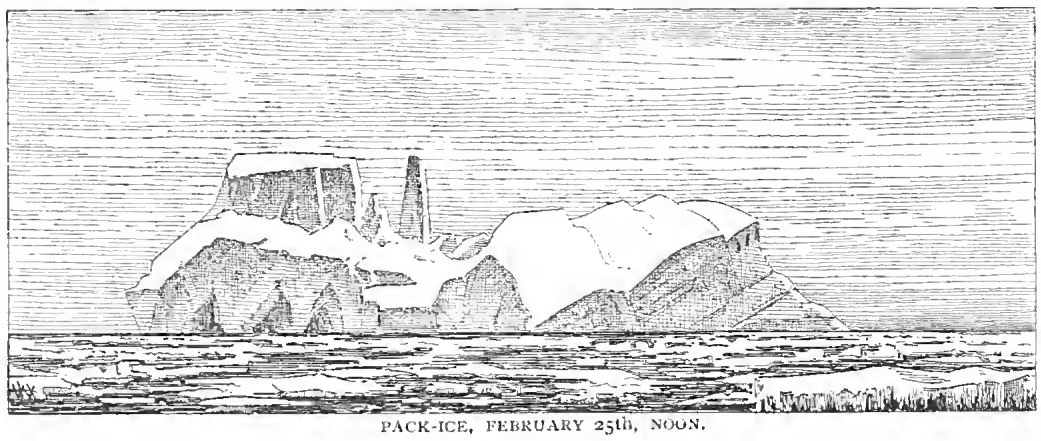
But to return to the opposite hemisphere. On the 22nd a display of Aurora Australis was observed for the first time in the shape of some slight flashes seen shortly after midnight. At 4 p.m., the number of icebergs visible above the horizon had fallen from seventy-seven on the previous day to thirty-two; and a change of colour in the sea, from blue to olive-green, was again observed during a run of several hours. We were still travelling in the company of whales and of sea-birds of every description. The following day brought us again into the vicinity of pack-ice; while in the afternoon a sounding was obtained in 1300 fathoms. Flashes of Aurora Australis were observed after sunset. February the 24th threatened to be the last day of the "Challenger's" cruise. Shortly after an unsuccessful attempt at dredging, a gale surprised us while surrounded by icebergs. About noon, while the men were on the yards reefing sail, the ship, apparently diverted from her course by an eddy, drifted upon a berg, and, coming in collision with it, buried her jib-boom in its side. With the help of



THE "CHALLENGER'S" ANTAGONIST.

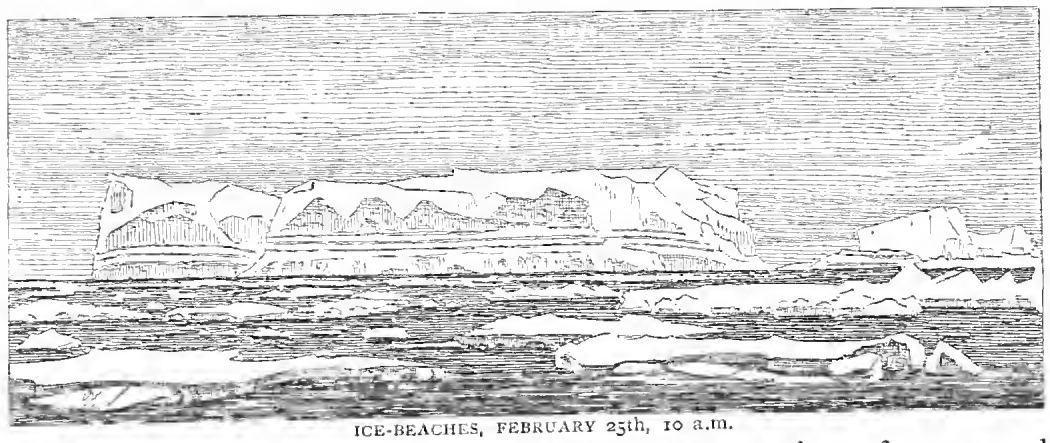
steam, however, the ship happily got clear of the berg without further damage than the loss of her jib-boom and adjoining gear. Both on the 23rd and 24th we had been within a short distance of a position named in the charts "Wilkes' Termination Land," discovered in February, 1840. This navigator mentions "an appearance of land" at a distance of sixty miles. Although we had approached to within twenty miles of the position, no trace of land could be made out, and its existence seems very doubtful. In fact, even the most practised eye, as it scans the ice-bound horizon, often crested with sharp-edged banks of white clouds, will be deceived by what appear to be unmistakable signs of land.

The afternoon of the 24th was spent in skilfully avoiding contact with the numerous icebergs that crossed our path, and which in the gloom of the gale were hardly visible until they were close upon us. A hardly less anxious night was passed in steaming to and fro between two of these giants. During the 25th, we proceeded along the edge of the pack-ice which encumbered the horizon in the east, south, and west. Amongst the bergs noticed in the course of this day was one which very prominently showed a series of beaches formed by the successive changes of the line of flotation.



PACK-ICE, FEBRUARY 25th, NOON.

After the critical moments through which we had passed, it was a source of relief to all on board when the "Challenger" altered her course for Melbourne, distant about 2300 miles. In spite of the gales and snowstorms of the next following days, the good ship soon carried us into more genial latitudes. Near midnight on the 3rd March a fine Aurora Australis stretched its four concentric arcs above the horizon, from south-east to west, and from an altitude of 30° up to the zenith. On the 4th, the last iceberg was observed in the shape of an attenuated slab of ice, with its upper surface worn smooth by the waves. On the 8th, the patent log was found foul, having got entangled in a quantity of sea-weed (*D'Urvillia*), covered with numerous barnacles (*Lepas*); while in the evening of the 9th, the ship passed through a shoal of *Pyrosoma*, leaving a long trail of light in her wake, that "burned in silver streams along the liquid plain." The temperature-soundings of the 10th and 13th afforded evidence of the existence of the great South Australian Current—a mass of warm water which, issuing from the Indian Ocean, flows in a south-easterly direction to the southward of Australia and Tasmania—an oceanic river about 400 miles broad and as many fathoms deep, which, as it bends towards and crosses the Antarctic Circle, is the



ICE-BEACHES, FEBRUARY 25th, 10 a.m.

probable cause of the wide area of open water off Victoria Land discovered by Sir James Ross. On the 15th of March, when we were only 200 miles from the coast of Australia, a calm set in, to the great disappointment of all on board. On the following day every eye was strained to obtain the first glimpse of England's great colony. In fine, half-an-hour after noon, a narrow streak of land appeared above the horizon, and was hailed with unmingled delight. Soon the sight of several sail told of our approach to a civilised land, after having spent three months in the society of the albatross, the whale, and the penguin. Cape Otway was passed at 8 o'clock in the evening, and the entrance to Port Phillip about the same hour on the morning of the 17th. While steaming up this beautiful sheet of water, which so many an emigrant from home has hailed with a heart full of hope, we met the Colonial defence training-ship "Nelson" belching forth volumes of black smoke. At 1.45 p.m., H.M.S. "Challenger" anchored off Sandridge Pier in Hobson's Bay, and in sight of Melbourne—the precocious child of the 19th century.

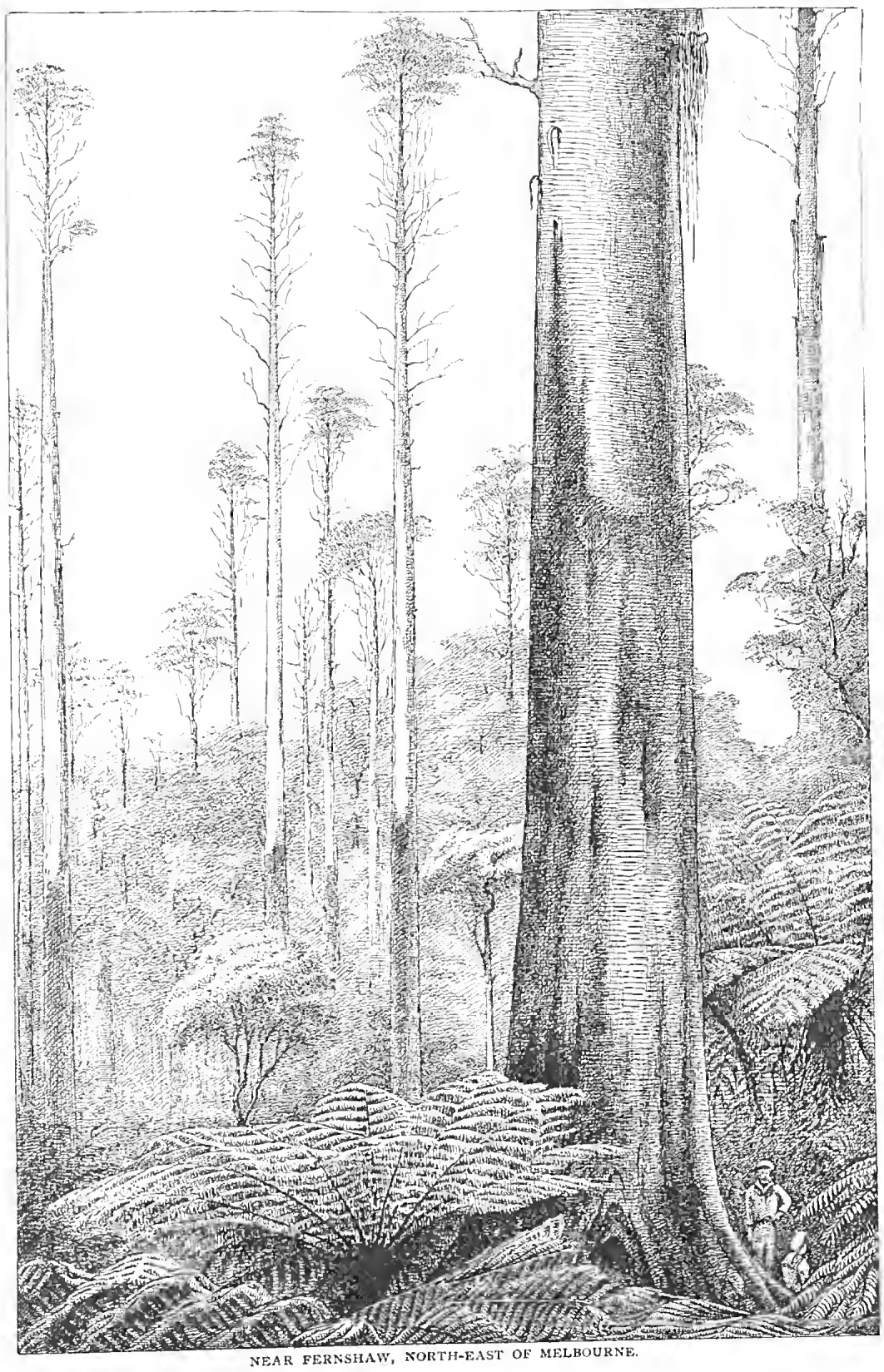
AUSTRALIA.

"Now, strike your sailes, you iolly Mariners,
For we be come into a quiet rode,
Where we must land some of our passengers,
And light this weary vessell of her lode.
Here she a while may make her safe abode,
Till she repaired haue her tackles spent,
And wants supplide. And then againe abroad
On the long voiage whereto she is bent:
Well may she speede, and fairely finish her intent!"

The first view of Melbourne and of its port, as seen from the anchorage, was not prepossessing. Perhaps our arrival did not coincide with the time of year when both land and sea look their best; perhaps our recent sojourn in the midst of the striking scenery of Kerguelen had rendered our taste exacting, but the panorama now spread out before us seemed flat and unpicturesque. The eye first encounters a long wooden pier crowded with shipping; beyond, an agglomeration of sheds, timber houses, and tall chimneys; and some miles inland, a ridge crowned with buildings, towers, and steeples which mark the site of the famous capital of Victoria. No wooded islets dipping into the sea, no rocky promontories festooned with flowers, no stately mountains here welcome the traveller weary of the monotonous look-out from the deck of his ship. Yet these deficiencies, if such they be—and perhaps our young Australian friends may differ from us—are forgotten as soon as he finds himself in the palatial streets of Melbourne. That a large city, the centre of a prosperous community enjoying the advantages of modern civilised life, should occupy a spot where within one's own memory there was a wilderness, the haunt of one of the least elevated races of man, seems little short of a miracle, and amply justifies the pride with which the citizen of Victoria speaks of his capital.

Melbourne has retained a more decidedly British physiognomy than the cosmopolitan

origin of its population might lead one to expect. The typical faces of England, Ireland, and Scotland, which the visitor meets at every step, would remind him of the fact that he is in a British colony, even if the hospitality extended on all sides had not already emphatically told him so. The handsome public and private buildings which adorn this newly-founded city of the Antipodes have been rendered familiar to the home reader by the illustrated press of Melbourne; nor are the charming grounds of the Botanical Gardens, the winding banks of the Yarra-Yarra, as well as the many picturesque sites to be found in Victoria, less well known to those who take an interest in this land of gold-mines, sheep-runs, and gum-tree forests. It would be impossible within the limits here available to give any adequate idea of the history and present status of Victoria—of its commerce, its educational and benevolent institutions, its government, and its social life. Those who seek such information may find in many recent works by observant travellers, as well as natives, abundant evidence of the rapid growth and importance of one of England's most promising daughters.

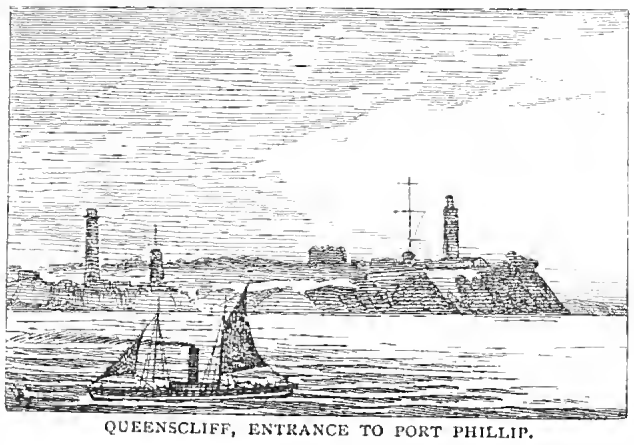


NEAR FERNSHAW, NORTH-EAST OF MELBOURNE.

In striking contrast with the somewhat tame surroundings of Hobson's Bay is the scenery of the Australian Alps, a westerly extension of which divides Melbourne from the basin of the Murray River. Here, in many a sheltered gully watered by mountain torrents, the characteristic vegetation of Australia may be seen in all its splendour—the fern tree, with its exquisitely tender and fresh green foliage, and the white gum tree, whose stupendous trunk rises straight and gradually tapering from its forest bed to a height of several hundred feet—the first the most graceful, the latter the most gigantic representative of the vegetable kingdom. The white gum, known to the botanist under the name of *Eucalyptus Amygdalina*, is

probably the highest tree in the world. It has been known to grow to a height of over 300 feet, with a girth of seventy feet at its base. One of these giants discovered in the Dandenong State Forest measured 306 feet. At a height of twelve feet from the ground its diameter was eleven feet four inches; and at a height of 210 feet, it was still five feet across. With the addition of the small branches at the top, its total height was estimated at 330 feet.

H.M.S. "Challenger" steamed out of Hobson's Bay on the 1st day of April to resume her work upon the high seas. We had another glance at the pretty headlands, Queenscliff and Lonsdale Point, which form the entrance to Port Phillip. They have become the favourite resort of the parched citizen of Melbourne, who comes here to breathe the fresh sea breezes. Indeed, the Victorian's excursions in search of a more congenial atmosphere now frequently extend to Tasmania, the beautiful island opposite, whose merits are perhaps not so well known as they deserve to be. Its climate, being more moist, is healthier than that of Victoria, and approaches more nearly the climate of Great Britain. April the 2nd was spent in sounding and dredging between the islands of Bass Strait, a cluster of barren rocks which render safe navigation a task by no means easy. The lighthouse on Gabo Island, and Cape Howe, which divides Victoria from New South Wales, were passed about sunset on Good Friday, April the 3rd. On the following day, a sounding of 2200 fathoms was obtained off Twofold Bay, showing the great depth of the sea which bathes the shores of New South Wales. Easter Sunday proved to be one of the finest days of our cruise. We sailed all day in sight of the coast, which lay slumbering under a cloudless summer sky. Range after range of forest-clad hills rose one above the other, until lost in the blue distance; and the eye strayed over vast tracts of land as yet barely touched by the hand of civilised man. Now and again we marked the silver streak of a waterfall tumbling over the cliff, or the opening of a little bay, probably the home of some pioneer. The last rays of the sun were still gilding the highest summits of this future home of a great nation, when a bright moon began to shed its glories over land and sea—an exquisitely beautiful sight when witnessed from the deck of a ship as she silently glides through the waves under her cloud of white canvas. The dawn of Easter Monday lighted up the pretty settlement of Wollongong, and then we steamed along a steep rocky barrier which extends northward beyond Port Jackson. An opening between the cliffs afforded us a glance into Botany Bay, now almost deserted, but still boasting of that park-like beauty and that variety of vegetation, new to the European eye, to which it is indebted for its name. The next opening forms the entrance to Port Jackson, hemmed in on each side by the precipitous Sydney Heads, but too well known in connection with unlucky ships that here have been literally "wrecked in sight of the port." We arrived off the Heads about noon, but a delay was made in order to prepare for entering the harbour. It was washing-day on board, and Jack's wardrobe was displayed



QUEENSCLIFF, ENTRANCE TO PORT PHILLIP.

in many-coloured garlands suspended from stem to stern. It would have been hardly fitting to present ourselves in such guise to the Queen of Australian cities, and on Easter Monday too. Soon, however, the good old ship, having put on her best looks—though showing signs of rough collisions with Antarctic ice—was threading the intricacies of the bar, and commenced her triumphal progress towards Sydney. It was our good fortune to make the acquaintance of these far-famed shores on one of the brightest days of a semi-tropical climate. Who that has had such an experience will ever forget the charming prospect of cosy bays and wooded promontories overlooked by the steeple-crowned ridge of Sydney? Every patch of green sward on each side of the harbour was alive with pleasure-seekers, keeping the day in time-honoured English fashion by excursions and picnics; and from the decks of crowded steamers rose enthusiastic cheers as they passed H.M.S. "Challenger" carrying the emblem of the mother country. About 2 p.m. the object of this flattering welcome anchored in Farm Cove, in sight of Government House and of the pleasant grounds of the Botanic Gardens.

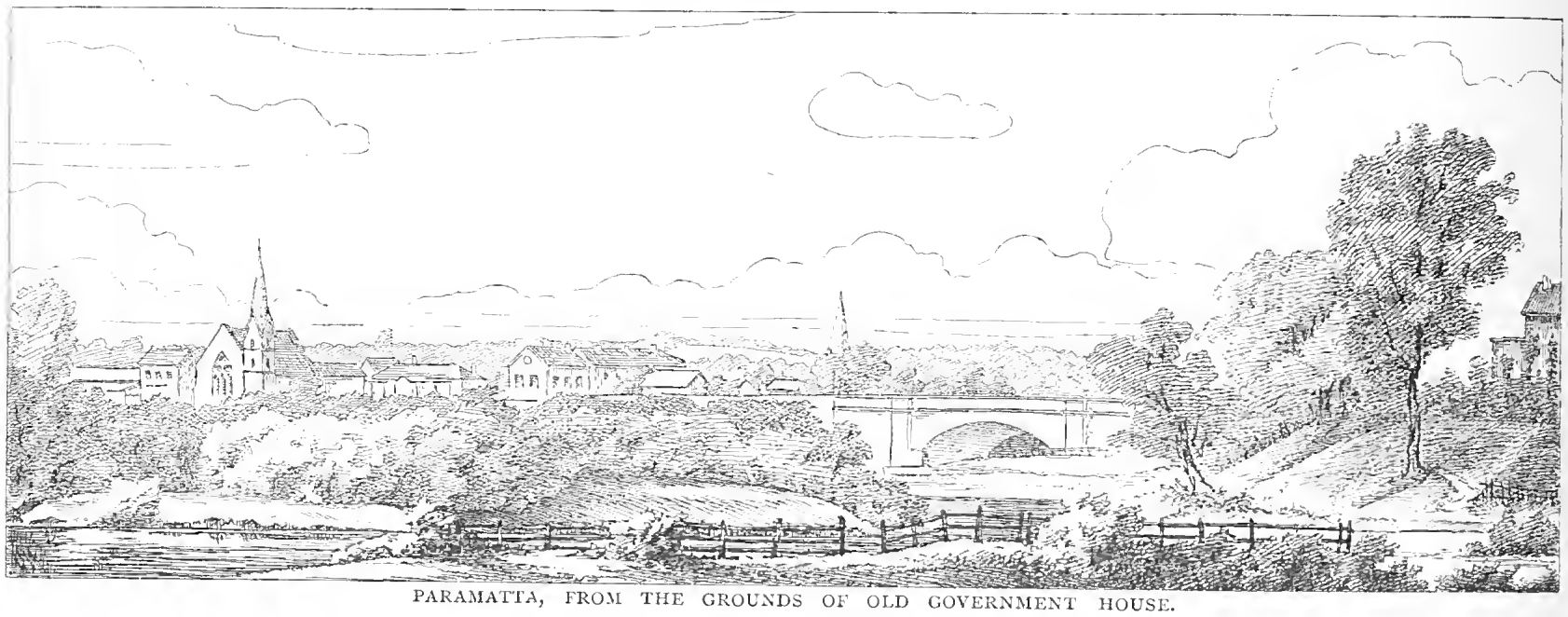
Only ninety years had elapsed since the foundation of the city which now rose before us in all the pride of the metropolis of a great colony, and with all the accessories of a flourishing centre of commerce. It was in the year 1784 that the settlement in Botany Bay was abandoned, and the seat of Government transferred to Paramatta, situated about fifteen miles inland. Soon afterwards, the first houses were built upon the southern shore of Port Jackson, the present site of the capital of New South Wales. Sydney, with her wharves and warehouses, her railways and steam-ferries, her busy streets and charming suburbs, her University, Museum, and Public Gardens, her Exhibition Building—newly inaugurated at the time of our visit—stands on a level with the most favoured cities of the Old World. While the development of the internal resources of the colony must tend to increase her wealth from year to year, her geographical position points her out as the future emporium of the South-Western Pacific. Already the Chinaman, the Malay, and even the Polynesian from Fiji and Tahiti, may be seen in her streets. The only member of the human family conspicuous by his absence is the native Australian, now banished to the deserts of the interior. Sydney society, at one time noted for its exclusiveness—judging by the reports of earlier travellers—has more recently acquired a reputation for hospitality, sociability, and even gaiety, making the capital of New South Wales one of the most attractive stations on a long cruise.

The wide inlet which connects Sydney with the sea, as it winds its course round the wooded promontories which advance from both sides, looks more like a lake than an arm of the sea; and the lover of boating could not desire a more beautiful sheet of water whereon to disport himself. Above Sydney the channel contracts in width, and takes the name of the Paramatta River. The scenery of this stream is not inferior in quiet sylvan beauty to that of Port Jackson itself, and may be best enjoyed from the deck of one of the small steamers which daily ply upon the river. At the point where navigation ceases, the steamer is exchanged for a public conveyance by road, and after a short drive, over lands associated with the earliest attempts at colonisation, the visitor arrives at Paramatta, the centre of the railway system of New South Wales, and one of the most pleasantly situated townships in the

colony. Whether on account of its sheltered position amidst the gently undulating hills by which it is surrounded, or its more homely and rural aspect as compared with Sydney, or its genial atmosphere, Paramatta is one of those places which irresistibly tempt the traveller to murmur, "Here would I set up my tent!" It is some pleasant country-town of England, transplanted, as if by the stroke of a magician's wand, under the warm and sunny sky of Australia. It is the old country, without its chilly damp air, and its occasional clouds of smoke; and Thomson's lines rise to memory—

> "Do not the skies, with active ether clean,
> And fanned by sprightly zephyrs, far surpass
> The foul November fogs?"

The old-fashioned architecture of Government House, with its park-like surroundings, further helps the illusion. The green lawn, the avenues of trees, the gate-lodge, and the façade itself, suggest the demesne of an English country gentleman.

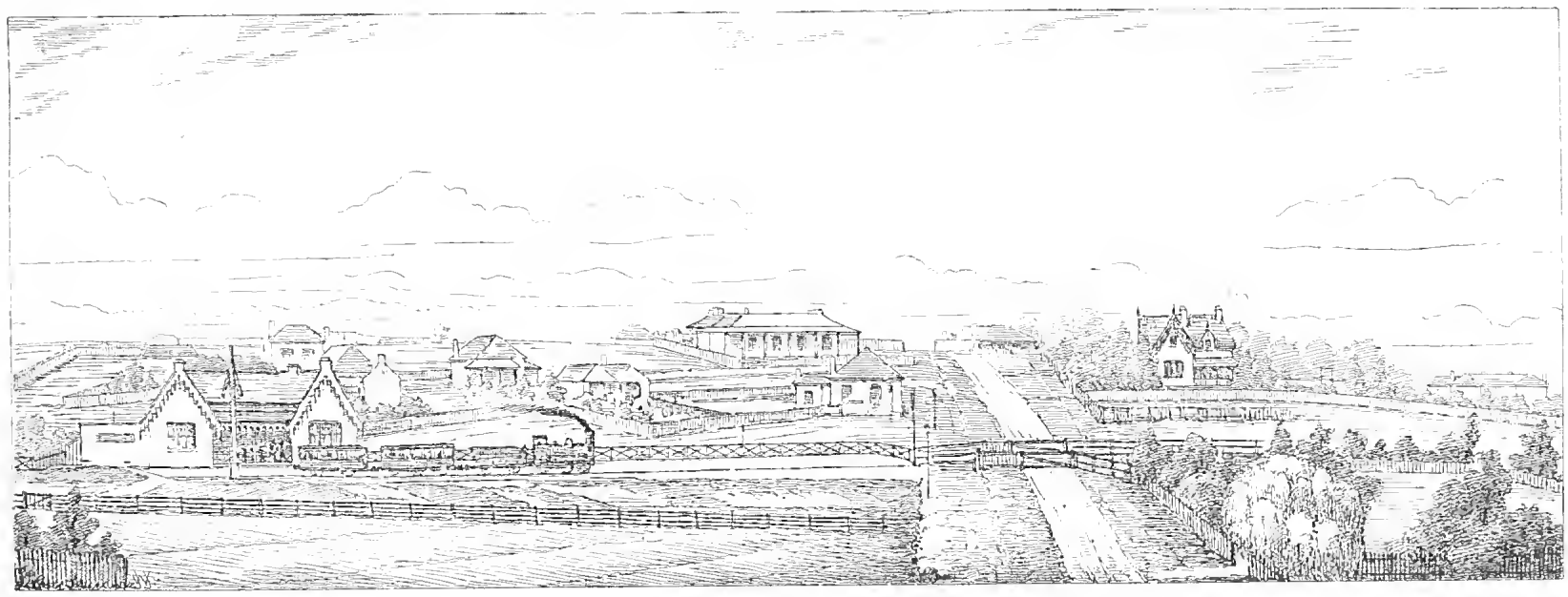


PARAMATTA, FROM THE GROUNDS OF OLD GOVERNMENT HOUSE.

Paramatta is the junction of four lines of railway. Of these one runs eastward towards Sydney; another penetrates the romantic valleys of the Blue Mountains to westward; a third line traverses in a south-westerly direction the districts which lie between the sea and the mountains; the fourth proceeds in a north-westerly direction towards the township of Windsor. The day—not far distant—when the railways of New South Wales are joined to those of Victoria, will commence a new era in the history of the sister colonies. Petersham is a station on one of these lines, and is a very agreeable suburb of Sydney, a few miles from the city; and one at least of our voyagers must preserve pleasant memories of the spot. It may not be inappropriate here to record the experience that the Australian colonist is no whit behind the genuine Briton in cordiality and open-handed hospitality; nor could the ladies be fairly asked to yield the palm to their English sisters for the grace with which they adorn the domestic circle, and render more grateful to the weather-beaten wanderer the amenities and comforts of civilised life.

In a recently colonised land like Australia, nothing is more interesting than the contrast which presents itself at every step between the uncivilised past—which, though it has left

no record in the pages of history, can be imagined by the student of mankind—and the present, with its abundant proofs of the inexhaustible energy of civilised man, and its promise of still greater achievements in the future. On one side the pathless forest, erstwhile the abode of the savage, whose only home was some temporary shelter in the bush; on the other, the lately cleared and fenced-in fields, the high-roads and spacious streets of projected towns, the paddocks on the hill-side slopes, the wooden farm-houses and the trim-looking villas, the church waiting for its steeple—for funds for which absent adornment, doubtless, a fervent appeal is annually made from the pulpit within—the railway station, the sound of the steam-whistle echoing through the forest and drowning the war-whoop of the conquered savage—everywhere the signs of a new life, the beginnings of a great nation of the future.



PETERSHAM, NEAR SYDNEY.

Chapter V.—From Sydney to Torres Strait.

AFTER a delay in the port of Sydney extending over two months, it need scarcely be said that we somewhat regretfully obeyed the call of duty, and prepared to traverse once more the lonely ocean. During the latter part of our visit there had been signs of approaching winter in the shape of heavy rain. H.M.S. "Challenger" had been docked, and was again ready to commence another cruise. A short time before her departure she was taken outside the Sydney Heads in order to give our Australian friends an opportunity of witnessing the operations of dredging and sounding, in which they seemed much interested. The day of our leaving Port Jackson, the 8th of June, was favoured by the same brilliant sunshine which had greeted our arrival. Amidst the strains of the band and the farewell cheers of the sailors of other men-of-war on the station, the "Challenger" steamed from her anchorage in Farm Cove. Soon after we had left the port behind us the weather turned boisterous, and, increasing to a gale on the following day, compelled us to seek shelter in Watson's Bay, situated just inside the Sydney Heads. We were to survey a line of soundings between Sydney and Wellington in connection with the laying down of a submarine cable between Australia and New Zealand—a task only to be accomplished in favourable weather, which we had little reason to hope for at this time of the year. The sea which divides the two islands, or rather continents, seems narrow enough upon a chart of the Pacific Ocean, yet the distance between Port Jackson and Cook Strait is over 1200 miles. After a tantalising delay of three days, a second start was made on the 12th, when we were able to commence our task. The soundings obtained on this occasion show that the western half of the sea between Sydney and Wellington attains a depth of over 2000 fathoms—the greatest depth ascertained being 2600 fathoms, or about three English miles—while the eastern half is much shallower—a depth of 1000 fathoms existing at a distance of 400 miles from the coast of New Zealand. Frequently interrupted by tempestuous weather, the passage to New Zealand proved one of our roughest trips.

NEW ZEALAND.

Early on the 25th we sighted Cape Farewell, the north-western extremity of Middle Island. A south-easterly gale blowing through Cook Strait compelled us to run into Port Hardy on the west coast of D'Urville Island, where we remained during the next day. Surrounded by steep rocks and hills covered with a scant vegetation, the port has a desolate air, and there appeared no sign of habitation. Its most remarkable feature is a long line of rocks jutting out into the bay, apparently the remains of a dyke or wall of igneous rock. The island bears the name of an illustrious French navigator, the captain of the "Astrolabe," who, after having successfully braved the dangers of the sea and of the Antarctic Ice-barrier, perished in a burning railway train between Paris and Versailles. The names associated with the port are emphatically English. Looking out to sea, the point of land on the left is Trafalgar Point; the pyramidal rock which rises high out of the water off the point is Nelson's Monument; the cape on the right is Cape Stephen; and the huge triangular rock which terminates the dyke is styled Victory Island.

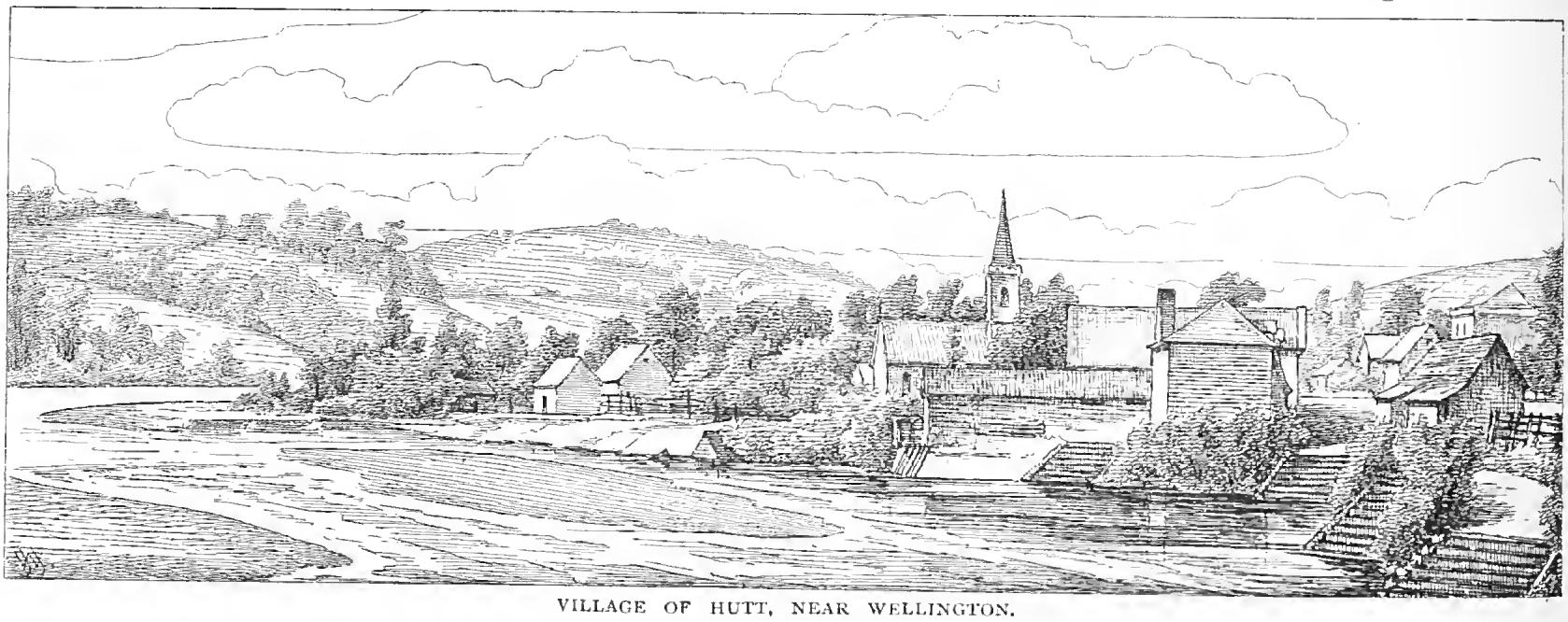
On the 27th we entered Cook Strait. The gale was as fierce as ever, and we made little progress. We accordingly sought shelter in Queen Charlotte Sound, an inlet on the south side of the strait, as desolate and uninviting as the port we had just left. Sunday, the 28th, found us battling with the heaviest sea we encountered during the whole of the "Challenger's" voyage; yet the day was bright, and we caught glimpses of the snow-covered mountains of Middle Island, the summit of the Kaikora Range, 9700 feet above the sea, and of the Looker-on Range, 8700 feet. This day's struggle against wind and waves between the rock-bound shores of Cook Strait cost the life of one of our sailors. When off Cape Terawiti, a heavy sea struck the ship, and a moment after, the ominous shout of "A man overboard" summoned every one on deck. It appears the leadsman had got his line entangled on the anchor, and was in the act of clearing it when the ship canted over, and he was swept away by the furious sea. As soon as he was missed, the ship was put about, and a search made in all directions for an hour, but no trace of the man could be seen. Probably he had been stunned by the shock, and had sunk at once, unconscious of his fate. Deeply concerned at the loss of one of the most promising of our young sailors, we proceeded towards Port Nicholson—which we had vainly endeavoured to reach during the last three days—and at 5 p.m. we gladly dropped anchor in smooth water before Wellington, the present capital of New Zealand.

The people who had gathered on the landing-stage to watch our arrival were dressed in neat and sober attire, and looked very home-like—that is to say, rather commonplace, as a crowd is apt to look on a rainy Sunday. Our visit occurring in the mid-winter of the Antipodes, the state of the weather afforded little encouragement for excursions in the interior, and thus our recollections of New Zealand are not of the brightest. Moreover, there would not have been sufficient time for exploring the more famous districts, such as the

alpine valleys and glacier regions of the Southern Island, and the remarkable volcanic district of the North Island, made known through the interesting labours of the "Novara" Expedition.

Port Nicholson communicates with Cook Strait by a narrow channel, and widens out into a broad basin surrounded by hills, and having an island in the centre. Wellington overlooks the western end of the basin, and the general appearance of the town bears witness to rapid progress during the last decade. The houses, however, are all built of wood, even such important structures as the Houses of Parliament, Government House, the Roman Catholic Cathedral, and other churches. It may be premature to criticise the style of architecture in the case of a city which is, as it were, but the creation of yesterday, and where the first desideratum must be to obtain the shelter of a roof; but it seems a pity that the builders of Wellington, in striving to imitate the appearance of stone, should neglect the great constructive and ornamental capabilities of wood. A hint might be borrowed from the Maori, whose well-known skill in carving might be further developed under the white man's direction. The Wellington Museum contains many beautiful specimens of native art.

A railway follows the western shore of Port Nicholson, connecting the capital with the township of Hutt, situated at the head of the basin, and on the banks of a river of the same name. Hutt is a fair illustration of England at the Antipodes. The immigrant, as he



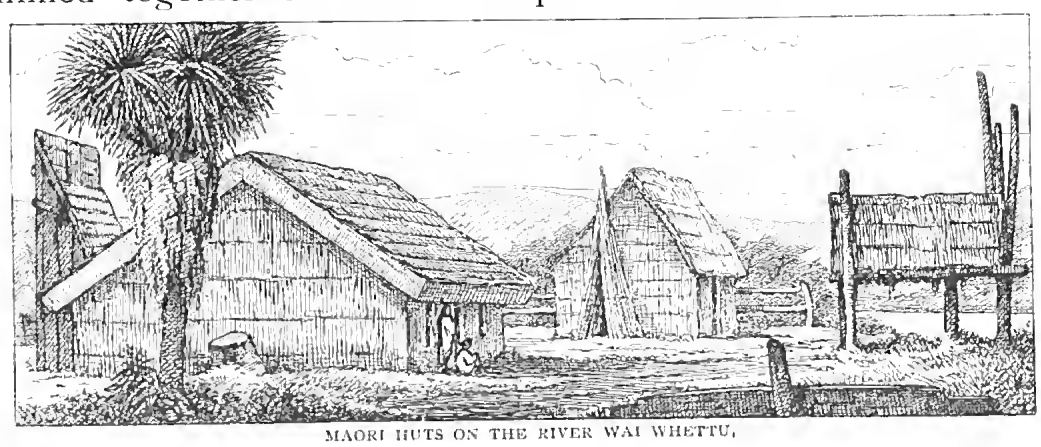
VILLAGE OF HUTT, NEAR WELLINGTON.

surveys it from the bridge—with its houses and gardens, its steeple and its winding river, its cultivated fields and timbered hills—might fancy himself at home, and forget that he has put half the earth's compass between himself and his native land.

The Maori, thanks to his valour, has not yet been improved out of existence. He may still be met in the streets of Wellington, disguised, however, in the garb of civilisation. The faces of the older men are elaborately tattooed according to ancient custom; but the younger people have apparently given up this mode of personal adornment. The Mao i King and the bulk of his whilom subjects, we were told, now occupy the north-eastern pait of the island. This courageous and intelligent branch of the Polynesian race may possibly learn to adapt itself to the conditions of civilised life, and thus escape the fate of the

aboriginal tribes of Australia and Tasmania. One day, while visiting some native dwellings near Hutt, a Maori was pointed out to me as the owner of the land on which he stood. In dress, stature, and expression of face, he seemed the exact counterpart of one of our Celtic peasants, but of course his complexion was somewhat darker. He was waiting for the white man who was to buy his land, and in the meantime enjoyed his clay pipe.

The house of the Maori, like the cabin of our poorest peasantry, is generally very crowded, old and young being confined together in a narrow space. In the hut shown in the sketch we found a number of young women, their black hair hanging loosely over their shoulders, engaged in plaiting mats and baskets. They received us with that pleasant smile which was henceforth to be our welcome during the "Challenger's" cruise through Polynesia, but, owing to our ignorance of the Maori tongue, conversation was necessarily limited. The smaller hut near the principal dwelling is intended for the use of mothers when expecting the birth of a child. A third structure supported on poles is the provision-store.



MAORI HUTS ON THE RIVER WAI WHETTU.

We left Port Nicholson in the afternoon of the 6th July. When outside the port, our further progress was stopped by a dense fog, and we anchored for the night. On the following day we succeeded in rounding Cape Palliser, a steep promontory called by the natives Kawa-Kawa, and the most southern point of North Island. Thence shaping our course along the east coast, we sighted the Mahia Peninsula at daybreak of the 9th. The evening before, we were favoured with the most brilliant display of phosphorescence it had been our good fortune to witness. All around the ship, and as far as the horizon, the sea was covered with large luminous patches, literally islands of light. They proved to be dense masses of *Pyrosoma*. One of the specimens fished up with the tow-net was 9·6 inches long, and two inches in diameter at the broader end—about double the size of the specimens obtained off the west coast of Africa in the first year of the cruise. For several minutes after their capture, these strange organisms—as yet, I believe, little known to the naturalist—would at the least touch become instantly luminous from end to end, the light having a faint bluish tinge. The patches visible from the ship would, if joined together, have covered a square mile at the very lowest computation, which, allowing fifty individuals to the square yard, gives the enormous number of over 150 millions per square mile. The light was so brilliant as to literally illumine the whole space enclosed by the horizon.

> "They coiled and swam, and every track
> Was a flash of golden fire."

This was the second display on so large a scale which had come under our observation, and both occurred in the vicinity of land.

Sunset of the 9th lighted up the summit of Mount Ikurangi, 5535 feet high, which dominates the eastern peninsula of North Island. This was our last glimpse of New Zealand —a land highly favoured by Nature, and doubly interesting as one of those rising colonies which are likely to occupy a large place in future history.

A three days' run with a strong westerly breeze brought us amongst the Kermadec Islands, said to be uninhabited, though they must have been occasionally visited by canoes from the neighbouring islands, situated as they are nearly mid-way between New Zealand and the archipelagoes of Tonga and Fiji. We obtained a distant view of the bare Esperance Rocks, and devoted the greater part of the 14th to sounding and dredging within sight of Raol or Sunday Island, then distant about twenty-eight miles to the southward. It presents to the eye a long serrated ridge, seemingly covered with vegetation, the highest point not rising much over 1500 feet above the sea. Recent soundings have shown that the Kermadec Islands belong to the same submarine plateau which, with an average depth of about 1500 fathoms, connects the Tonga, Fiji, and Samoan Islands, a channel of over 2000 fathoms dividing this plateau from that of New Zealand.

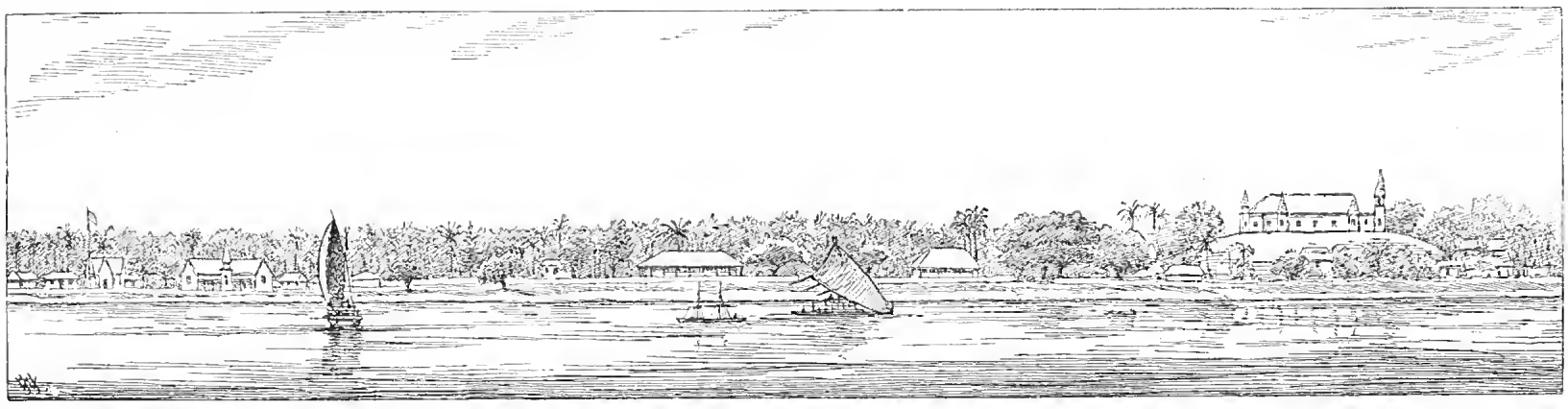
We were now rapidly approaching the belt of the tropics—the enchanting region of never-ending summer. But, as seems to be the general rule on the dividing line between the temperate and the torrid zones, both wind and weather proved inconstant, and we were driven further eastward into the wide expanse of the Pacific Ocean. On the 17th, the sounding-line marked the great depth of 2900 fathoms, or over three and a quarter miles. It appears we had drifted into the area of depression subsequently explored by the German frigate "Gazelle," and which has been found to extend from the coasts of New Zealand to those of Patagonia, with depths varying between 2000 and 3000 fathoms. With the exception of the Chatham Islands near New Zealand, not a single island or solitary rock rises out of this immense watery waste—5000 miles wide and three miles deep—which fills up the space between the 40th and 50th parallel.

On Sunday morning, the 19th July, H.M.S. "Challenger" was close to Eoa Island, the most southern of the group which Cook named the Friendly Islands, on account of the hospitable character of their inhabitants. Eoa, unlike its neighbour Tongatabu, forms an elevated plateau rising abruptly from the sea on all sides. Although fertile and inhabited, it is but rarely visited by vessels of large size, having no good anchorage. The port we expected to reach on this day is also defended by a formidable barrier of coral reefs, the scene of frequent wrecks; but after carefully threading our way through a labyrinth of channels, often not wide enough to allow a ship to turn, we took up our station before Nukualofa, the capital and residence of His Majesty King George of Tongatabu.

TONGATABU.

In size and shape the island of Tongatabu may be compared to the Isle of Wight. It is heart-shaped, a wide lagoon bisecting the northern part. But the little Eden of the English Channel is more hilly than its rival of the Pacific, for, though the surface

of the latter is composed of gentle undulations, no part of it is said to rise more than sixty feet above the sea-level, the highest point on the island being the little knoll on which stands the missionary church of Nukualofa. The population of Tongatabu, reckoned by former navigators as high as 15,000 and even 20,000—probably an over-estimate—is now reduced to about 4000. The whole island, measuring about twenty-five miles from east to



NUKUALOFA.

west, and the largest of the Tonga group, seems to rest upon a foundation of coral rock, on the surface of which Time has accumulated a rich dark-coloured soil, the result of vegetable decay. Hence the extreme fertility of the land, seed-time and harvest alternating all the year round; whilst trees and flowers have been allowed to run riot in the utmost luxuriance. Patches of the brightest blue and red line the avenues of palms which here do duty for roads; the convolvulus stretches its leafy arms across the path, and, creeping up the trees on the opposite side, falls down in graceful garlands from their feathery branches. Now and then a native maiden, like some "daughter of a woody Nymphe," would step out from the recesses of the foliage, a scarlet flower coquettishly stuck in her dark hair, and look with wonder and amazement at the white strangers feverishly hurrying past on horseback in search of the "lions" of the place. To any but a European or North American mind, that restless disposition which makes a man forsake his home and wander all over the world in quest of novelty is simply incomprehensible. Tongatabu was discovered by Tasman in the year 1643. Cook visited the island in 1773, and Namuka and other islands in the same group in 1774 and 1777. In the month of April, 1827, the "Astrolabe," commanded by Dumont d'Urville, ran aground upon the reefs opposite Nukualofa, and was detained a whole month for necessary repairs. From information obtained from the natives, D'Urville concluded that the unfortunate La Pérouse, in search of whom he had been sent out, had visited the Tonga Islands on his return from Botany Bay in 1787. The shattered remains of the two frigates under La Pérouse's command were discovered upon the reefs of Vanikoro Island, north of the New Hebrides.

The arrival of H.M.S. "Challenger" thus occurred exactly a century after the sojourn of Captain Cook in these islands. We had no sooner anchored off Nukualofa than some natives made their appearance on board, seemingly quite at home on the deck of the big ship. Like all former navigators, we were pleasantly surprised at their fine manly appearance, the light yellowish-brown tint of their skin, and their intelligent and open countenances. Their

hair, radiating from the massive square forehead, and taking a pale yellow tint from a light-coloured wash which they apply to it, gives them the appearance of veritable children of the sun. They are probably the best-looking of Polynesian races—praise which extends to both sexes. In the opinion of some travellers, however, the Samoans, Hawaiians, and Tahitians are by no means inferior to the Tongans in personal beauty.

After paying our respects to King George of Tongatabu and his consort Queen Charlotte, who received us in their extensive mansion overlooking the beach, all the apartments being on the ground floor, surrounded by a verandah, we roamed through the avenues of Nukualofa and visited the thatched huts of the natives. We received everywhere the most hospitable welcome, were invited to squat down on clean mats amidst a circle of friendly faces, old and young, and had to watch the preparation of the favourite native beverage the "kava." The latter is extracted from a root, and its bitter, somewhat mawkish taste does not recommend it to the new-comer. On the other hand, our cigars were much appreciated by both ladies and gentlemen. With the native salute of "Alōfa" we parted from our entertainers, whose courtesy and good-humour were beyond praise. Their dress, originally confined to a piece of cloth called "tapa," made from the bark of trees and wound round the loins, is now more frequently replaced by stuffs and garments of European manufacture—light jackets, petticoats, loose gowns, bonnets, hats, and bright-coloured scarfs—more or less ill adapted to a Polynesian frame. King George-Tabou is over seventy years of age, and his reign has already lasted about forty years, to the apparent advantage of his subjects, now all converted to Christianity, and not unfamiliar with the mysteries of the "three R's." He is apparently the chief Touboou of Nongalofa mentioned in the account of the expedition of the "Astrolabe," at that time the only Christian chief, and to whom D'Urville, when giving up his vessel for lost, proposed an alliance offensive and defensive in order to protect his men against an attack by the other chiefs in the island, Tahofa and Palou; but Touboou did not consider himself strong enough for such an undertaking, and advised D'Urville to "keep to his ship." Happily the latter was got off the reef, and the illustrious navigator was able to prepare for his departure. Touboou seems to have subsequently overcome the resistance of the other chiefs, with the help of the missionaries, and probably also of more material means. Near the church door is a monument erected to the memory of Commander W. Croker of H.M.S. "Favourite," who was killed in an attack on Bea in June, 1840. The village of that name is situated at the western angle of the great lagoon. It was in D'Urville's time the stronghold of the chief Tahofa, and is now the principal station of the Roman Catholic mission. A chief called

Mafou is mentioned as the probable successor of King George. He is a man of commanding exterior, superior talents, and great enterprise, who has extended his conquests to Fiji, and will probably be heard of again. The vessels used by the Tongans in their more distant expeditions are double, consisting of two canoes, from thirty to forty feet long, connected by a broad solid platform, which projects on both sides, and supports an oblong-shaped and flat-roofed hut. When preparing for a cruise, a single mast is set up in one of the two canoes, and this mast is surmounted by a lyre-shaped ornament, through which the ropes are passed. The large triangular sail, adorned with streamers, covers nearly the whole length of the canoe. Stem and stern being alike, the course may be reversed without turning. A mosaic-work of shells, fore and aft, completes the outfit of this singular craft. The Tongans, like most Polynesians, are expert sailors and swimmers, and are as much at home on the water and in the midst of a roaring surf as on land. If we include the assistance of favourable winds and currents, there is no difficulty in explaining the successive peopling of the numerous islands scattered over the broad Pacific. For centuries the most intimate intercourse seems to have subsisted between Tonga and Fiji; and doubtless, in these regions, there has been from a remote past continuous inter-communication amongst

"The sea-girt isles,
That, like to rich and various gems, inlay
The unadornèd bosom of the deep."

We received from the missionaries of Tongatabu a very hospitable reception, and every assistance in exploring the most interesting sites of the island. The most attractive objects, from an archæological point of view, are the remains of pyramidal tombs still visible near Mua, at the head of the great lagoon. The existence of these structures, which recall the monuments of Mexico and of Egypt, upon an island of the Western Pacific Ocean, is, to say the least, a fact deserving attention. The larger of the two tombs is known as that of Tui Tonga, the title formerly borne by the pontiff or high priest of these islands. We found the ruins to consist of three steps or terraces, each about three feet high, and faced with large slabs of coral rock. The lowest step formed a parallelogram, measuring about 135 feet by 95 feet—the proportion between the two sides being as three to two. The monument, however, was so completely overgrown with trees, that we would have been unable to find it without the assistance of guides. The roots of the trees fell, as it were, in cascades from one terrace to the next and down to the ground, almost entirely concealing the stones and the general outline of the monument. We had lost some time in discovering it in the middle of the wood by which it is surrounded, and the declining day prevented us from going in search of the other tomb, situated not far off, but said to be reduced to an almost shapeless ruin.

Upon the brink of a bluff overlooking the lagoon near Mua stands a gigantic tree, reported to be the largest tree in the Pacific regions. It belongs to the genus *ficus*, and the trunk measures 110 feet in circumference, or 35 feet in diameter. Unlike the Australian

gum-tree, the effect of its size is not spoiled by scanty foliage, for it is surmounted by a magnificent dome of green leaves.

On the first day of our landing, an incident occurred which recalls tales of childhood, and the primitive manners of patriarchal times. As we gathered on the beach, waiting for the boat to bring us back to our floating home, the king's grand-daughters came down to us bearing trays laden with choice fruit. The princesses were dressed in green—the colour affected by Tongan royalty. A day or two after, as I sat sketching in front of one of the native huts at Nukualofa, a pair of young Tongans, named Josiah and Ileizane, insisted on being added to the picture. Ileizane picked up a bunch of leaves that lay at her feet, and the pair stood up hand in hand under the shade of a palm-tree, delighted with the idea of having their portraits taken.

ILEIZANE AND JOSIAH.

The "Challenger's" short visit to Tongatabu terminated on the 22nd. This was one of the pleasantest episodes of our cruise round the world, and we were loath to part from an island which seemed to realise the dream of the idyllic poet. The sun of a primitive civilisation is fast sinking below the western horizon of the Pacific. We were fortunate enough to gather some of its last rays.

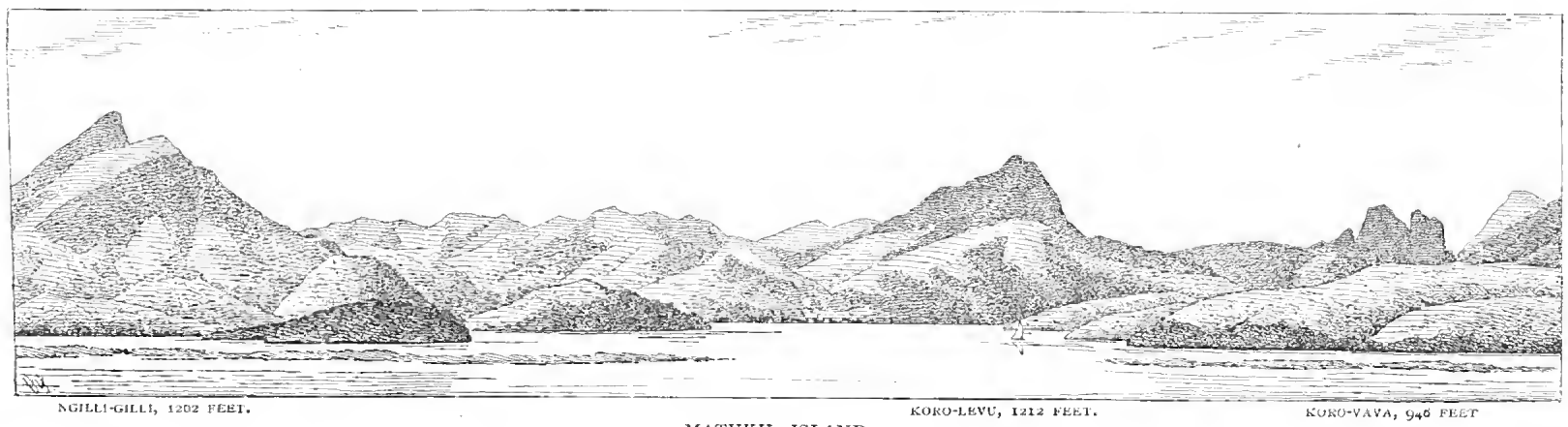
About noon on the 23rd we were close to the reefs of Turtle Island, and on the 24th we stopped off Matuku Island, belonging, like the former, to the Fijian Archipelago.

FIJI ISLANDS.

Matuku, with its picturesque variety of hill and dale, its mountain-cones and fantastically-shaped rocks densely covered with a rich carpet of vegetation, and its girdle of coral reef, gives a fair idea of the general aspect of the Fijian Islands, apparently all of volcanic origin. It is well known that the reef-building coral cannot live in fresh water. Hence we always find an opening in the reef at the point where the drainage of a valley flows into the sea, as shown in the sketch, and vessels of the largest size are thus able to enter and take shelter behind the natural breakwater or harbour formed by the coral reef. The deep blue water of the ocean outside, the snow-white foam of the waves as they dash against the reef, the placid emerald sea inside, where

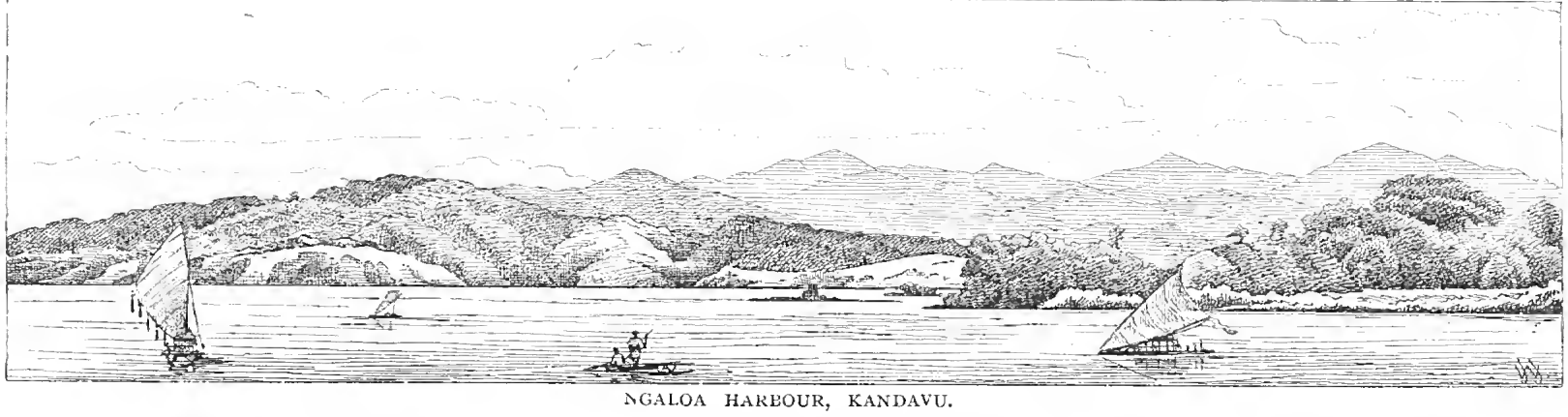
"The glassy ocean hushed forgets to roar,
But trembling murmurs on the sandy shore;"

and, as a background, the dense masses of the tropical forest, compose a scene never to be effaced from his memory, and which still awaits the painter who can transfer it to canvas.



MATUKU ISLAND.

In the course of the day's dredging, amongst other wonders of the deep, a live nautilus was brought up. The gracefully-shaped delicate shell of this creature is familiar to every one; but naturalists have seldom had an opportunity of observing the animal in its living state. The specimen was watched with much curiosity as it swam about in a tub on the bridge amidships, apparently propelling itself by ejecting water from a large tube. On the following

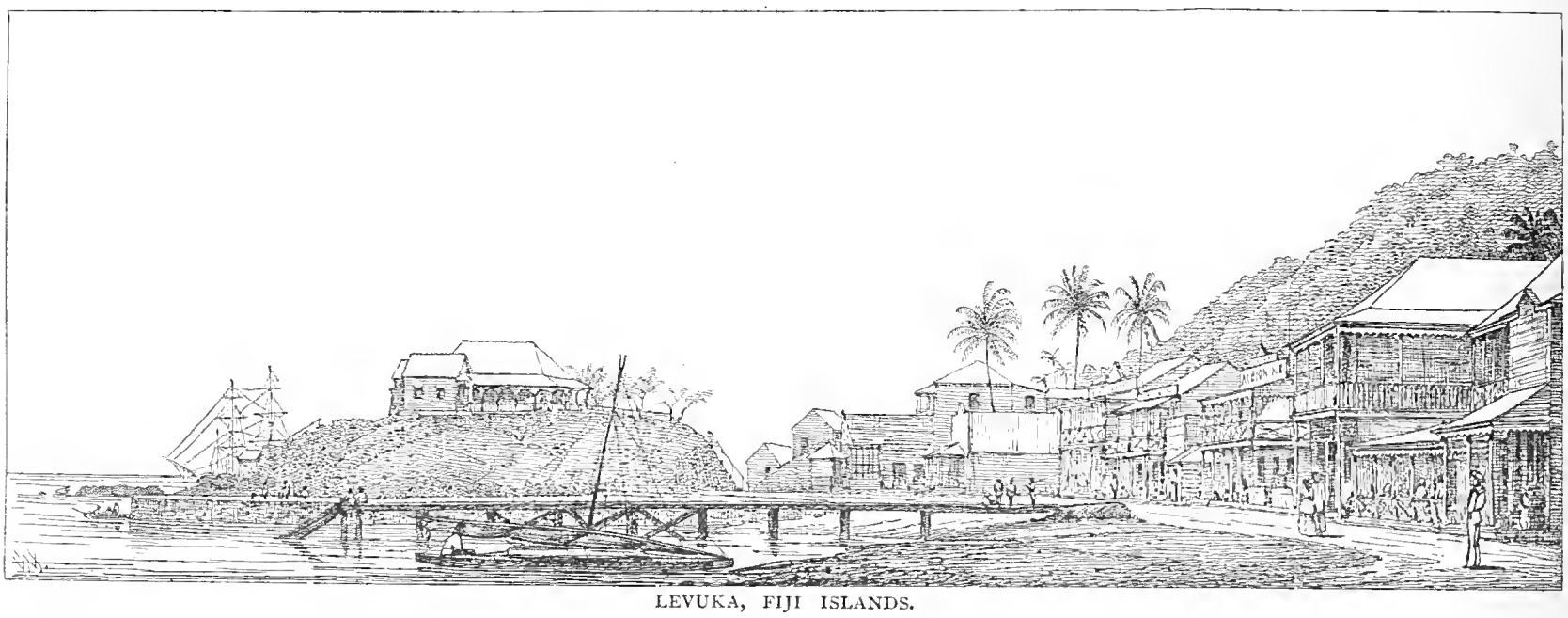


NGALOA HARBOUR, KANDAVU.

day the long ridge of the island of Kandavu rose above the waves, and, passing inside the reef, the "Challenger" anchored in the beautiful harbour of Ngaloa.

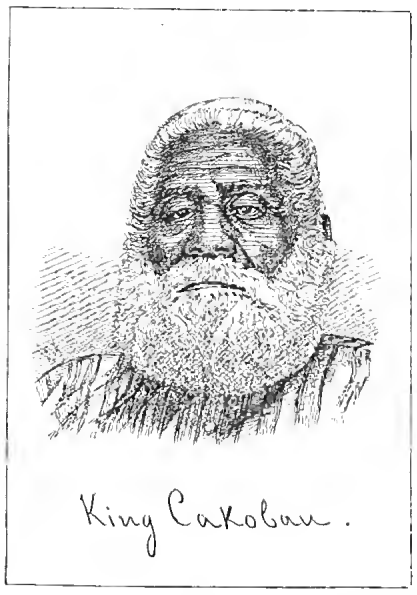
On the 28th we proceeded for Levuka, the residence of the British Consul and of the ministers of King Cakobau. It is situated on the island of Ovalau, an island off the east coast of the mainland of Viti Levu. The whole Fijian Archipelago, comprising more than 200 islands of all sizes, forms a ring of an average diameter of from 200 to 250 miles, and enclosing a sea, studded with islands and coral reefs, by no means easy of navigation. The two largest islands are placed, one—Vauna Levu—in the north, the other—Viti Levu—in the west. The longest diameter of each, though they look mere specks upon the charts of the Pacific Ocean, is about 100 miles. The port of Levuka, which we reached in the afternoon of the 27th, is one of those natural harbours, above described, formed by a coral reef. It has two entrances accessible to large vessels, both of which we used—one in coming, the other at our departure. Levuka is composed of a modern town, containing the hotels, shops, and private dwellings of the white man, and of the ancient town still inhabited by the

native Fijians. The latter is surrounded by a wall built up of loose stones, is flanked on one side by a rivulet, on the other by the sea, and on the land side by an inaccessible rock, the site having evidently been chosen for its defensive capabilities. During our stay we paid a visit to a German settler, who had founded a home in one of the palm groves which descend to the beach on each side of Levuka. He had transformed his grounds into a compendium



LEVUKA, FIJI ISLANDS.

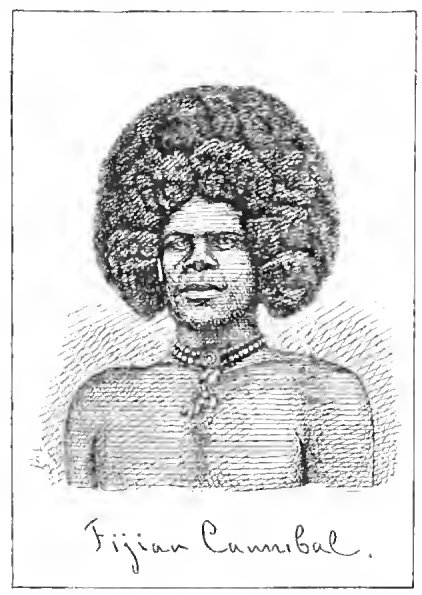
of Fijian botany and zoology, with that genial enthusiasm so characteristic of his nation. Among the guests in the parlour was a fine young Fijian in his native dress, or rather undress. I wondered what our exquisites at home would have said at the sight of such a dark-skinned Adonis in a drawing-room. Yet, although he had not been adorned by a tailor of Paris or London, his manner and conduct were beyond reproach. Our German host lived on the best of terms with a neighbouring notable, the chief of Ovalau,



to whom we were introduced. No man bred in the most polished Court of Europe could have surpassed the perfect courtesy and quiet dignified bearing with which that chief received us and presented to us the members of his household. His hair was tinged with grey, but in stature and features he was a model for the sculptor—a dusky Farnese Hercules. After the return of the "Challenger" to England, King Cakobau made a voyage to Sydney, and arrangements—fully made known in the public press—having been happily completed, Fiji became an appanage of the British Crown, and its former ruler joined the company of "monarchs retired from business."

In Fiji, as elsewhere, a decided difference may be observed between the inland and the coast tribes, the former representing the remnants of an earlier population, while the latter are generally a mixture of the aboriginal race with the invaders from neighbouring countries and islands. Thus the native from the hills of Viti Levu, with his shock of woolly hair, seems to belong to the race which originally took possession of all that region of the Western Pacific, of which the continent of Papua or New Guinea may be considered as the

centre; while the natives of Kandavu show a decided approach to the more advanced type found in Tonga, Samoa, and New Zealand.



On the 2nd of August we returned to Kandavu. This island, about thirty miles long, consists of two portions, both mountainous, joined to each other by a narrow low isthmus, which forms the northern boundary of the harbour of Ngaloa. At the extreme western end of Kandavu stands a huge block of mountain, the highest on the island, which some American patriot has styled Mount Washington. Its native appellation is Buke-levu, and its height 3800 feet. Ngaloa is the name of the island which occupies the centre of the southern bay of Kandavu. As the "Challenger" was anchored but a few hundred yards from its shores, it was the favourite resort of all on board. Amongst its richly wooded hills, at the end of a narrow inlet of the sea, lies the village of Ngaloa—a fair specimen of the land recently added to the British dominions.

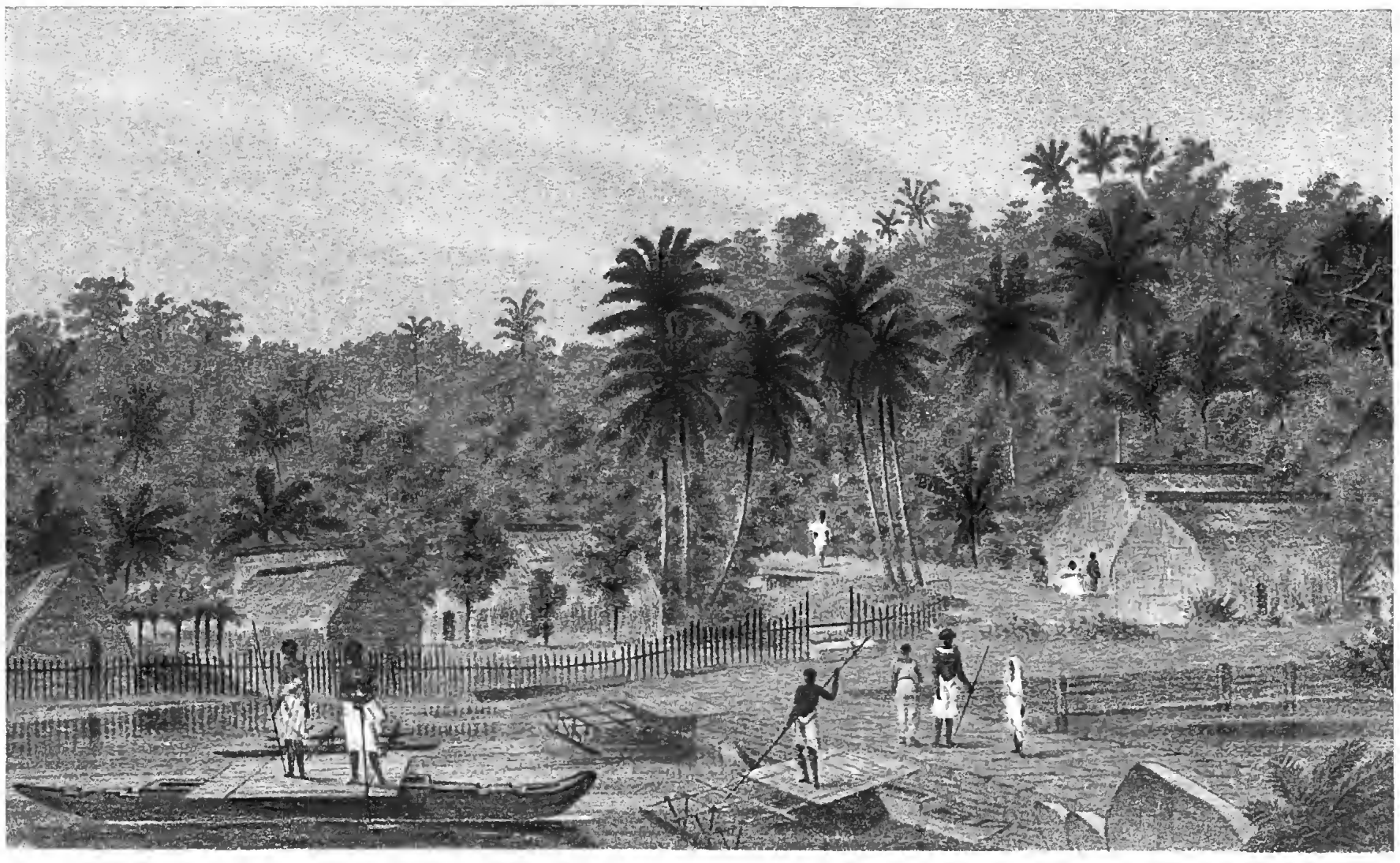
Encouraged by recent experience, we unceremoniously entered the native dwellings, even the chief's house, sometimes rousing the inmates from their afternoon siesta. The ridge of the roof is formed by a huge piece of timber projecting over the gable, and giving by its weight stability to the whole structure. The interior, but dimly seen by the light which gains an entrance at the narrow low door, affords a cool retreat from the fierce rays of the noonday sun. The floor is thickly covered with matting, and the inmates use no other bed. Suspended along the walls, or stowed away among the rafters, are weapons—spears, clubs, &c., the custom from time immemorial amongst primitive races; and the only kitchen utensils visible are large wooden bowls. A slender palisading, probably intended rather to mark the boundary than as a means of defence, surrounds the part of the village where the chief resides, and access is gained by stepping over a stile. The shells of cocoa-nuts are piled in numerous heaps. In such a spot, I posted myself conveniently on a grassy slope, a number of dark faces looking over my shoulder to watch the progress of my sketch. Here, as on other islands in the Pacific, I have been struck with the rapidity with which the natives—whom, unthinkingly, we call savages—identify the object represented by a few hasty outlines. When, too, in the eagerness of curiosity, some young Fijian or Tongan would obstruct my view, he was always peremptorily ordered out of the way by his seniors. How often do we see people considered to be not only civilised, but polite, look at a sketch without the power of distinguishing the top from the bottom, or even interpose their person between the artist and his view!

A fair maiden of Ngaloa, with that charming *bravoure* which is the universal attribute of her sex, stepped upon the platform of a canoe and leisurely traversed the scene of my sketch, as if conscious that a picture of Ngaloa would be very imperfect did it not include the pride of the village. The addition was received with a chorus of approval from the good-humoured crowd around. It was a day of brilliant sunshine; the sea, the hills, the

trees, were bathed in a flood of golden rays, and all nature seemed to breathe forth silent adoration to the great Source of light and life. But the pleasant hours spent at Ngaloa were rapidly drawing to a close, and we were forced to beat a hasty retreat along the narrow smooth paths marked by the footprints of the natives, some of whom piloted us through the woods, lest we should be surprised by the brief twilight of the tropics.

Kandavu has been used of late as a port of call for trans-Pacific steamers. On the 8th the mail steamer "Mikado" arrived from Sydney, on the 10th the "Cyphrenes" from New Zealand, besides which H.M.S. "Dido" and H.M. schooner "Reynard" had come in on the 7th of August, so that the harbour of Ngaloa wore all the appearance of an important commercial and naval station. Yet, excepting a few wooden huts, there were no visible beginnings of the city which in days to come may possibly reflect its stately outlines in the calm waters of this inlet, not inferior in the charm of its scenery to the most famous harbours in the Old and New Worlds. The port, moreover, has the advantage of lying in the direct route between Sydney, Honolulu, and San Francisco, and vessels calling here avoid loss of time, as well as the risks connected with the navigation of the inland or central sea of Fiji.

Sometimes in the morning one heard a low harmonious chant, accompanied at intervals by clapping of hands, and, looking out upon the sunlit bay, discovered that the sounds proceeded from a canoe laden with a crowd of brown women, girls, and boys, rowed by a couple of men. In the background, the broad sails of the native craft were stealing along the richly wooded shores—it was a perfect picture of Polynesian life. A few days before our departure we were invited to a "miki-miki," or native entertainment, given in our honour by the chief of Kandavu. The spot selected was an avenue of palms close to the beach on the western side of the harbour. At the end nearest to the spectators, about a score of natives were seated in a circle. This was the band, and the music consisted of a monotonous but not inharmonious chant, accompanied by the sound of the Fijian drum. There were few, if any, traces of melody, simply a combination of bass, tenor, alto, and treble voices, now swelling to a loud chorus, now dying away upon the night air. The time kept by the singers was faultless, and rather quick, becoming more rapid towards the end of each dance. The number of the performers, who were gathered at the opposite extreme of the avenue, buried in darkness, could not be exactly ascertained, as they seemed to vary with each dance, but it may have amounted to a hundred or more. They had been summoned by the chief from the different villages of Kandavu. Their polished skins reflected the light of the torches, and, besides being fantastically adorned with feathers and every item of a Fijian toilette, they appeared differently armed in each dance; and accordingly we had a fan-dance, a dance with bow and arrow, a club-dance, &c. A sprightly lad, the son of the chief, carrying a fan, acted as master of the ceremonies. The performance mainly consisted of a slow advance towards the spectators, the men moving in double file, sometimes four abreast, gracefully swinging their bodies, now to one side, now to the other. They kept exact time, every movement being executed as by one man. The last dance evidently simulated the skirmish, the charge, the alternate advance



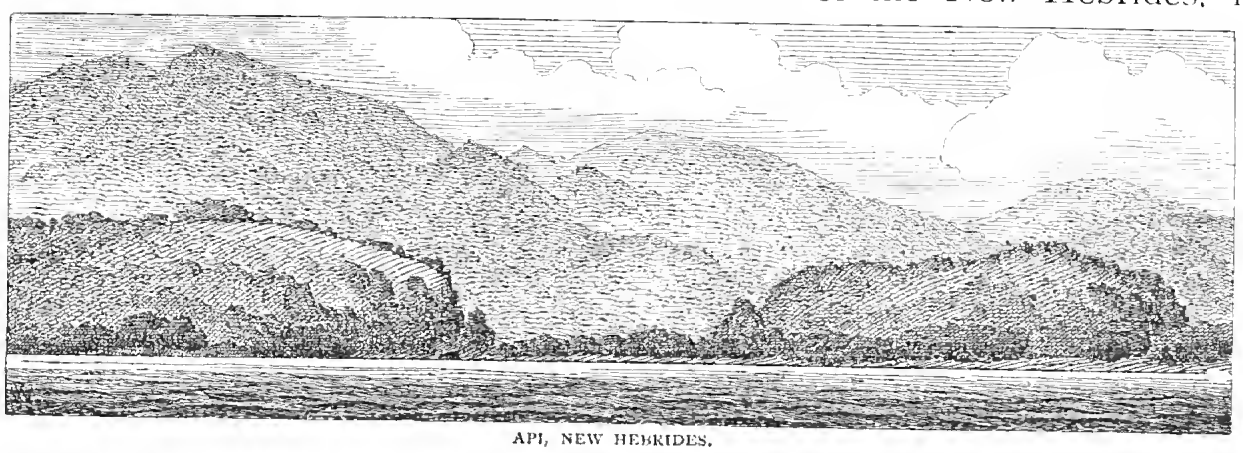
and retreat before an enemy. It would be difficult to exaggerate the picturesque and imposing effect produced by these warriors as they gradually emerged from the darkness of the night into the blaze of the torchlight. Not a sound was heard but the rhythmical hum of the band, the shrill voice of the young "ballet-master," and an occasional war-whoop. A large native crowd was seated on heaps of empty cocoa-nuts, and in front of some wooden huts appeared the white dresses of the chiefs and the blue uniforms of our naval officers. I believe we all left, not only much gratified, but deeply impressed by the novel spectacle, and after wading over coral reefs we reached our boats in safety. The missionaries discountenance these performances, and probably the next generation will grow up ignorant of the manly sports and graceful feats of their fathers. Then too will probably disappear the light elastic stride, the swift, flexible, and tiger-like action of every limb, compared with which the movements of civilised man are like those of an automaton driven by clock-work.

While at anchor in the harbour of Levuka, we noticed a schooner crowded from stem to stern with what appeared to be over-grown monkeys, dressed as if for a show in blue trousers, scarlet jackets, and scarlet caps. They proved to be natives of the New Hebrides about to return home after labouring upon a plantation in Fiji, and the above tasteful outfit, to which were added a number of muskets, shovels, and other triumphs of Birmingham skill, were the result of three years' labour. These make up the mess of pottage for which the South Sea Islander sells his birthright of freedom, and descends to the level of a hired labourer. When, subsequently, we landed at the New Hebrides, a fellow-countryman of theirs, when offered the usual trade-goods in exchange for his bow and arrows, contemptuously refused them, and asked for a sixpence and a glass of brandy. From these evidences of civilisation we concluded that this naked savage must have been employed on a plantation. But few of the iniquities and acts of meanness innumerable perpetrated against native races, by those whom some euphoniously style the "pioneers of civilisation," come to the knowledge of the home reader; but one may guess at the character of the men who carry on and profit by the modern system of slavery called "the importation of free labour," and we can understand why that system should have led to a renewal of the old atrocities. Simple slavery was justified under the plea of religion; the new plan hides itself under the ample cloak of civilisation. Fire-arms and fire-water are the first boons which the white man confers upon his dark-skinned brother. When, after many years, something more like true civilisation steps in, it is generally too late to undo the mischief: the aborigine has either disappeared totally, or has retreated to the inaccessible regions of the interior. It is easy to assert that he is incapable of adopting the ways of civilisation; we ought to know that he has never really come in contact with it. He has, on the contrary, fallen a ready victim to the superior weapons and superior cunning of the white man. Hence we need not be astonished if the first use to which the islander puts his hardly-earned musket be to point it at the crew of the first ship that is wrecked upon the reefs of his native shore. In the present instance, the small schooner, crowded to overflowing from stem to stern, was about to perform a voyage of 700 miles under a tropical sun. Our destination being the same, we proposed to take about a dozen of these natives

on board, with whose help we hoped to establish friendly relations on our arrival at Api. They were soon upon the best of terms with our tars, and formed, in their gay attire, a remarkable group on the deck of the "Challenger;" and with this addition to our floating population we left the harbour of Ngaloa about noon on the 10th of August. Off the western end of Kandavu we stopped to pick up one of our boats which had been on a cruise to Bau or Mbau, the principal stronghold of Viti Levu, built on an island near the delta of the river Rewa.

Our progress over the comparatively shallow sea which divides Fiji from the New Hebrides was but slow. On the 17th we sighted Tongariki, belonging to the latter group. A strong breeze from the east raised a heavy sea, and we hove-to for the night between Makura and Two Hills Islands—two of the group of small islands situated south of Api. Most of these islands form steep conical hills rising abruptly from the sea. On the following day—just one hundred years from the time of the illustrious Cook, who was here in August, 1774—we stopped opposite a part of the coast, apparently the mouth of a river, pointed out to us by the natives on board. The latter, who had been remarkably quiet and well-conducted during their voyage in the "Challenger," were landed in our boats. On a strip of cleared ground between the sea and the woods, one or two dark brown, lean, and naked figures, armed with bows and arrows, could be seen cautiously stealing along the water's edge. The ship had been for some hours visible from the island, and probably a large number of savages lay concealed behind the trees. Gradually a group of these gathered at some distance from the point for which the boats were making, but on recognising their countrymen they approached without hesitation; and whilst the latter were being transferred to shore there occurred a lively scene of barter, the natives exchanging their weapons, chiefly bows, poisoned arrows, and spears, for such goods as tempted their cupidity.

The island of Api, one of the smaller of the New Hebrides, is hilly throughout, and attains an elevation of about 1500 feet. Its name, which signifies smoke or fire, seems to point to the former existence of an active volcano. From the beach to the summit of the highest hills the land appears covered with an impenetrable forest, and from this sea of verdure tall solid masses of foliage rise up like the ivy-covered towers of a castle. It was indeed



API, NEW HEBRIDES.

"The champain head
Of a steep wilderness, whose hairy sides
With thicket overgrown, grotesque and wild,
Access denied; and over-head up-grew
Insuperable highth of loftiest shade."

Scarcely a ray of light can pierce this dense mass of branches and leaves joined together by a network of climbing plants; and the rivers, whose bed must be the only practicable highway, find their way to the sea

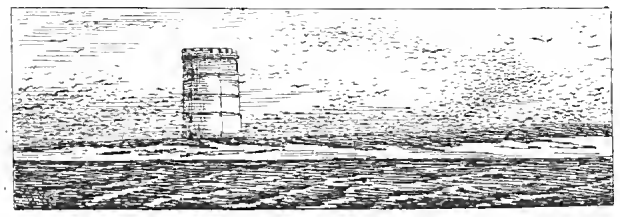
"With mazy error under pendant shades."

The traveller, hitherto unaccustomed to such luxuriant vegetation, is struck with awe in presence of such a display of the immense productive forces of nature, and feels that man is only a part of "one stupendous whole." The tropical forest excludes him from the land which he considers as his especial inheritance, and seems to say, "Here is no place for you!"

On the same day we sighted the southern shores of the larger island of Malikolo, and then commenced our cruise across the sea which stretches from the New Hebrides to Torres Strait. This is a remarkable basin whose depths we were the first to explore, and we therefore proposed to call it the Melanesian Sea. The most interesting result of our soundings was the fact, on this occasion observed by us for the first time, that the temperature of the water, which, as a general rule, is found to decrease gradually from the surface down to the bottom —rapidly near the former, very slowly towards the latter—may, under certain conditions, be arrested at a certain depth, and remain stationary between that depth and the bottom. Thus our observations on the distribution of temperature in the Melanesian Sea showed that its temperature, from an average of 26° C. at the surface, falls to 5° C. at a depth of 400 fathoms, to 2°.5 C. at 900 fathoms, and to 1°.8 C. between 1200 and 1400 fathoms from the surface, and then remains stationary, or almost stationary, down to the bed of the sea at a depth of over 2000 fathoms, forming a bottom-stratum of nearly uniform temperature about one mile in thickness. The explanation naturally suggested by this curious phenomenon is, that the depths of the Melanesian Sea must be cut off from the depths of the Pacific Ocean by a submarine ridge or area of elevation, which prevents the colder bottom-stratum of the latter from communicating with the former. A glance at the chart shows that the Melanesian Sea may be considered, hydrographically speaking, as an almost land-locked basin. Its length from east to west is about 1200 miles, with an average width of about 300 miles. It is bounded on the north by the chain of islands which extend from Papua to the Hebrides, and on the south by a labyrinth of coral reefs which connect the peninsula of Cape York with the island of New Caledonia. The soundings of H.M.S. "Challenger," combined with those of the U.S.S. "Tuscarora," indicate the existence of a narrow channel, from 1500 to 2000 fathoms in depth, between New Caledonia and the New Hebrides, and a similar channel of about the same depth will probably be found extending along the west coast of New Caledonia. These are a north-easterly extension of the channel which separates the Kermadec Islands from New Zealand, and they constitute probably the only deep-sea communication between the Melanesian Sea and that portion of the Pacific where, at a depth of 2900 fathoms, we found a temperature of 0°.5 C. The decrease of temperature in the Melanesian Sea is arrested at a depth varying between 1200 and 1400 fathoms, which is apparently the maximum depth of its communications with the Pacific. The same phenomenon we found subsequently exhibited in a much more striking manner in the nearly land-locked seas of the Indian

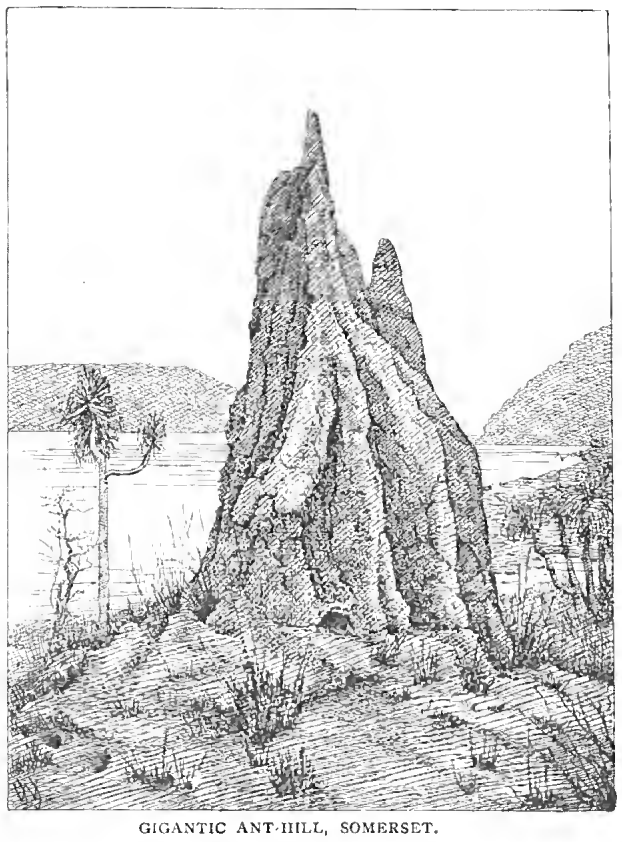
Archipelago, namely, in the Banda Sea, the Sea of Celebes, the Sulu Sea, and the China Sea. But an illustration of the same fact occurs nearer home. The Mediterranean Sea is separated from the Atlantic by a submarine elevation extending, at an average depth of about 100 fathoms, from Cape Spartel in Morocco to Cape Trafalgar in Spain; and the observations made on board H.M.S. "Porcupine," in 1870, show that the temperature of the Mediterranean decreases down to a depth of about 100 fathoms, and then remains stationary, at about 13° C., between that depth and the bottom—the colder depths of the Atlantic being cut off from the basin of the Mediterranean by the above-mentioned ridge.

At the end of a twelve days' cruise over the blue waters of the Melanesian Sea, only at rare intervals ploughed by the keel of merchant-vessel or man-of-war, we sighted, a mere



speck upon the level horizon, the beacon of Raine Island, rising from the edge of that Great Barrier Reef which, over a length of 900 miles, skirts the east coast of Australia from Cape Townshend to Cape York. On a point of this reef, about 500 miles to the southward of Raine Island, Captain Cook nearly lost his ship, the "Endeavour," on the 10th of June, 1770. Cape Tribulation and the Endeavour River, so named by Cook, mark the scene of this disaster.

The weather not favouring the difficult task of navigation which lay before us, we remained until next day in the vicinity of Raine Island. On closer inspection we found this little spot—barely a quarter of a mile long and rising but a few feet above the waves—in possession of sea-birds. Their nests literally covered the ground, and "the winged air" was "darked with plumes." On the following day, the 1st of September, favoured by sunshine and a good breeze, we made rapid progress along the Australian shore, which here has a barren and inhospitable aspect, and about sunset H.M.S. "Challenger" was safely anchored in the strait between Albany Island and the settlement of Somerset, near Cape York.

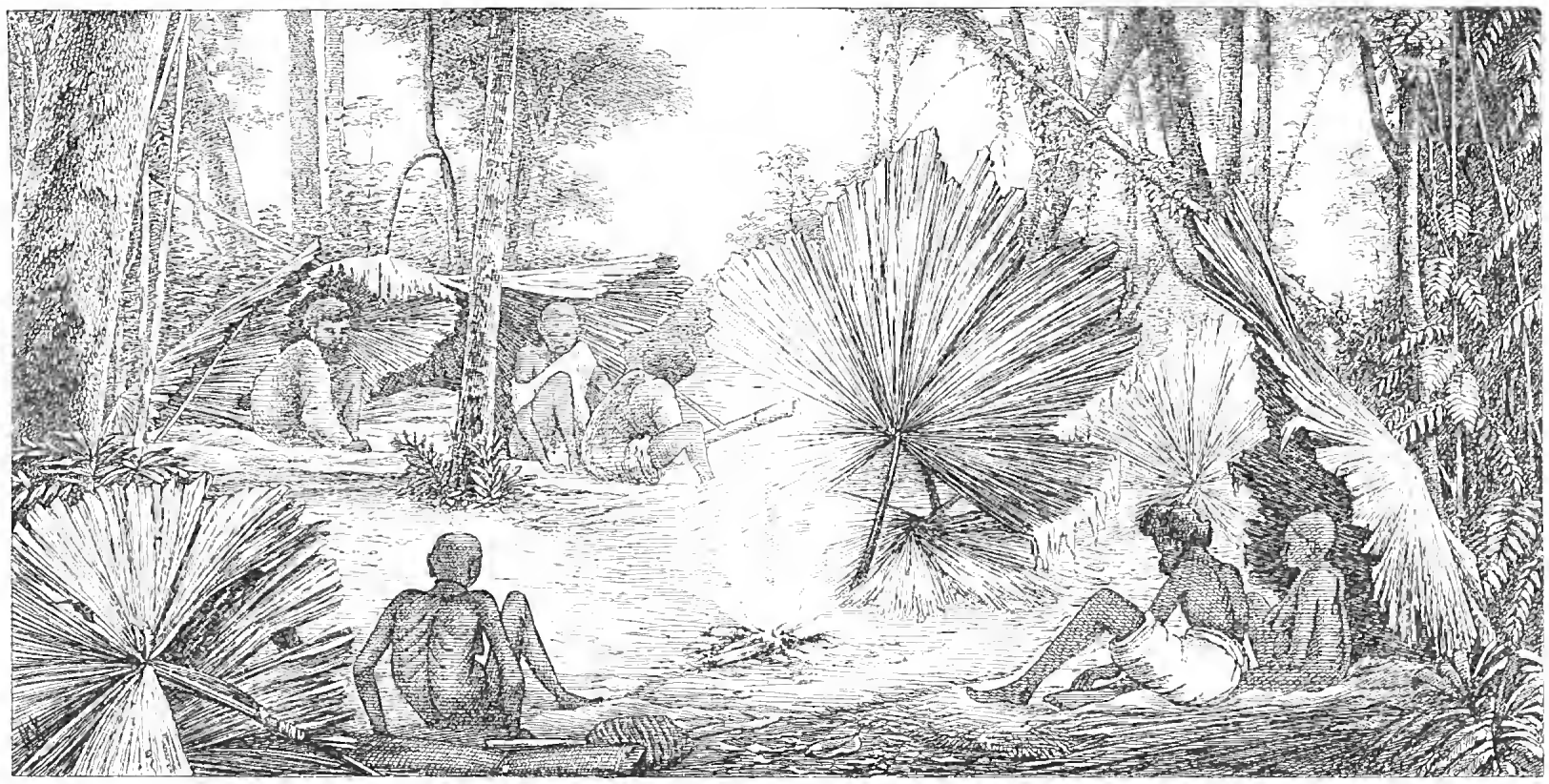


GIGANTIC ANT-HILL, SOMERSET.

The first objects that attracted our attention in passing up the strait were a number of brick-coloured, irregularly-shaped, conical pinnacles, which studded the slopes on our left. These were ant-hills, the largest rising to a height of twelve feet from the ground. We were soon to learn by painful experience that Australian Somerset is the favourite abode of this pattern of patient industry, and, as a trifling matter often usurps a larger share of attention than it deserves, the peninsula of Cape York will always be associated in our memories with the ants which covered our garments after the first few steps in the bush, and whose sting seemed doubly acute beneath the rays of a blazing sun. The ground for a considerable distance round these hills is strewn with large leaves and their

fragments, apparently transported hither by the ants; while the trees, stripped of every vestige of foliage, sufficiently attest the presence of these voracious insects. Compared with the size of the builders, the height of these ant-hills exceeds that of the great pyramid of Egypt. A number of subterranean passages and gateways give access to the structure, which, moreover, is perforated in every part by small holes. The walls, as hard as stone, seem to have attained their present proportions by a process of successive plastering.

The settlement of Somerset was planned with the intention of forming a naval station



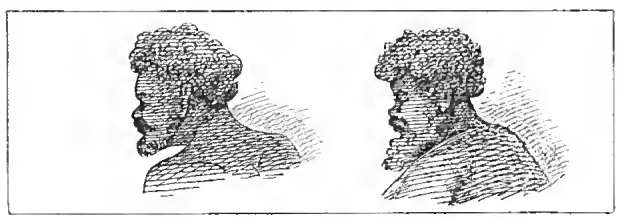
CAMP OF AUSTRALIAN NATIVES, NEAR SOMERSET.

in Torres Strait. At present this is only represented by a few wooden huts and barracks; but there can be little doubt that its central position between India and China on the one side, and Fiji, New Zealand, and the Australian colonies on the other, will in the near future draw renewed attention to the promontory of Cape York, which, indeed, has of late acquired additional importance as a convenient basis of operation for the exploration of the continent of Papua, situate on the opposite side of the strait.

NATIVE WOMAN, NORTH AUSTRALIA.

In the woods behind Somerset we discovered a camp of native Australians. The latter bear the unenviable reputation of occupying the lowest step on the ladder of civilisation. Indeed, the aspect of the camp and of its inmates was melancholy in the extreme. The shelter of a palm-leaf their only dwelling; a few rags their whole wardrobe; the bare ground or a mat their only bed. No trace of drinking or cooking vessels could be found. One man seemed to be playing on a musical instrument; but it proved to be the Australian equivalent for a tobacco pipe. A little old woman was seen literally crawling on all fours. We would hardly be justified in considering these poor creatures as typical of the tribes who inhabit

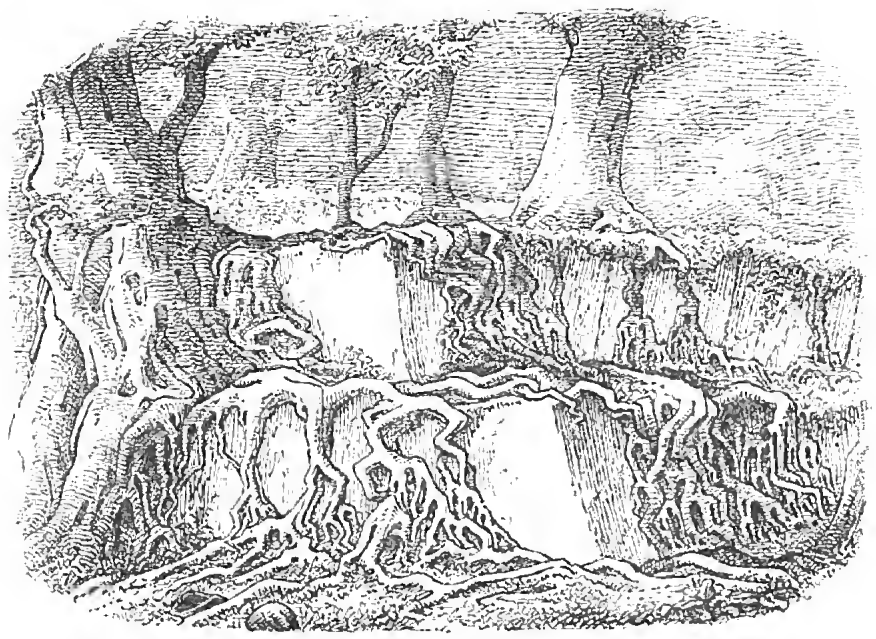
Northern Australia. They were probably a few individuals frowned on alike by Nature and by Fortune, perhaps outcasts from their tribe, who had set up their camp near Somerset in the hope of picking up some crumbs from the white man's table. Nor do such represent a primitive, but rather a degraded condition of mankind—the outcome of a life of semi-starvation, and of complete isolation from better endowed races, which has lasted for ages.



NATIVES, CAPE YORK.

There are reports of the existence, in the interior, of tribes in the possession of superior attributes, both physical and mental, and of whom we may learn more hereafter, should they escape the rifles of their white enemies. Some of the men and women who formed the native portion of the scanty population of Somerset were not unfavourable specimens of the Australian race.

Port Albany looked lonely and deserted, for only now and then a vessel attempts the difficult navigation of Torres Strait. A small schooner, painted white, belonging to the London Missionary Society, was anchored not far from the "Challenger," and on the 4th of September the silent bay was enlivened by the arrival of a Colonial steamer, the "Gothenburg," bound for Sydney. On the 8th of September, H.M.S. "Challenger" started on her next cruise through the labyrinth of seas which separate Australia from the old Empire of China.



TOMB OF TUI TONGA, TONGATABU.

Chapter VI.—From Torres Strait to Hong-kong.

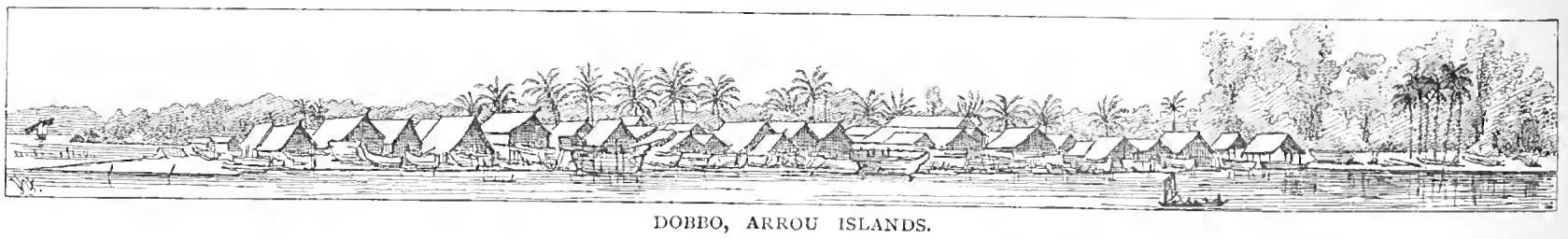
THE contrast which, from an historical point of view, may be established between the regions situated east and west of Torres Strait is one of the most remarkable to be found on the surface of our globe. While the inhabitants of the numerous island-groups scattered over the wide expanse of the Pacific Ocean have only recently, we might almost say in our days, been brought into contact with the more advanced branches of the human family, the populations of the Indian Archipelago have been for ages under the influence of a civilisation which dates at least as far back as the earliest written records. Many centuries before the first European ship rounded the Cape of Good Hope, the Arab, the Persian, the Hindu, the Malay, and the Chinese had shared between them this the fairest and most favoured region of the earth. At a later period the great seafaring nations of the West came, each in its turn, to claim a portion of the riches which Nature and the industry of man had accumulated in these latitudes of never-ending summer. At the present day the Portuguese, who were first in the field, possess only a few remnants of their former conquests. The Spaniards still own the Philippines, but incessant civil broils have deprived them of any opportunity of developing the immense resources of these beautiful islands. The French, defeated by their ancient rivals the English in their gallant struggle for the possession of Hindostan, are laying the foundations of a new dominion in the delta of the Cambodia River. More to be envied than all the rest, the Dutch reign supreme from the Strait of Malacca to the shores of Papua, and their unostentatious rule almost makes the world forget that this nation, whose enterprise reclaimed Holland from the mud-banks of the Rhine, owns an empire which extends from east to west a distance of over 2000 miles, and embraces, besides the famous spice-islands, the greater part of Borneo and Sumatra.

It was therefore with more than ordinary interest that we commenced our cruise through the seas westward of Torres Strait. Noon of the 8th September found H.M.S. "Challenger" off Cape York, whence her course was altered for the Prince of Wales Channel.

We anchored for the night between Hammond Island and Wednesday Island, two of the barren and deserted-looking islets which form the south side of the channel. On the following day we cleared the reefs of Torres Strait, and stopped to dredge in six fathoms close to Booby Island, which marks the approach to the strait from the west. It is a bare grey and white rock, with here and there dark-green patches of vegetation. The soundings obtained in the course of the next four days—during which we had put more than 400 miles between us and Torres Strait—never exceeded fifty fathoms, thus showing that Australia and Papua are separated only by a very shallow sea, not much deeper than the channel which divides England from France, and that they may have formed at one time a single continent. This conclusion is further confirmed by the resemblance which naturalists have been able to establish between the fauna and flora of the two islands. During this cruise in what is known as the Arafura Sea, we noticed numerous yellow patches due to minute organisms, as well as the generally abnormal colour of the water, which from a light greenish blue gradually deepened into a very dark green as we approached the Arrou Islands. At night the sea appeared phosphorescent, and the easterly sky was rent by incessant flashes of lightning.

THE ARROU ISLANDS.

In the morning of the 14th September a few scattered trees showed above the horizon; they belonged to the small island of Ngor, the southernmost of the Arrou group. For the rest of that day, and during the whole of the next, we sailed within sight of the western shores of these little-known islands. Nothing was visible from the deck but a long level shore covered with dense forest, some of the trees rising to a great height. The whole Arrou group—about 100 miles long from north to south, and thirty miles wide—seems to consist of islands of low elevation, barely raised, indeed, above the level of the sea, and separated from each other by narrow channels. There are many coral reefs, especially on the eastern side, and a shallow sea divides these islands from the neighbouring shore of Papua. We hove-to for the night, and at sunrise started for Dobbo, a trading settlement situated at the north-



DOBBO, ARROU ISLANDS.

western end of Wokan. As we were about to enter the channel between the latter island and Wamma, we noticed two prahus or Malay vessels on the horizon. These singular craft, with their overhanging poop, low bow, and sails of irregular shape, reminding one of the wings of some monstrous sea-fowl, are extraordinary objects when compared with the smart rig of our home-built ships; yet such vessels probably navigated these seas long before a sail dared to cross the Mediterranean or the German Ocean.

Dobbo is built on a sandy spit which projects into the channel at its narrowest point,

and looks like a collection of old barns, with a carved ornament surmounting the gable-end of each. The town or village owes its existence to the necessity of providing accommodation for the Chinese and Malay traders who land at a certain time of year in search of pearl shells, the gorgeous plumage of the bird of paradise, edible birds' nests, and trepang. At the same time, shipbuilding is carried on to a large extent; the beach was covered with the hulls of prahus in various stages of preparation, and the sound of the hammer and axe was heard from morn till eve. Dobbo consists of a long and narrow main street, with a second street behind running parallel with the principal thoroughfare. The houses are built upon piles, a slender framework of bamboo doing duty for walls, partitions, and floors, the whole being covered with a steep roof thatched with palm leaves. The rooms occupied by the inmates are all on the first floor, reached by a ladder from the outside. The space below is used as a store-room, or, if not made a receptacle for all sorts of refuse, is handed over to poultry and pigs.

Here and elsewhere in the Indian Archipelago, but especially at the Ki Islands and in the Philippines, it struck me that the style of building affected by the natives must have originated in lake-dwellings, which are even now frequently met with in the far East. The houses are simply such abodes transferred, as it were, on shore, with their foundation of piles, their platform and ladder. Since the interesting discovery of the remains of ancient villages in the lakes of Europe, surprise has been frequently expressed that man should have preferred to build his home upon the water rather than on land. Apart from the obvious advantages which a lake-dwelling offers as regards protection against wild animals, dangerous reptiles, and human foes, and also for purposes of cleanliness, it should not be overlooked that the land in its primitive condition—that is to say, in most cases covered with forest, and, for want of drainage, reduced to a swamp—is by no means a desirable place to build a house upon. Affording little or no protection against attack, unhealthy, and presenting serious obstacles to communication, land must have appeared to the primitive dwellers on earth very inferior to water, whether river or lake, or to the sea-shore, considering the facilities which these afforded as a means of communication, of protection, and, not least, as offering an almost inexhaustible store of food ever within reach, and requiring little cooking. Besides, the clearing and drainage of land, the construction of roads and bridges, the use of vehicles and beasts of draught, are processes only possible in an advanced stage of civilisation, and imply, amongst other necessaries, the possession of powerful tools and the knowledge of working metals, which the primitive races of mankind have lacked for thousands of years, and do not possess even at the present day. The raft, the hollow trunk of a tree, probably preceded any other mode of conveyance by many centuries, and water must have been from the beginning, as it is still, the great highway of communication between man and man, civilisation having spread, as far back as we can follow its traces, from island to island, along the course of great rivers and lakes, round the shores of the smaller seas, until at last it embraced the confines of the ocean itself. The assertion that man owes his advance in the social scale more to the facilities of locomotion presented by water than to

those he finds on land may seem strange, but it can hardly be doubted in the face of numerous historical facts. Nor should it cause surprise if, in the domestic architecture of some nations, certain arrangements and details of structure, the origin of which it would be difficult to explain otherwise, can be traced to the lake-dwellings of remote ancestors. It is a remarkable coincidence that the style of the old farm-houses still to be seen on the banks of the Swiss lakes—where, as is well known, the remains of numerous lake-villages have been discovered—agrees in its leading features with the native dwellings in the Philippines, the Ki Islands, Dobbo, and other places in the Indian Archipelago: the ground floor used as a store or a stable; the dwelling-rooms on the first floor reached by an outer stair; the galleries or balconies outside the windows—a vestige of the platform of the ancient village built above the water.

Besides Malays and Chinese, we noticed at Dobbo a number of dark-skinned, woolly-haired, and scantily-clad figures, apparently natives of the Arrou Islands, and of the same race as the neighbouring Papuans. One of their villages, on Kobroor Island, was visited by an exploring party from the "Challenger." It consists of large huts of bamboo, each of which shelters several families, sometimes as many as fifty persons living under the same roof.

NATIVES OF ARROU ISLANDS.

Shortly after our arrival off Dobbo, two boats were seen coming towards us carrying the Dutch flag at bow and stern, and propelled by brown-skinned men, who rowed with short paddles to the sound of the gong and drum. The boats contained a deputation, consisting of Malay officials dressed in gold and silver embroidered uniforms, and carrying silver-topped canes marked with the Dutch royal arms; also a few missionaries or Protestant school teachers, arrayed in black dress-coat, trousers, and tall black hat—the latter of a very ancient pattern, and almost red with age. At the termination of their visit we were much amused to see them

> "putting off
> These troublesome disguises which we wear,"

so soon as they had descended into their boats; nor was this to be wondered at, considering that the temperature was at about 90° F. The tall hat—precious symbol of European civilisation—was carefully passed from hand to hand till it was safely deposited in the stern, and the gorgeous uniforms and respectable suits of black were exchanged for the more comfortable loose garments and the broad-brimmed pointed hat of the far East.

Among the Malay merchants then residing at Dobbo was one with whom we succeeded in establishing very friendly relations, although we were unable to converse with him in his native tongue. He seemed to take a great interest in the "Challenger" and its belongings, and his genial and intelligent face betokened one of those men who in every clime are sure to rise above the ordinary level. In Germany, he would be the popular landlord of the village inn, and the great authority on farming and politics; in France, the

kindly parish priest and welcome visitor at every cottage door; in England, a well-to-do farmer, a good judge of horseflesh, never absent from the hunting-field, and whom the squire or even his lordship would think it no condescension to notice with a friendly nod. Here he is the enterprising merchant, whose prahu has ploughed the eastern seas for many a year, and who has come to the remote Arrou Islands in search of the pearl and the silken plumage of the bird of paradise.


OUR HOST AT DOBBO.

One day, having ascended, not without trepidation, the frail ladder which connected the street with the reception-room of our host, we found that he had made festive preparations in our honour. Among the unexpected delicacies offered to us were a box of Huntley & Palmer's biscuits and butter, with which our friend the Malay merchant probably intended to give us a surprise. Save an uneasy fear lest the slender floor on which we were assembled should give way and land the whole party on the ground, which could be seen through the openings between the slips of bamboo, nothing interfered with the enjoyment of our visit.

Dobbo is already known to the European reader from the description given by Wallace, the distinguished naturalist, who resided here for some time. No doubt he still retains a vivid recollection of its busy main street beneath the carved gable-ends and the waving palm branches, of its friendly inhabitants, and of the magnificent forest which presses so closely upon the settlement. Before leaving the Arrou Islands we secured specimens of the *burong rajah* or king-bird, and of the famous bird of paradise, both unsurpassed for beauty of plumage. The insect fauna of the place includes butterflies of extraordinary dimensions. One of these, measuring about eight inches across the wings, I mistook for a bird as it sailed past me through the hot summer air.

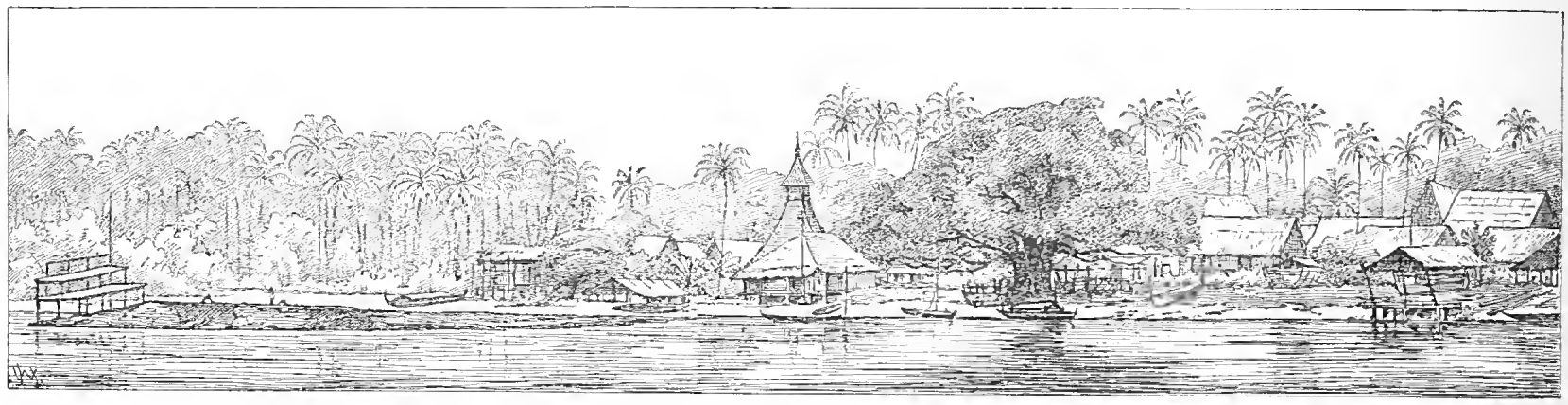
THE KI ISLANDS.

H.M.S. "Challenger" left Dobbo in the morning of the 23rd September. While sounding across the strait which divides the Arrou Islands from the Ki Islands, we were surprised to find a depth of 800 fathoms at a distance of only seven nautical miles from Dobbo. On the following day a sounding of 580 fathoms was obtained at the other side of the strait, and in view of Great Ki Island. These were the first depths exceeding fifty fathoms that we had ascertained since our departure from Torres Strait, and, taken in combination with other soundings, they indicate the existence of a deep channel between the Papua-Australian plateau and the plateau of the Indian Archipelago, thus forming a deep-sea communication between the Pacific and the Indian Ocean. This channel commences under the name of the Molucca Passage, continues eastward between the islands of Ceram and Mysole, divides the Ki Islands from the Arrou Islands, and, passing to eastward of Timor Laut, enters the Indian Ocean at the southern end of the island of Timor.

About noon on the 24th we rounded the northern extremity of the island of Great Ki, which is about forty nautical miles in length, and very mountainous. Its

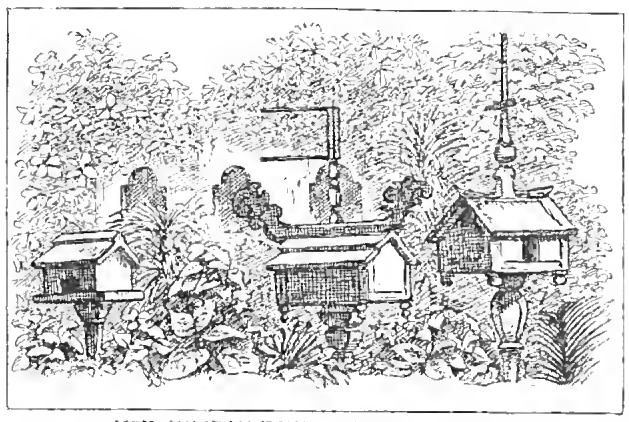
inhabitants are noted ship-builders; the fine timber growing on the island offering unusual facilities for the exercise of their craft. Several boats, gaily decorated with large triangular flags and crowded with natives, came alongside in the course of the morning. They presented the mixture, usual in these seas, of the two races, Malay and Papuan; the former evidently the superior race who invaded and conquered these islands, the latter the original possessors. In the evening we anchored off Little Ki, and the deck of the "Challenger" was soon crowded with visitors from the shore, who arrived with drums beating and flags flying. They performed various dances, and in return we gratified them by burning blue lights. On the following morning we shifted our anchorage to Ki Doulan Harbour.

The village of Ki Doulan presents, like Dobbo, an assemblage of grey and brown coloured steep-roofed houses, all supported on piles, but rather more solidly built than those we had



KI DOULAN.

seen at the Arrou Islands. A conspicuous object is the tall pyramidal roof of the mosque; but the chief ornament of the place is one of those gigantic banian trees, specimens of which we had admired at Tonga and Kandavu. The inhabitants being Mahommedans, no members of the fair sex were visible. Occasionally a female head would appear, but only for a moment, at a narrow opening not more than a foot square, which seems to be the only window through which the women are allowed to look upon the outer world. The tall woods at the back of Ki Doulan are alive with pigeons, green parrots, scarlet lories, and other tropical birds. With the exception of one or two low conical hills, the island seems to be quite flat, and appears to have been originally a coral reef. The Dutch flag was hoisted at the landing-stage, and shortly after we had anchored, a deputation from the village, dressed in official costume, paid us the customary formal visit.



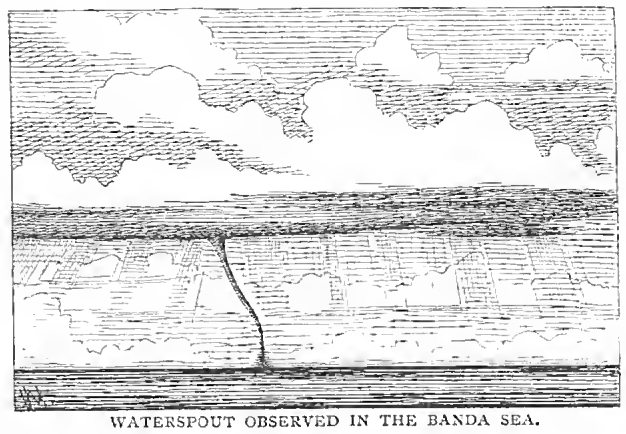
MOHAMMEDAN TOMBS AT KI DOULAN.

In the cemetery some of the graves bore a carved wooden post supporting what looked like a small dovecot or model of a house, in some cases adorned with elaborate carvings and terminating in a vane. Perhaps this little house or shrine is used as a receptacle for pious offerings to the departed, or it may be that the spirit of the latter is supposed occasionally to inhabit it. The whole village as seen from the deck of the "Challenger," with its houses, trees, and boats reflected in the smooth water of the harbour, was a fair example of life in the tropics

—one of those remote and quiet places which are becoming every day more rare, where man contrives to live, and to live happily, without railways, telegraphs, and daily newspapers.

We left Ki Doulan on the morning of the 26th September, and our track for the next two days lay amongst that chain of little-known and rarely-visited islands which connect Ceram with Timor Laut, and form the eastern boundary of the Sea of Banda. Such are the Tionfolokker and Nusa Tello Islands. Some of these are hilly, without, however, attaining any great height; some barely rise above the level of the sea; but all are covered with a dense vegetation. About sunset on the 27th we passed the southern end of Kanalur Island, near enough to observe lights or fires on its western shore. These islands, I believe, have never been explored by the naturalist. They could easily be reached from Banda or Amboyna with the assistance of the Dutch authorities—always liberally disposed towards the scientific traveller.

At daylight on the 28th we sighted Bird Island, the actual position of which we found to be about twenty miles further east than laid down in the charts. The day's sounding indicated a depth of 2800 fathoms, and the temperature of the water was ascertained to remain stationary at 37°.5 F., or 3° C., from 900 fathoms down to the bottom. This seems to prove that the Sea of Banda forms a separate hollow or basin of great depth, cut off by submarine elevations from the colder bottom-strata of the Indian Ocean in the south and of the Pacific Ocean in the north. Shortly after 2 p.m. we observed, for the first time during the voyage, the phenomenon of a waterspout. The day was very fine; there was an almost perfect calm, a few showers passing in the distance. Neither the barometer, which stood at 30.0 in., nor the thermometer, which indicated a temperature of 29° C. of both air and surface-water, gave any warning of the existence of an atmospheric disturbance. The waterspout was visible at a distance of several miles to the northward, and, as all the representations I had hitherto seen of similar phenomena seemed to have been drawn from memory and very much exaggerated, I took advantage of this opportunity to make, with the help of the telescope, an exact sketch of what we saw. From the horizontal base of a large *cumulus* cloud, a column or massive thread was seen to detach itself, and remain suspended over the surface of the sea, sometimes hanging down nearly straight, but generally assuming the undulating form of the letter S. Being in the shadow of the cloud from which it issued, the column was of the same dark neutral tint as the base of the cloud, and it stood out with a well-defined outline from the sunlit horizon behind it. After emerging from the cloud in the shape of an inverted cone, or like the open end of a trumpet, its diameter gradually decreased, and for a short time its lower extremity seemed to connect itself with a cone of water or spray which rose from the surface of the sea to meet it. The phenomenon lasted about a quarter of an hour, and ended by a gradual retreat of the lower extremity towards the cloud, until the whole column was once more



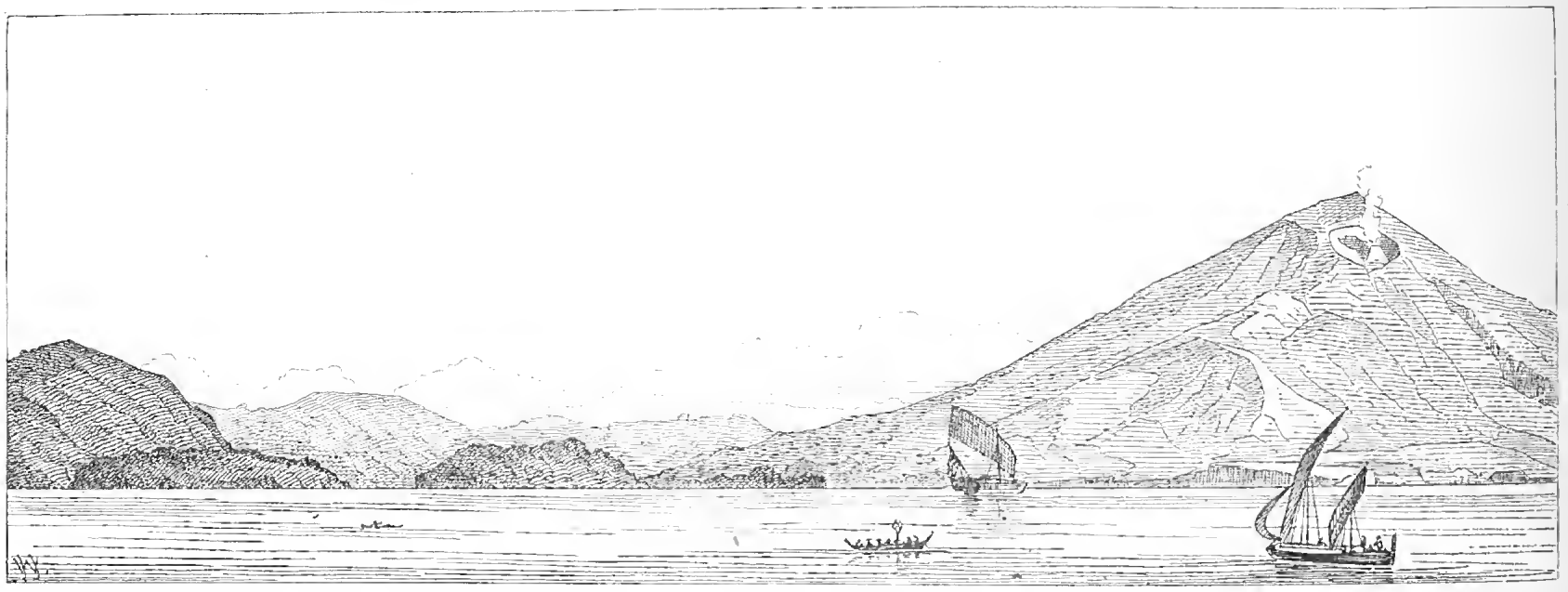
WATERSPOUT OBSERVED IN THE BANDA SEA.

absorbed. There were appearances of the previous formation of other waterspouts from the same cloud, which had commenced to disappear before our attention was attracted to this part of the horizon. The portion of the sea rising towards the waterspout had not the solid, sharply-defined outline of the latter, but looked more like a conical mass of waves or spray.

Bird Island, which lay to the southward of our track, rises from the sea in the shape of a steep hill, and, judging from this day's sounding, it must be the summit of a high mountain, probably of volcanic origin. On gaining a view of the western side of the island, a tall column of white smoke or steam was seen to rise from the southern slope, but, as there was no appearance of a crater, it remained doubtful whether this betokened the presence of an active volcano, or simply indicated a bush fire. However, we were soon to be gratified by the sight of a volcano whose fires are not yet extinct, for at daybreak on the 29th the low group of the Banda Islands, with its "smoking mountain," rose above the horizon.

THE BANDA ISLANDS.

The six islands which compose the group, and of which Groot Banda is the largest, are ranged in oval shape, the widest opening being towards the north, and seem to be the remnants of an ancient volcano whose crater now forms the harbour of Banda, the present volcano rising to a height of about 1500 feet from the rim of the earlier crater. Gounong



THE BANDA ISLANDS AND THE VOLCANO "GOUNONG API."

Api is an almost perfect cone, wooded on its eastern slope, but quite bare towards the west. Its ascent and descent were accomplished by some of the officers from the "Challenger" in the short space of three hours. The summit showed traces of several craters which had opened at different times to pour a torrent of lava into the sea. On the north side, some distance below the summit, we observed a large hole scooped, as it were, out of the slope of the mountain, and from the centre of this depression rose a conical peak emitting smoke or steam.

Stad Neira, off which we anchored in the afternoon of the 29th, lies half hidden among trees on the western side of Banda Harbour. It is protected by two large forts,

one of which, "Fort Belgica," crowns the hill at the back of the town, and with its round towers at the four corners looks like an old baronial castle; the other, "Fort Nassau," is placed at the foot of the hill, and represents a more modern system of fortification. The streets of Stad Neira are admirably kept. Planted with trees and lined with carefully trimmed grass-plots of the freshest green, they are more like the avenues of a private domain than public roads. The whole town has that appearance of neatness, cleanliness, order, and comfort which pre-eminently distinguishes Dutch settlements, and gives the visitor the impression that the Dutch, perhaps more than any other nation, understand the art of rendering life enjoyable. The dwellings are entered through spacious verandahs, and are sheltered from the tropical sun by very high roofs. The inhabitants retire to rest during the hot hours of the afternoon, but at sunset they turn out for a walk on the terrace along the shore, neither sex wearing any head-gear whatever—a fashion we felt strongly tempted to imitate. After several months' sojourn amongst the dark-skinned, black-haired Polynesians, it was quite refreshing to see once more the light complexions and flaxen locks of the children of a northern race.

The rule of the Governor—or Resident, as he is styled—of the Banda Islands extends as far as the Ki and Arrou Islands and the south coast of Papua. Besides the Dutch officials, the population consists of Malays and Chinese, who live in separate campongs or quarters. The colony is used as a penal settlement for the Dutch Indies, and all day long gangs of men and women may be seen sweeping the walks, cleaning the ditches, and executing other similar tasks, in charge of a man armed with a bamboo, which he occasionally applies to the shoulders of lazy or obstinate convicts. The principal branch of industry in these islands is the cultivation of the nutmeg tree. The latter is not unlike a peach tree, with somewhat larger leaves, and grows to a height of from fifteen to twenty-five feet. Most of the plantations are situated upon the slopes of the Groot Banda, and after a shower of rain the air is filled with a delicious perfume.

Earthquakes are said to be of frequent occurrence, though nothing of the sort occurred during our stay, nor did Gounong Api—whose latest display dates from the year 1820—show any signs of activity. In spite of the fierce sun, a game of cricket was played at the foot of the "smoking mountain," while our amateur sailors' band performed for the amusement of the natives.

On the day following our arrival, the steam-pinnace was sent off in search of a small Dutch steamer reported to be in distress, and without water and provisions, between this port and Ceram. The searchers fell in with a small boat containing the captain and a few of his men—all in a very exhausted condition—who had left their ship in order to get assistance in Banda. Early on the following day, the 1st October, the "Challenger" went out in search of the steamer itself, but after a careful search north, east, and west of Banda, no trace of the vessel could be discovered, and we concluded that, favoured perhaps by a southerly breeze, it had been able to make the coast of Ceram, distant about fifty miles from this port. During this cruise we had a fine view of the little compact group of the Banda Islands.

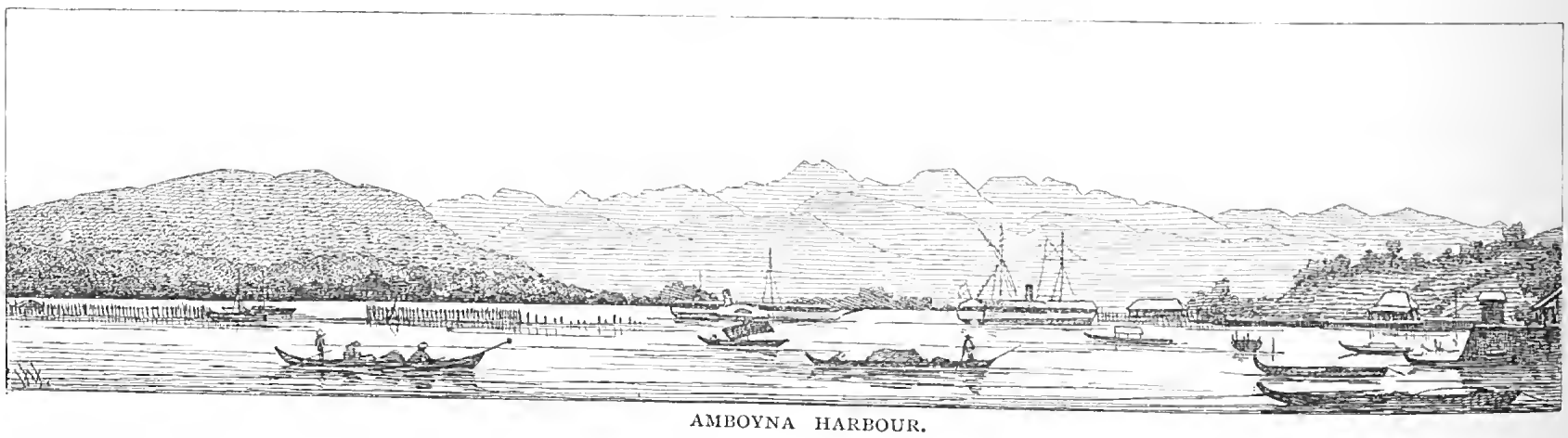
In the evening of the 3rd we steamed out of Banda Harbour, leaving behind us another charming spot, which few, probably none, of us will ever see again. With sunrise next day we stopped to dredge in the immediate vicinity of a sounding of 4000 fathoms, as marked in our charts. Accordingly, 4400 fathoms of dredge-rope were paid out, but the actual depth was found to be only 1420 fathoms, which shows how little trust can be put in the older soundings—obtained by lowering a heavy shot or some other weight, and judging of the depth by the length of line run out. By the method in use on board H.M.S. "Challenger," not only did the sample of the bottom usually brought up in the tube of the sounding-machine afford certain proof that the bottom had been reached, but the running out of the line was timed with the help of a watch, and the rather sudden slackening of the speed with which the line ran out indicated the moment when the weights had ceased to act. At great depths the weight of the line alone suffices to make it run out almost indefinitely, or, if the sounding-lead be not heavy enough, the line may be carried away by an under-current, and thus we can explain the enormous depths reported from time to time before improved sounding-apparatus came to be used. So far, no depth has been ascertained greater or even equal to the height of the highest mountain. And thus does science rob the traveller's narrative of many cherished fancies and mysteries which delighted—and yet awed—our forefathers. No future poet can sing, as did one a century since—

"Old ocean, hail! beneath whose azure zone
The secret deep lies unexplored, unknown."

This day was marked by heavy showers of rain, accompanied by thunder and lightning. At noon on the following day H.M.S. "Challenger" was in sight of Noessaniva Point, at the entrance of the Bay of Amboyna.

AMBOYNA.

Extending for about twenty miles in a north-easterly direction, several miles wide, and sheltered on both sides by forest-covered hills, the Bay of Amboyna forms one of the finest harbours in the world. Behind it rises the lofty mountain-range of Ceram. Early in



AMBOYNA HARBOUR.

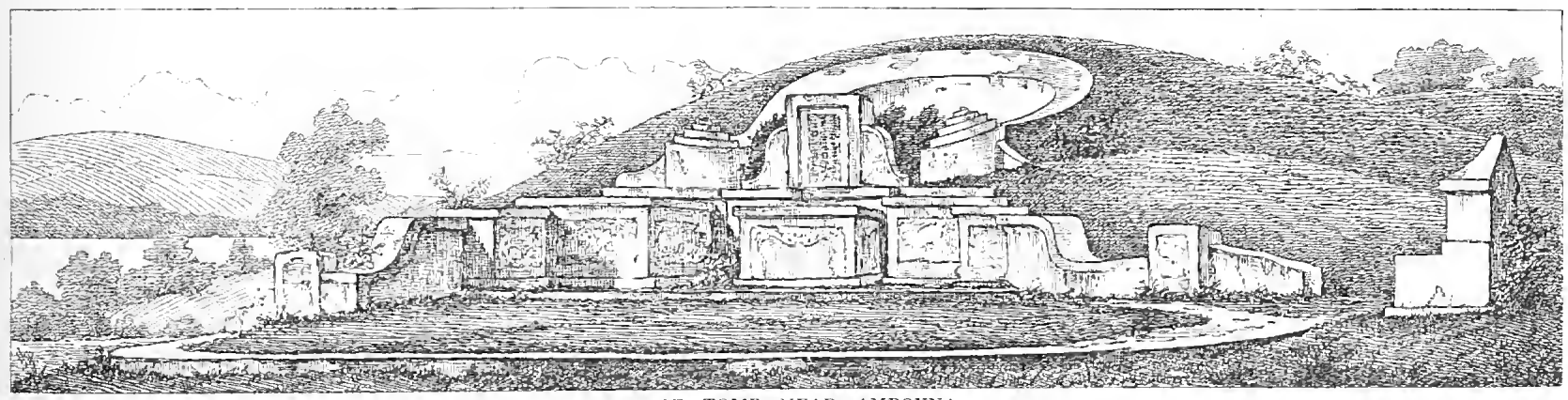
the afternoon we were moored close to Fort Victoria. The town of Amboyna is not very extensive, and lacks the shady terrace of Stad Neira. The enterprising and generally prosperous Chinaman is a conspicuous figure among its inhabitants. A portion of the 5th

was devoted to an exchange of civilities between H.M.S. "Challenger" and the authorities. We saluted the Dutch flag with the rapid fire of twenty-one guns—our tars taking a pride in handling the few guns at our disposal—and the fort returned the salute in the slow, comfortable fashion of our Dutch cousins, while the strains of their national air came floating on the breeze. All that invested the name of Amboyna with memories of hatred and vengeance is at length happily forgotten, nevermore to be

> "Picked from the worm-holes of long-vanished days,
> Nor from the dust of old oblivion raked."

Early on the 6th we dropped a few miles further down the harbour to take in coal. Partly to avoid the dust and noise connected with this operation, partly to enjoy the rare luxury of feeling solid ground beneath our feet, we pitched a tent in a pleasant shady spot overlooking the coaling-sheds. Here we pursued our various tasks of writing, drawing, chart-making, posting-up of books, &c., while inhaling the balmy air of Amboyna, considered to be the healthiest colony in the Dutch Indies. All around us were spread green meadows in which cattle were placidly grazing, and the whole scene, with its background of wooded hills, was more suggestive of a valley in the Swiss Alps than of a spot within six degrees of the Equator.

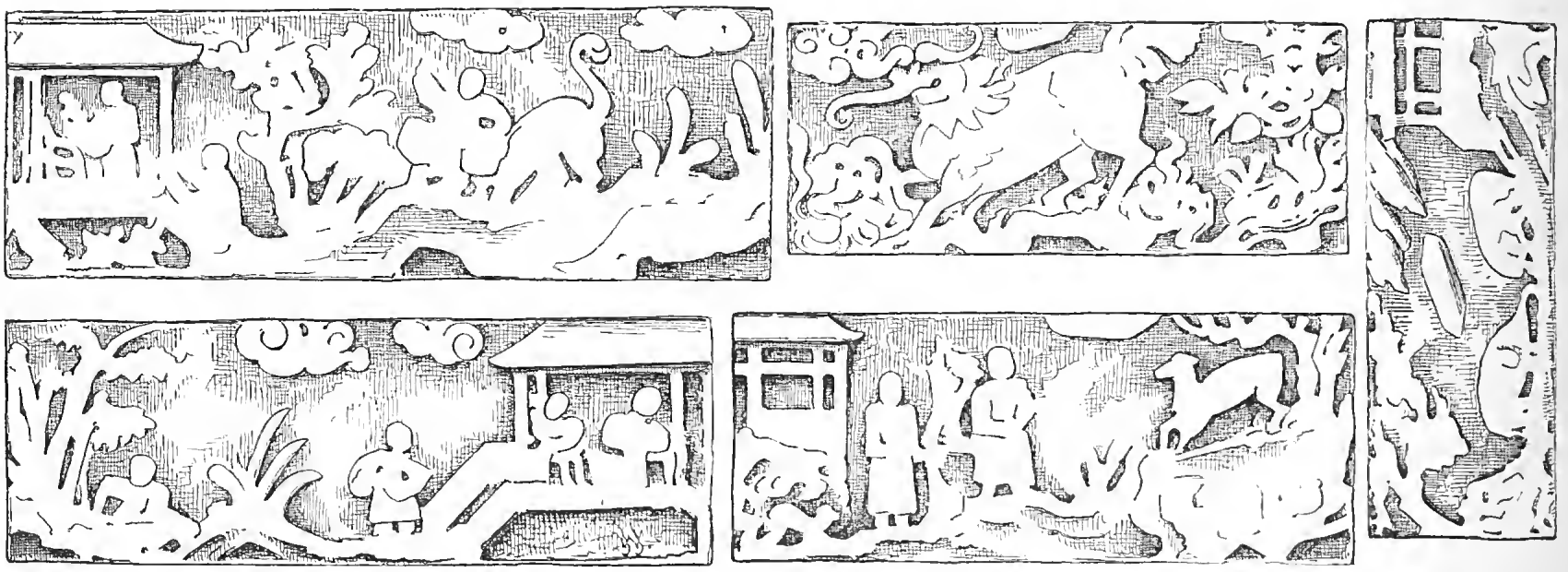
Our attention was attracted by a number of monuments which covered the slope of a hill at a short distance from our tent. They proved to be Chinese tombs, probably erected



CHINESE TOMB NEAR AMBOYNA.

over the graves of wealthy Chinese merchants who had died at Amboyna. Their large dimensions, as well as the care bestowed upon their ornamentation, attest the dutiful respect with which the Chinese honour the memory of their departed. Rising one above the other along the face of the hill, they all front the same point of the horizon, namely, the west, and were probably *oriented*, or rather *occidented*, with the aid of a compass. Each tomb consists of an artificial mound, on the western slope of which is a carefully walled-in space in the form of the Greek letter Ω. The two arms of the oval end in a scroll or spiral ornament, and the space enclosed contains a small mound, that seems to be the actual grave, and which is planted with shrubs. In front is an upright stone slab bearing an inscription in Chinese characters, and overlooking an altar similar in design to the altar or tables in Chinese temples, on which incense is burned. A low wall, sometimes adorned with bas-reliefs, extends on each side, and the level semi-circular space before the altar is

defined by a step. On the south side, and facing the tomb at right angles, stands what looks like a side-altar or large stone chair. The tomb figured on preceding page was the only one adorned with bas-reliefs, these being executed in the style with which Chinese carvings on wood or ivory have made us familiar, but their meaning must, I fear, remain a "Chinese puzzle." The various animals introduced may allude to the different countries visited



BAS-RELIEFS ON CHINESE TOMB.

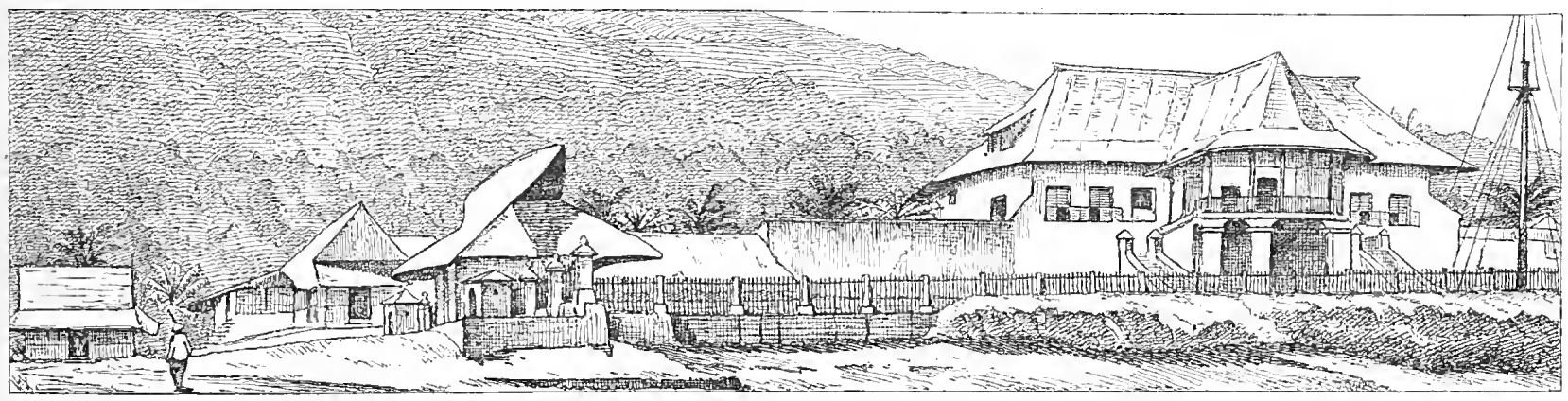
by the individual who is buried here. The bas-relief with the deer may be considered as typical of Amboyna, those with the elephants and the tiger as representing Siam and India. Another exhibits one of the symbolic monsters of Chinese mythology, composed of the trunk of an elephant, the horns of a cow, and the body and tail of a horse. Near its fore feet is a figure resembling an octopus. In one of the bas-reliefs appears the figure of a man rising out of the ground, and of another man with a bundle on his back like a traveller returning home. It may be an accidental resemblance, but I was surprised to find in these Chinese tombs more than one reminiscence of ancient Greece: the outline of the tomb in the shape of the letter Omega; the spiral, the symbol of infinite development or eternal life, which, under the form of the ram's horn, is one of the attributes of Zeus, the god of life; and the bas-reliefs themselves.

Some of the enterprising natives of Amboyna had followed us to the coaling-wharf, which during our stay was transformed into a market for the sale of fruit, fish, birds, shells, the horns of deer—which abound in the forests of the island—baskets made of cloves strung together, and other articles. Cloves, as is well known, are the principal production of Amboyna. One evening, at the invitation of the Resident, we attended a performance of the band of the National Guard at the club-house. After listening to a selection of operatic and national airs, some of us, preferring a walk to a tedious passage by boat, returned on foot to our station at the coal-wharf. The cool evening air, delightful after the heat of a tropical day, was illumined by the sparks of the fire-flies, which swarmed in and out among the branches of the trees and shrubs along our path. They seemed to settle especially upon a species of tall shrub remarkable for its numerous branches but few leaves. Occasionally we crossed one of the light roofed-in bridges characteristic of this part of the world.

On the 9th of October we returned to our anchorage off the fort, and on the 10th, after a farewell visit from the Resident, H.M.S. "Challenger" left this picturesque bay to continue her voyage among the islands of the Indian Archipelago. Steering northward through the Strait of Manipa, between Ceram and Bouro, we sighted Obi Major and Obi Latta on the 12th; Marigorang, Tawalli, and the high mountains of Batchian Island on the 13th; and, crossing the Equator during the night, we entered the channel between the lofty volcanoes of Ternate and Tidore—names enshrined by a great epic poet in immortal verse—in the following afternoon. Tidore, 5700 feet high, is an almost perfect cone with a well-defined crater at the top; its fellow, 5480 feet above the sea-level, has a broad flattened summit, whence issued, at the time of our visit, a considerable volume of smoke. Its upper surface looked rugged and torn, due probably to the successive formation of numerous craters of eruption. Between these two eminences rises the island of Maytara, and to eastward of Ternate the island of Hieri—both evidently volcanic cones.

TERNATE.

At sunset on the 14th October, H.M.S. "Challenger" anchored in front of Ternate, which may be considered as the capital of the Moluccas. A fine avenue of trees—a species bearing a large variegated leaf—leads the traveller into the town, which extends for a considerable distance along the shore, as far as Fort Orange and the palace of the Sultan



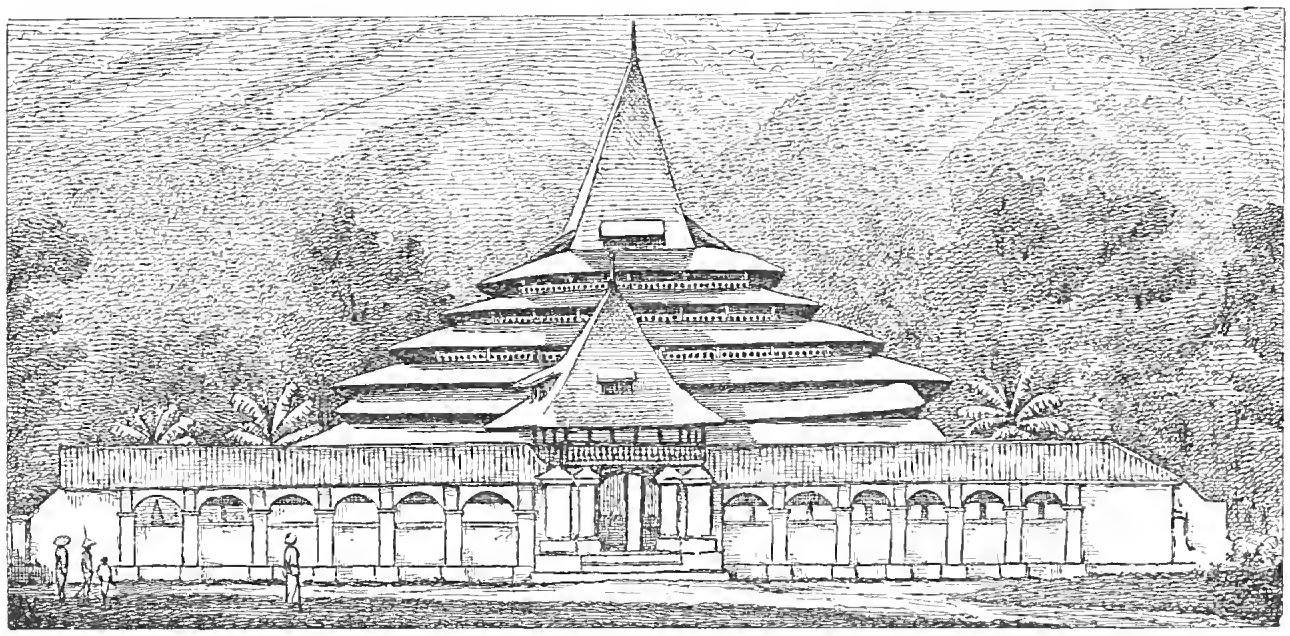
RESIDENCE OF THE SULTAN OF TERNATE.

of Ternate. This building presents a curious mixture of Malay and Dutch styles of architecture. Behind the town rise the magnificently wooded slopes of the volcano, while the shore road commands a beautiful view of the opposite island of Tidore, and of the more distant coast of Gillolo. The native name of the latter island is Halmaheira, a compound of *hal-ahoewal*, meaning state, condition, and *maheira*, wild, untamed—the whole indicating a country in a wild, uncultivated state.

The principal mosque of Ternate, with its seven roofs piled one above the other in the shape of a pyramid, is a very interesting specimen of Malay workmanship.

At a reception given by the Resident of Ternate, the company included several Malay, Arab, and Chinese gentlemen, representatives of the various elements which constitute the population of this outpost of civilisation. The ascent of the volcano of Ternate was successfully accomplished by two officers of H.M.S. "Challenger."

We left the island about noon on the 17th, and steaming through the channel between Hieri and Halmaheira, we proceeded to cross the Molucca Passage in a north-westerly direction towards the Strait of Banka. On the 18th we passed between the islands of Tifore and Mayo, two hilly, tree-covered tracts, situated in the centre of the Passage. In the afternoon of this day we witnessed the formation of a water-spout under precisely the same conditions as on a former occasion in the Sea of Banda, namely, a fine day with passing showers, little or no wind, and a large isolated cumulus cloud, the horizontal base of which may have been about 1000 feet above the surface of the sea. The mass of falling rain below the cloud was seen to divide itself into separate columns, which soon afterwards assumed the cylindrical and undulating shape of a waterspout. The impression produced at the time was that the sudden cooling and condensation of the column of air beneath the cloud, while surrounded by an atmosphere of a very high temperature, may have some connection with the production of this remarkable phenomenon. The gradual formation and dissolution of the waterspout could be distinctly observed. The evening closed in with heavy rain showers.



MOSQUE AT TERNATE.

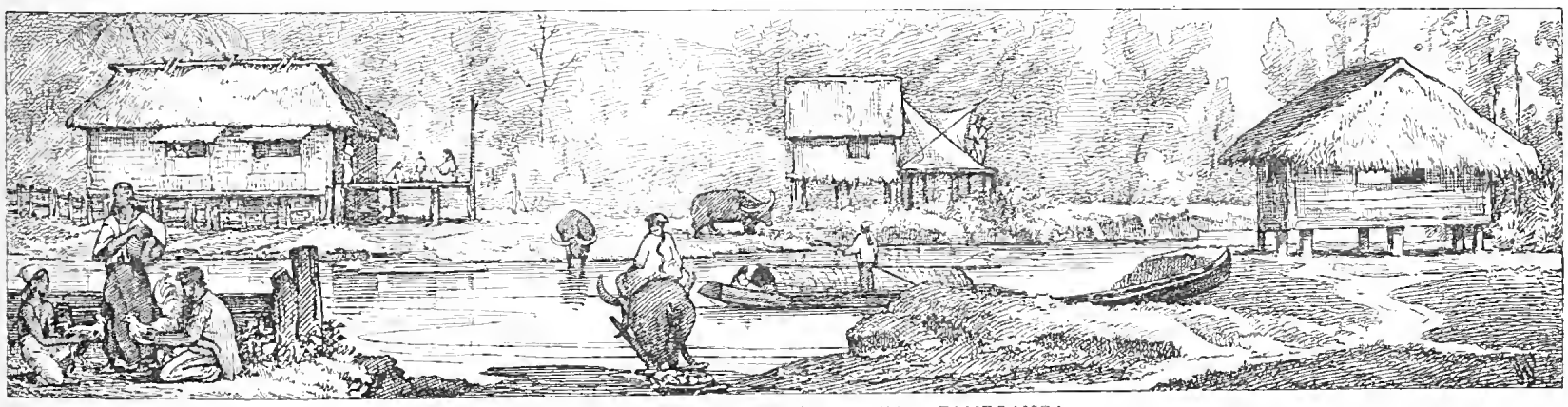
At daybreak on the 19th, the northern end of Celebes, with the lofty cone of Mount Klobat (6700 feet), the islands of Banka, Bejaren, Roang, and Tagulanda, were in sight. Later in the day we obtained a good view of the active volcano of Roang. Its reddish slopes, shaded towards the base with patches of dark green, were surmounted by a column of smoke. Most of the islands amongst which we had been lately navigating rise abruptly from the sea, and suggest the idea that they are the remains of a former continent now submerged. This observation may be extended to the whole Indian Archipelago, the gradual sinking of which was perhaps simultaneous with and compensated by the elevation of the neighbouring continent of Australia.

The "Challenger" was now entering the Sea of Celebes, and the rays of a tropical sunset lighted up the whole range of islands from Siao in the north-east to Tana Manado in the south-west. October 20th was spent in trawling near Siao Island, the western end of which is occupied by an active volcano of considerable height; and at daylight on the 21st the island of Sanguir was visible to the eastward. This proved one of the hottest days of our cruise, and the thermometer when lowered into the sea registered the unusually high temperature of 88° F., or 31° C.

THE PHILIPPINE ISLANDS.

On the following day Mindanao came in sight, and early on the 23rd we entered Basilan Strait. After a brief dredging-cruise among the thickly-wooded islands of this strait, we arrived off Zamboanga, one of the oldest settlements of the Spaniards in the Philippines. The town is situated upon the margin of an alluvial plain, covered with rice-fields, and traversed by several rivers. It is defended by an old-fashioned fort, contains a large military hospital, and is used as a penal settlement. The churches in this part of the world seldom possess any striking architectural features, being purely conventional in style; but their cool interiors, dimly lighted by the few rays which penetrate the stained-glass windows, afford a welcome retreat from the hot glare of the street without. The chapel in the cemetery of Zamboanga is flanked by two wings, the front of which is divided into four tiers of vaults used for sepulture. We observed that some of the vaults were open, others walled up. The latter were probably opened after the lapse of a certain time, and the bones lying therein added to the common heap preserved in the mortuary chapel close by. Strange indeed is the scene here presented, the remains being ranged as it were on shelves, like books in a library.

The streets and squares of Zamboanga, planted with trees, have a pleasant, neat appearance; but the sight of gangs of chained convicts in this region where Nature, lavish of her gifts, seems to have done everything to render man happy and contented, strikes one like a discordant note in music. A walk to a village situated about a mile to the eastward, near the banks of the river Tumaga, afforded an insight into the daily surroundings of



VIEW ON THE RIVER TUMAGA, NEAR ZAMBOANGA.

peasant-life in the Philippines: the thatched houses raised on piles some ten or twelve feet above the ground, their platforms occupied by women and children; the slow buffaloes, either mounted by a rider, or drawing some primitive vehicle furnished with two large wooden discs in lieu of wheels; the native black pigs taking their siesta in the middle of the road; the sporting youths of the village walking about with fighting cocks under their arms; and the lightly-clad maidens enjoying their cigarette.

We were indebted to the hospitable "Comandante" of Zamboanga for an opportunity of witnessing a native dance. The performers belonged to the class called by the Spaniards "Moros"—a name which they seem to apply to all races of the Mohammedan faith.

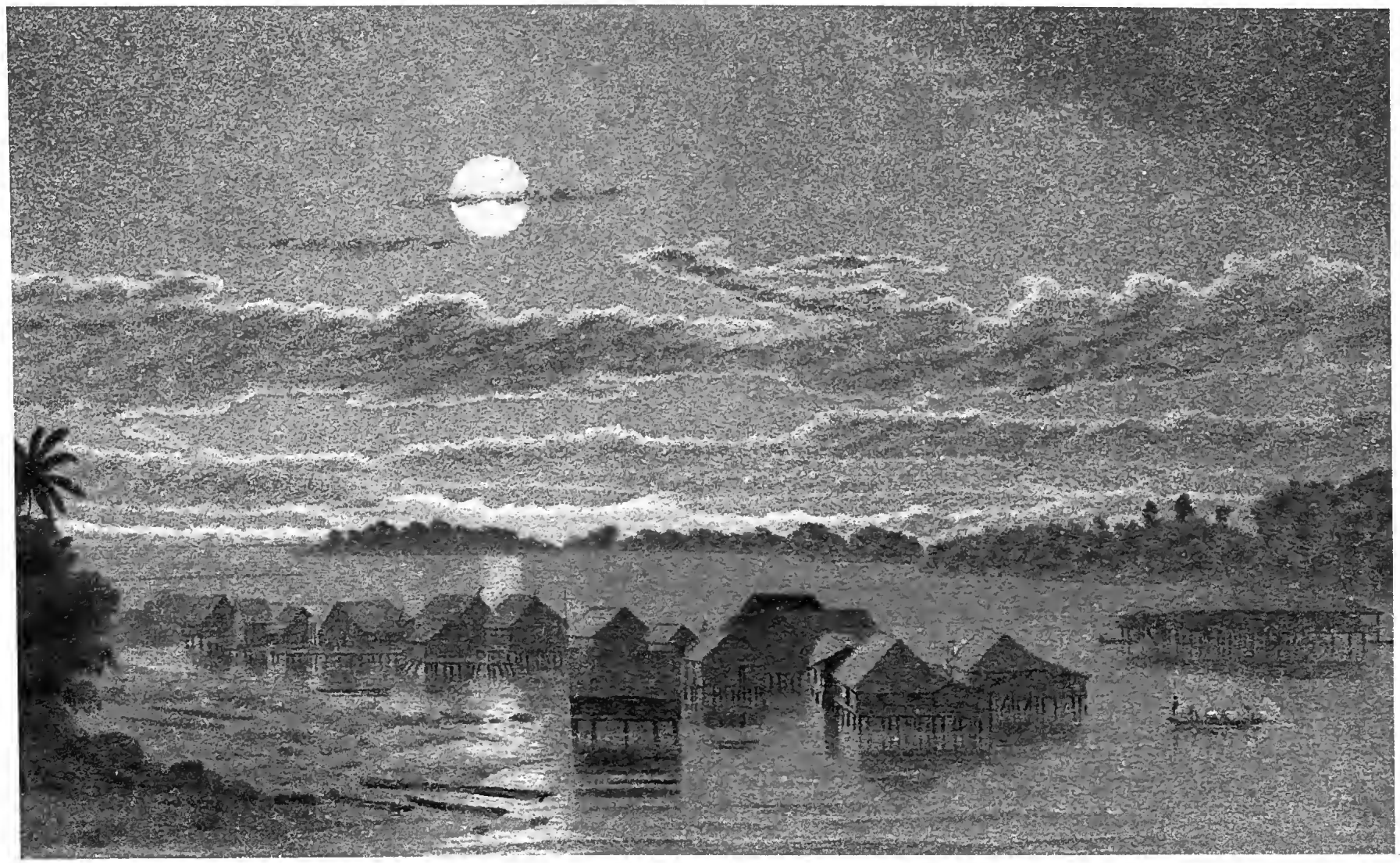
Probably looked upon by orthodox Spaniards as heathens and outcasts, we found them living in separate communities at Zamboanga and at Puerto Isabella, on the opposite island of Basilan. Their dwellings are usually built on piles a short distance from the shore, and, if we were rightly informed, these Moros are the same race as the inhabitants, of piratical fame, of the neighbouring island of Sulu. Dressed in many-coloured garments—red is their favourite colour, as with our gipsies—in silver-spangled jackets, and with silken scarfs round their waists, they danced, one or two at a time, to the monotonous accompaniment of the gong, the drum, and some stringed instrument. The dances, chiefly executed by females, consist of a series of graceful, serpentine movements, commencing at the shoulder and continued through the elbows and wrists. The body sways gently to and fro, but the feet, excepting a slight shuffling movement, contribute nothing to the display. The performance offered but little variety, and after a while became rather tiresome; but the room at the house of the Comandante showed an array of brilliant colouring and remarkable contrasts which would have charmed a painter. On one side of the room, squatting on the floor, were the dark-skinned Moros, decked in every colour of the rainbow; in the centre, the graceful figures of the dancers, their dresses and jewels flashing in the lamplight; and on the opposite side the Spanish and English officers in their varied uniforms. The male dancers, armed with spear and shield, executed a war-dance.

Early on the 26th, H.M.S. "Challenger" set out for the capital of the Philippines. The west coast of Mindanao, now visible to the eastward, is noted for its gigantic and almost impenetrable masses of vegetation—

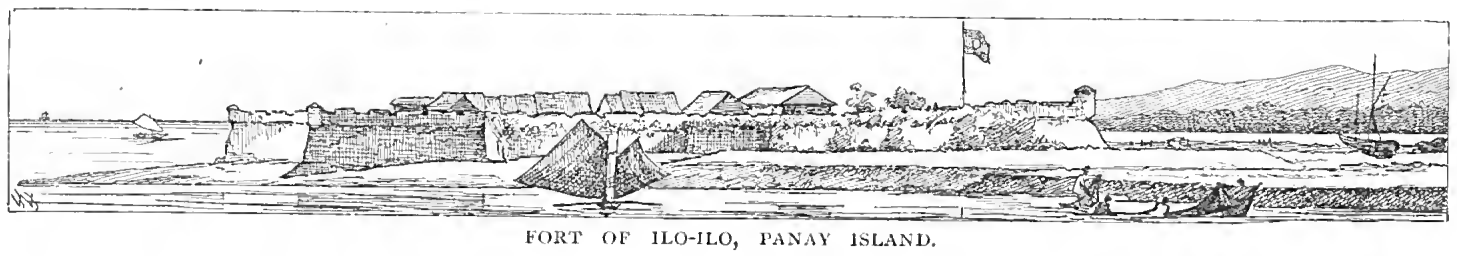
> "And e'en to tell,
> It were no easy task, how savage-wild
> That forest, how robust and rough its growth."

The falling branches and leaves, failing to reach the ground, are said to form in many places a solid roof upon which a new vegetation springs up, so that the explorer has to find his way by the light of torches, keeping all the time a sharp look-out for wild boars, poisonous serpents, and human foes. Large portions of the island of Mindanao are as yet *terra incognita*, and in possession of savage tribes. Recently, the Spanish authorities have begun to colonise the banks of the river which, issuing from a large inland lake in the eastern part of Mindanao, falls into the Bay of Illana.

The seas of Sulu and Celebes, although small in comparison with the Atlantic, are not much inferior to the latter in depth, as our soundings indicated depths of from two and a-half to three English miles. Together with the Banda Sea, they form so many separate hollows, the temperature of the water remaining stationary in the Sulu Sea from a depth of 400 fathoms, and in the Sea of Celebes from a depth of 800 fathoms, down to the bottom. There is an irritating confusion of names respecting these seas, the Sulu Sea being also known under the name of the Sea of Mindoro, while the term Sulu is in some charts applied to the Sea of Celebes.



Late on the 27th the island of Negros was observed towards the north-east, and on the following day its lofty volcano, Mount Malaspina, over 8000 feet high, was plainly visible from our deck. Soon after, the hills of Panay Island rose above the horizon; and then, passing up between the level shores of the latter and the rocky bluffs of Guimaras Island, we



FORT OF ILO-ILO, PANAY ISLAND.

anchored in the afternoon of the 28th close to the dilapidated fort of Ilo-Ilo. The Spanish flag waving from the fort showed, to our surprise, a large hole in its centre. We learned that when the throne became vacant through the abdication of King Amadeo, the scutcheon of the alien house was simply cut out, and the place reserved for the insertion of that of the next dynasty to follow, whatever it might be—an economical plan, to be recommended to fickle nations who are not content without a change in the form of government once or twice in every generation.

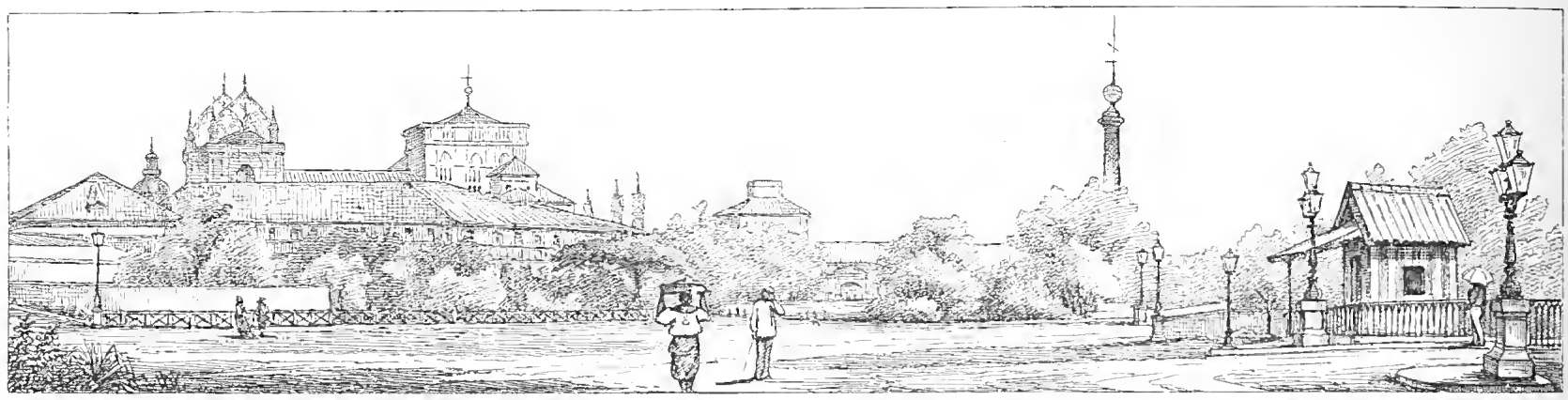
The town of Ilo-Ilo, with the closely adjoining towns of Molo and Xaro, are situated upon the swampy margin of a fertile plain which stretches far inland to the foot of the hills. The cultivation of sugar, rice, and tobacco, also the manufacture of the famous tissue called "piña," are carried on here on a large scale; and the considerable export trade of the place has attracted a colony of Europeans—English, Americans, Germans, and Swiss, who contrive to exist in this fever-stricken spot—besides the ubiquitous Chinaman, who abounds in every town in the Philippines.

After an excursion to the opposite island of Guimaras, which the heat of the day rendered very fatiguing, followed by a ball given in our honour at Xaro, attended by His Excellency the Governor, the Alcalde, the officers of the garrison, and all the notabilities of the three cities, when we were initiated into the mysteries of the "danza," a kind of very slow polka suitable to a hot climate, we commenced on the 31st our cruise through the Philippine Inland Sea. The numerous islands, large and small, which stud this sea, and fill up the space between Luzon in the north and Mindanao in the south, are comprised under the name of the "Bisayas." It would be difficult to exaggerate the charm of navigating between these islands, as, during the next three days, they lay around us under a warm blue sky, so varied are they in shape, so rich in the productions of nature, abounding in sites which a more enterprising race would have long ago covered with prosperous towns and villages. Let me recommend to the lover of nature, whether he be a man of science, or an artist, or simply in search of change and adventure, a cruise among the Philippine Islands.

In the afternoon of the 3rd November, when in the Strait of S. Bernardino, and looking across the Bay of Balangas, we had a view of the district of Lake Taal, from the centre of which rises the volcano whose eruptions and attendant earthquakes have been the cause of so many disastrous calamities to the city of Manilla. The high peaks of Mindoro Island, to the

southward, were unfortunately concealed by clouds. Mount Halcon, the highest point, rises to nearly 9000 feet. At last, on the morning of the 4th, the magnificent Bay of Manilla opened up before us, with the rocky Corregidor Island in front and the blue range of the Sierra de Mariveles on the left, and before sunset the deep boom of the Cathedral bell floating across the water told us that the low line of houses, churches, and trees which bounded the horizon was far-famed Manilla.

The city of Manilla proper is built on the southern bank and near the mouth of the river Pasig. The latter is the natural outlet of a large lake situated to the south-east of



MANILLA.

Manilla, and noted for the picturesque beauty of its shores. Surrounded by ramparts and a deep ditch, its narrow boundaries filled with churches, convents, colleges, barracks, an arsenal, and other public buildings, the old city forms a striking contrast to the new Manilla which has grown up on the northern bank of the river. On crossing the bridge, we seem to step from a mediæval city into the midst of the 19th century, from the narrow silent streets in possession of the soldier, the priest, or some devout female pacing slowly to church, into the crowded thoroughfares of a busy commercial place, where Europeans, Malays, Chinese, Mestizos, and Negritos jostle each other all day long as at a perpetual fair. In sight of the bridge, and near one of the gates leading into the old city, stands the monument erected in memory of Magallanes, the discoverer of the Philippines. The numerous ruins scattered over Manilla and its suburbs attest the violence of the earthquake of 1863. The Cathedral, the nave of which, it will be remembered, crushed in its fall a whole congregation while at prayer, is being rebuilt. Close by are the remains of a magnificent palace. The Alameda, or public promenade, outside the walls, is crowded every evening with the carriages of the more wealthy inhabitants.

METEOROLOGICAL OBSERVATORY AT MANILLA.

A visit was paid to the College of the Jesuit Fathers, who possess a meteorological observatory, and by whom a regular series of observations is carried on, the results being published periodically. Their self-recording meteorological apparatus was at one time in possession of the celebrated Père Secchi. We were here shown an instrument for measuring the shock of earthquakes. But it is to be supposed—notwithstanding a few notable historic instances—that when the ground

is shaking under one's feet there is little zest for observation. On the staircase I noticed a fine painting of large size representing the Descent from the Cross, said to be a copy of a Vandyke now in Madrid. The College, which boasts about 500 students, possesses the nucleus of a natural history museum, and the urbane and hospitable professors conducted us through the lecture-rooms and dormitories. The building which contains the latter rests upon a stout framework of timber, simply laid upon the ground with the intention of neutralising as much as possible the effects of earthquakes.

Provided with the necessary passes, we also inspected one of the cigar factories of world-wide renown, where thousands of women and girls are crowded together in stifling rooms —a state of things little likely to gratify an English sanitary inspector. On the 7th the Spanish Rear-Admiral and Commander-in-Chief of the station visited the ship, which was, indeed, generally thronged with visitors, amongst them the Jesuit Fathers and their pupils, who seemed to take much interest in the various appliances used for sounding and dredging.

H.M.S. "Challenger" left Manilla on the 11th. A fresh cool breeze we had lately felt while at anchor at that port warned us that we were once more approaching colder and stormier latitudes. After sailing during the 12th and 13th within sight of the west coast of Luzon, we experienced for the next two days the full strength of the north-east monsoon, the sea running so high as to render work on board almost impossible. The current induced by this wind was found to flow in a W.S.W. direction at the rate of fifty-two knots in twenty-four hours. With the first rays of the dawn of the 16th we discovered ourselves sailing in company with several Chinese junks, and a few hours later, a portion of the oldest empire in the world appeared above the waves in the shape of a chain of rocky islands, backed up in the distance by high mountain ranges seemingly destitute of all vegetation. He must be a callous traveller who could behold for the first time without a feeling of the most intense interest the shores of China—a country which has played so great a part, and is destined to play one yet more important, in the history of mankind. Covering an area equal to one-tenth of the whole habitable globe, its population—estimated, according to the latest calculations, to amount to between 250 and 300 millions—seems from the earliest times to have invaded the neighbouring regions, and now threatens to overflow into both hemispheres. Already, from Singapore to Papua, and up through the Philippines to Japan, the skilful artisan, the enterprising, prosperous, and often wealthy trader, is John Chinaman, and, as every one knows, he has recently made his appearance in large numbers in Australia and in California. The civilisation of the most fertile and most beautiful part of the world—that which is situated between the tropics—is purely a question of the supply of labour, and the accumulation of this vast people, inferior to none in its aptitude for all the arts of civilised life, seems like a providential arrangement to supply this want. Of all races, the Chinese are proving themselves the most capable of establishing agriculture, trade, and all useful arts in regions where the natives are too indolent or too savage to take the first steps towards civilisation, and where the climate repels the white man. Besides, the latter has not yet emigrated in sufficient numbers to furnish the labour requisite for bringing large

tracts of land under cultivation. While in China and in India millions are dying of starvation, the most fertile portions of the earth lie in a state of utter unproductiveness.

HONG-KONG.

By the time land was in sight the weather cleared up, and it was on a fine sunny morning that we steamed through the picturesque inland sea, bounded by high mountains to the north, which forms the approach to Hong-kong. At 2.15 p.m. the "Challenger" was one of the numerous fleet of vessels anchored in front of Victoria. Both town and harbour bore traces of a recent typhoon, which had been accompanied by great loss of life. The masts of sunken vessels were still visible above the water; while patches of new tiles on the roofs, and repairs still in progress, showed that property on shore had also suffered considerably. A Roman Catholic church, newly erected in one of the suburbs, was reduced to a heap of ruins.

Home-news received on our arrival at Hong-kong contained an item of concern to us—namely, the appointment of Captain George S. Nares to the command of the Expedition then about to start for the Arctic Regions. The exploring voyage of H.M.S. "Challenger," commenced auspiciously under the very skilful and genial authority which had during the last two years directed our movements, was brought to a perfectly successful termination under the able control of Captain Frank T. Thomson, previously commanding H.M.S. "Modeste," stationed in China.

As the eye wanders over the line of stately buildings which stretches along the water-side and leans up against the steep slopes of Mount Victoria, the place suggests reminiscences of Gibraltar. Here on the confines of China, as at the gates of the Mediterranean, the energy of a northern race has turned a barren rock into a flourishing colony, provided with all the luxuries of modern life, traversed by fine roads, and adorned with tastefully laid-out public grounds. The east end of the town is chiefly inhabited by Europeans. It includes Government House, the Town Hall, and the English Church, and presents, especially when seen from the water, a very stately appearance. The west end, more or less in possession of the Chinese, is in that crowded and not over-clean condition so dear to the subjects of the T'ien-tze. As one looks down upon the Chinese quarter from the promenade above the town, which commands a magnificent view of the harbour and the opposite mountains of the mainland, a confused noise rises from the labyrinth of streets below like the hum of an immense bee-hive.

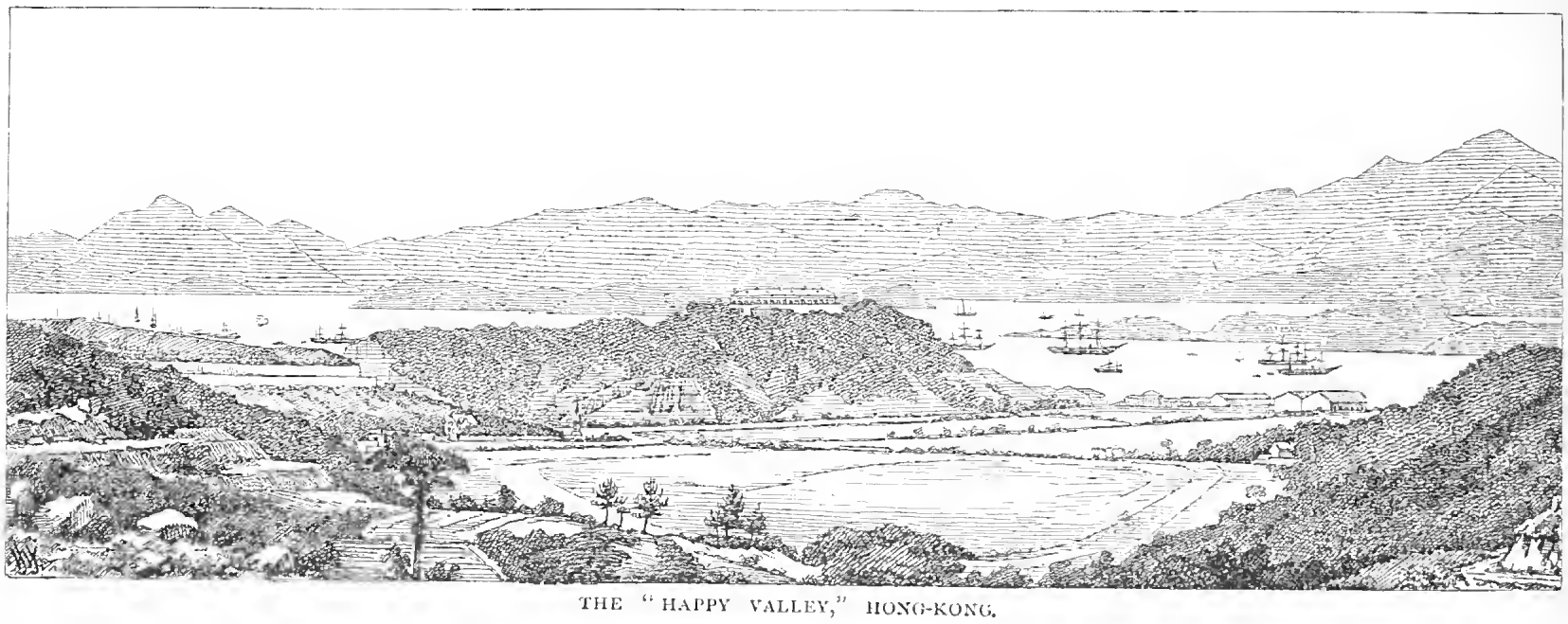
A characteristic feature of the harbour of Hong-kong are the "sampans," small single-masted and partially roofed-in boats, which form the only home of numerous Chinese families. Entire floating villages composed of sampans may be seen sheltering in the bays and creeks of the harbour, and it was principally amongst these that the typhoon of the 22nd September caused serious loss of life. A large number of such boats are employed as carriers, and for keeping up communication between the shore and the vessels stationed in the harbour.

Sometimes, when taking our passage in a sampan, we were surprised by seeing the heads of two or three children suddenly emerging from under a lid in the fore part of the boat, which seemed to cover a space not much exceeding the dimensions of a traveller's chest. In spite of their being thus cooped up, these Chinese "cherubs" looked very healthy, with black roguish eyes. The mother, often with a baby on her back, manages the oar, generally assisted by a grown-up daughter or other relative. Husbands and brothers seem to earn their livelihood on shore. We found these water-folk a good-humoured, light-hearted, industrious race.

China has been called the "flowery" land, which may be true of certain parts of the Empire, but the only flowers I remember to have seen growing wild in the vicinity of Hong-kong are the convolvulus and a white camellia which is found on the slopes of Mount Victoria The peninsula of Kowloon, which projects into the harbour from the north, has been ceded to England, and is used for naval and military purposes. An enthusiastic amateur astronomer had, at the time of our visit, erected an observatory on one of the hills of Kowloon in preparation for the coming transit of Venus. Much to his disappointment, the long-expected morning proved cloudy, and the first outer and inner contact could not be distinctly observed. Behind the peninsula rises a chain of hills and mountains as destitute of vegetation as the volcanic elevations of Ascension and the Cape de Verde Islands. Amid the recesses of these hills, and overlooking a well-sheltered bay, lies the Chinese town of Kowloon, which I visited with the object of seeing John Chinaman in his own country. The appearance of the place justifies its former reputation as a nest of pirates. What may be called the citadel or official part of the town is surrounded by a crenelated wall; the remainder is a dense mass of low dwellings, only separated from each other by narrow passages a few feet wide, and more suggestive of a rabbit-warren, or of one of those colonies of birds' nests we had seen in the oceanic islands, than of a collection of human habitations. On the two occasions when I extended my excursions to Kowloon, I was impeded at an early stage of my progress by a dense mob of children and grown people covered with dirty rags, and I preferred to make my retreat, followed by a shower of stones, rather than offer further resistance to native prejudices. The Chinese of the more cultured class, whom I had some opportunity of observing, gave me the impression of a proud, high-spirited, sensitive, very intelligent, and, in the ordinary transactions of life, remarkably matter-of-fact race; and nothing could be in worse taste than the ignorant scorn and contempt with which the Chinese are treated by a certain class of Europeans. Even the well-meant but blunt and unceremonious bearing of some educated travellers must occasionally give serious offence among a people who, like all Orientals, are accustomed to the most punctilious observance of an old-established ceremonial, and of certain forms of speech varying with the rank and station of the person addressed. While the lower classes of the Chinese offer many examples of great bodily strength and powers of endurance, I was often struck with the fine stature, dignified bearing, and regular features of individuals belonging to the more prosperous grades of society.

The harbour of Hong-kong may boast of the greatest variety of floating craft to be seen assembled in any port—Chinese and Japanese gunboats, the old-fashioned piratical-

looking war-junk, men-of-war, merchantmen, and mail steamers from every part of the world, the tiny sampan and the comfortable steam-pinnace. The island of Hong-kong affords ample scope to the pedestrian, who finds his exertions rewarded by highly picturesque views of the neighbouring islands and continent. A favourite exercise-ground of those muscular Christians who strive against the relaxing effect of the climate is the "Happy Valley," at once the race-course and the cemetery of Hong-kong. Situated within a short walk from the town, it is approached through a deep cutting. Facing the latter is the obelisk erected in memory of the departed shipmates of H.M.S. "Vestal," 1847. To the right are ranged the Protestant, Roman Catholic, Mohammedan, and Parsee cemeteries; while the level space in front, surrounded by "a woody theatre of stateliest view," is the race-course, the scene of the gayest meetings in Hong-kong.



THE "HAPPY VALLEY," HONG-KONG.

Chapter VII.—From Hong-kong to Yokohama.

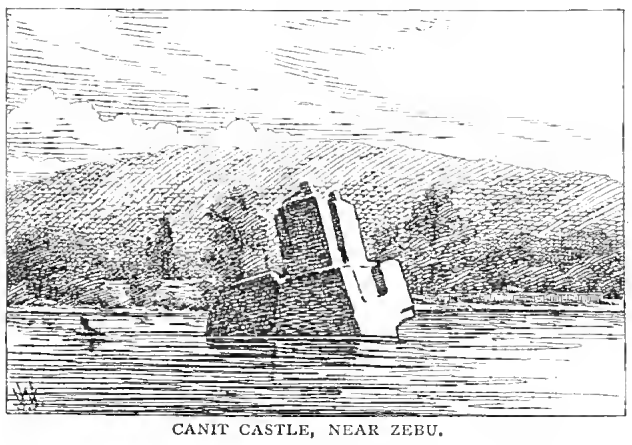
AFTER a pleasant sojourn among the hospitable residents of Hong-kong, we commenced the third year of our cruise on the 6th January, 1875. Before the day was over, our good ship was once more breasting the high seas raised by the north-east monsoon. The soundings obtained on the 8th showed that the China Sea, the western and southern portions of which are very shallow, attains in its north-eastern part a depth of over 2000 fathoms, forming a separate hollow like the seas of Sulu, Celebes, and Banda. The decrease of temperature was observed to cease at a depth of 1000 fathoms, so that a channel of about that depth, probably situated directly south of Formosa, establishes a deep-sea communication between the China Sea and the Western Pacific. During our stay in Hong-kong a typhoon had swept this sea, and on the afternoon of the 10th we fell in with one of its victims, a dismantled and abandoned vessel, rigged with a jury mast, and remnants of sails and ropes hanging over her side. Her name was the "Santa Maria," of about 100 tons, probably a Philippine coasting craft; but nothing was found on her to give a clue to the port whence she had sailed, so taking the wreck in tow, we entered Manilla harbour in the course of the 11th.

THE CATHEDRAL, MANILLA.

Once more, while watching the sun setting behind the Sierra de Mariveles, I heard the distant boom of the Cathedral bell quivering through the evening air. The "Challenger" was the first ship to bring the news of the accession of Alfonso XII.—proclaimed King on the 30th December, 1874—to his distant subjects in the Philippines, whereupon they probably patched up without delay the hole in the flag surmounting the old fort of Ilo-Ilo. We paid

a farewell visit to the Jesuit Fathers, who presented the Expedition with a collection of their meteorological observations, commencing with the year 1865; but we noticed that the beautiful copy of Vandyke—if indeed it was a copy, for it seemed the work of a master hand—had disappeared from the walls of the staircase.

On the 14th, H.M.S. "Challenger" began to retrace her course through the Philippines, passing through the Strait of St. Bernardino on the 15th, with the island of Mindoro and Mount Halcon this time fully in sight, and sailing down between the islands of the picturesque inland sea until, on the afternoon of the 17th, the conical peak of the "Pan de Azucar" (Sugarloaf), which overlooked the scene of our former labours, and the coast of the island of Panay, were visible to the westward. Here we lost sight of our old track, and, making for the channel between Leyte and Zebu, we arrived about noon on the 18th, after a pleasant run past the cultivated shores of the latter island, before the ancient capital of the Philippines. We were anchored in the narrow passage between the town of Zebu and the island of Mactan—the latter the scene of the miserable death of the illustrious navigator Magallanes, the first European who, in one of the small and ill-found ships of his day, crossed the immense expanse of the Pacific Ocean from the Straits of Patagonia, which now bear his name, to the islands whence he was never to return. According to old writers, Magallanes, after discovering the Mariana or Ladrone Islands, arrived off Samar on the 16th March, 1521. On the 28th of the same month he is supposed to have anchored off the southern end of Leyte, and thence, sailing up between the islands of Bohol and Leyte on the 5th and 6th April, he arrived, on Sunday the 7th April, at the port of Zebu. The walls of a ruined castle, called Canit Castle, attached to a piece of rock now entirely surrounded by water, were shown to us as marking the spot where the discoverer of the Philippines first stepped on land. This point is situated a little to the southward of Zebu, and when leaving the port the "Challenger" passed close to the ruins, tilted over to one side, and lighted up by a golden sunset; and imagination could easily picture the scene of three centuries and a-half since—the glittering armour of the Spaniards as they clambered over the ship's side, the first white men ever seen in these regions.

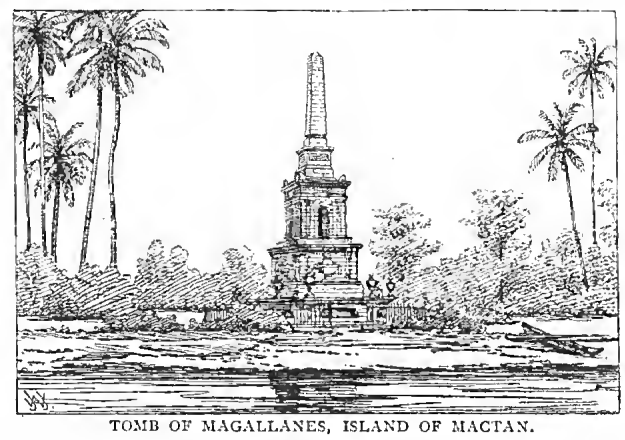


CANIT CASTLE, NEAR ZEBU.

Having prevailed upon the King of Zebu to allow himself to be baptised, Magallanes, in an unlucky moment, took part in a quarrel between the King and the chiefs of the opposite island of Mactan. It is reported of the navigator that he was in the habit of counting upon the terror inspired by the appearance of men clad in full armour, and never hesitated to present himself in this fashion, even before overwhelming numbers of natives. On this occasion, accompanied by his Spaniards, reduced to a small band after their long voyage across the Pacific, he landed on the island of Mactan, and attacked the natives. Whether it was that his enemies were more than usually skilled in the art of war, or more accustomed to the sight of strange men, he had to give way before superior numbers, and in the retreat

was wounded in the leg by an arrow. His person being known to the enemy, he was made, when seen to be no longer invulnerable, the object of a special attack. His Spaniards ran for their boats, moored at some distance from the shore. Magallanes, whose helmet was twice beaten off with stones, and who was unable to use his sword, having been wounded in the right arm, was pursued into the water, and, overpressed by the multitude, fell, and was slain with a lance-thrust.

It was on the 20th January that we went to see the monument erected by the orders of Queen Isabella II. on the spot where, according to tradition, Magallanes' body was buried. The structure overlooks the northern entrance of the narrow channel between Zebu and Mactan. Like the Spaniards of old, we had to leave our boats at some distance from the shore and wade across the wide coral reef which extends in front of the monument. While looking out for the lump of coral on which to seek a foothold, the idea struck me that this must be the very reef across which the Spaniards retreated to regain their boats, and in whose shallow waters the unhappy Magallanes perished, surrounded by a crowd of yelling savages.



TOMB OF MAGALLANES, ISLAND OF MACTAN.

The monument rises to a height of about fifty feet, and in its design possesses considerable merit. Encircled by an iron railing, it rests upon a broad pediment adorned with funeral urns, and is surmounted by a tall obelisk. On its northern face is the inscription—"1520. Glorias Españolas;" on the western side, "A Hernando de Magallanes;" on the south side, "1866. Regnando Dª Ysabel 2ª;" and on the east side, "Siendo Gob. el Coronel D. Miguel Creus."

I was surprised to find the date of 1520 given on the monument, as the death of Magallanes is stated by the best authorities to have occurred in the year 1521, on a Saturday, the 27th of April. It is well known that Magalhaens, by birth a Portuguese—called Magallanes by the Spaniards and Magellan by the English—fought with distinction under Albuquerque at the time of the conquest of the Indies. Disappointed on his return by the scanty recognition his skill and valour met at the hands of his countrymen, he entered the service of Spain, and was appointed in 1519, by the Emperor Charles V., to the command of a fleet, of which only one vessel, with eighteen men, returned to Europe, in September, 1522, having perforce left the body of their brave commander in the hands of the savages of Mactan.

On our return from visiting the monument, we landed at the pier in front of the convent of Nª Sª of Opong, situated on the same island, one of those ecclesiastical piles which, by their size and splendour, contrast unpleasantly with the squalid huts by which they are surrounded. At the end of the pier stands a square tower, or rather three towers, one rising above the other, the topmost one commanding a fine view of the strait between Mactan and Zebu, the well wooded and cultivated shores and the distant hills of the latter island.

On the day of my first stepping ashore at Zebu, my attention was attracted by the loud strains of a brass band playing a lively march. To my surprise it headed a funeral, proceeding at a rapid, almost a running pace. Behind the musicians came a car covered by a canopy, under which appeared the body of a young girl dressed in white, her hair adorned with flowers. Who could fail to remember Friar Lawrence's words?—

> "Then, as the manner of our country is,
> In thy best robes, uncovered, on the bier,
> Thou shalt be borne to that same ancient vault
> Where all the kindred of the Capulets lie."

A crowd of mourners, some on foot, some in carriages, tried to keep up with the band heading this strange procession. Following the cortége to the church, another odd sight awaited me at the church door. Placed in the open air, and stretched on a wooden bier, lay the body apparently of a woman, dressed in the brown hood and gown of a friar, a large wooden crucifix stuck between her poor shrivelled hands. The corpse was so placed as to face the high altar, and the crowd which had accompanied the funeral were gathered around, paying little or no attention to what was no doubt to them a familiar sight. Although there was a certain want of dignity and solemnity in the surroundings of the funeral, yet the music, the white robe, and the flowers seemed to me more in keeping with the cheerful, comforting creed of the Christian, than the gloomy, and, as a rule, ugly trappings of a funeral in Northern Europe. In the genial, warm sunny South, where Nature is the friend of man, where a luxuriant vegetation and a prolific fauna render the spectacle of rapid growth and decay a sight familiar to the least observant eye, death ceases to wield the abject terrors with which the mind of Northern races, ever struggling against poverty, cold, and hunger, and prone to melancholy, has invested it. It presents itself more in the light of a natural event, neither more nor less extraordinary than the countless changes which constitute the whole course of existence—a transition from this beautiful earth to a still more beautiful heaven.

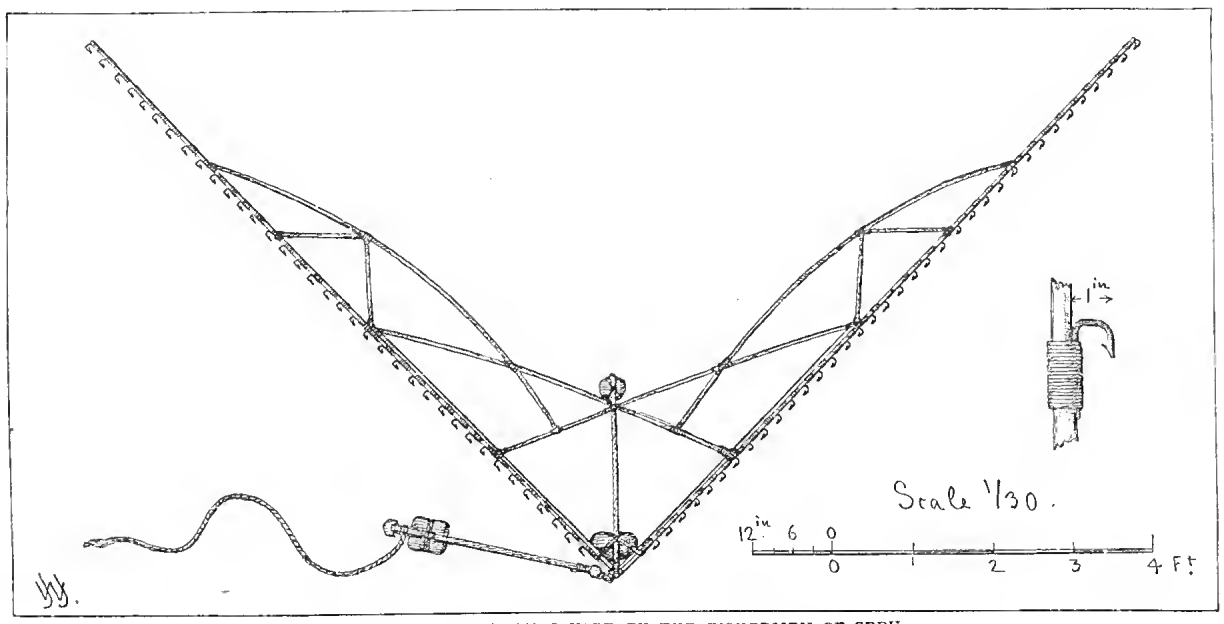
CALLE DE LA PRINCESA, ZEBU.

The streets of Zebu, at the time of our visit gaily decorated with flags in honour of the accession of King Alfonso, have that pleasant suburban aspect which lends an additional charm to the towns of the Philippines. Every corner not usurped by road or dwelling is filled up with tree, shrub, or flower; the palm-tree protruding its drowsily nodding branches over the wall of the courtyard, or the light graceful foliage of the bamboo peeping over the roofs, as if the country were contesting every inch of ground and every yard of sky with the town. The enjoyment of a ramble in the sunny streets is further heightened by the unaffected courtesy

of the people, inherited from their Spanish conquerors. While making the foregoing sketch in a blazing noonday sun, a young lad ran to fetch a chair for me, while a little black-eyed maiden held an umbrella over my head. She must have been the "princesa" after whom the street was called! Often too was I invited to step into the houses, a reception very different from that which I had recently experienced at Kowloon.

Off the southern entrance of the channel, between Zebu and Mactan, is the locality where so many specimens of that beautiful sponge called "Euplectella" or "Venus's basket," or by the people here "regaderas," have been found. Its exquisitely delicate skeleton, stripped of the yellowish pulpy matter with which it is covered, and showing a mass of silicious spicules looking like fine threads of spun glass, forms a much-admired ornament of natural history museums. The sponge is fished up by the natives from the bottom of the sea, by an ingenious apparatus, far better adapted for securing specimens of a fragile character than the heavy, clumsy dredge with which we were provided.

As shown in the diagram, the Zebu dredge consists of two rods of bamboo, each about 9½ feet long and half-an-inch in diameter, placed nearly at right angles to each other, so as to form the apex of a triangle. Each rod is armed with strong fish-hooks about thirty-six in number, and both are connected by slender rods of bamboo which act as stays. Bisecting the angle at the apex is a wooden stick about one inch in diameter, which acts as it were as the backbone of the whole apparatus, and is weighted at each end with a flattish stone, the inner one being about four inches square, the other, somewhat heart-shaped, from six to eight inches in diameter. Attached to the apex by a short piece of cord is another wooden stick about three feet long, weighted at the further end by a stone six inches square, and tied to this end is the strong line of Manilla hemp by which the dredge is managed from the boat. The fish-hooks measure about one inch across the bend, and are tied to the rods at a distance of three inches apart.

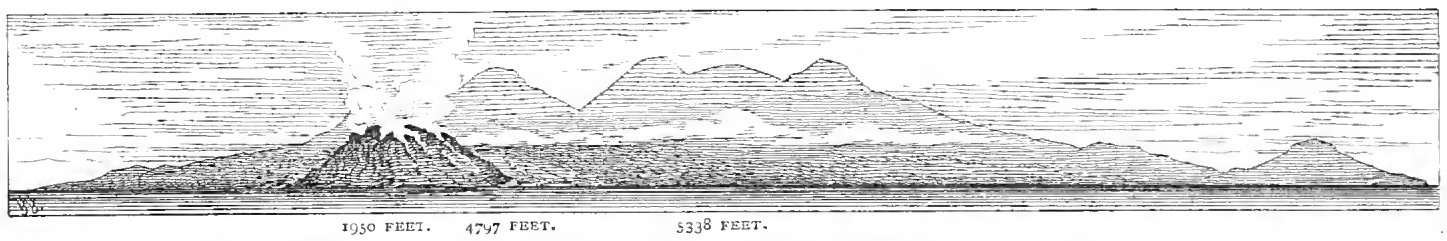


DREDGING APPARATUS USED BY THE FISHERMEN OF ZEBU.

Euplectella is found partially imbedded in the ooze at a depth of about 100 fathoms, and the fishermen, after lowering the dredge to that depth, pull it gently along the bottom for the space of an hour, when, raising it to the surface, they usually find from half-a-dozen to a dozen sponges caught on the hooks. The whole apparatus struck us as a very creditable specimen of native ingenuity. In the skilful hands of our makers of fishing-tackle, it might readily be converted into a portable folding instrument, for the use of the professional or

amateur naturalist. The stones could almost always be procured near the spot, or their places might be supplied by leaden weights. For dredging in lakes and shallow estuaries the contrivance seems invaluable, since a large percentage of the delicate plants and animal organisms collected by the dredge hitherto in use turn up broken, crushed, and mangled out of shape.

His Excellency the Governor of Zebu was present at a ball given by the British Vice-Consul on the 21st. On the 23rd the town celebrated the accession of Don Alfonso by a general illumination, and in the afternoon of the 24th H.M.S. "Challenger" left her anchorage and proceeded on her voyage towards the south. After passing Canit Castle we spread our sails to a fine northerly breeze. The moon shone brightly upon the distant hills of Zebu and Bohol; while the nearer shore was dotted with the blazing fires of the fishermen. During our stay at Zebu, we had received news of a volcano recently formed upon the island of Camiguin, situated off the north-west coast of Mindanao; and on the morning of the 25th, when the "Challenger" had attained a position between Bohol and Siquijor, Camiguin being distant about sixty miles to the eastward, a large volume of smoke was seen to rise apparently from the surface of the sea, and at the foot of the high volcanic peaks of the latter island. At daybreak on the 26th the new volcano was distinctly visible,



NEW VOLCANO ON CAMIGUIN ISLAND.

surmounted by a column of smoke or steam drifting to southward with the monsoon. The temperature-soundings taken at noon in 185 fathoms, and at a distance of only two miles to the north-west of the volcano, afforded no indication of the vicinity of the latter, from which we may conclude that the focus of heat in which the lava-streams originate must be at a considerable depth below the sea-bottom. The temperature of the water in 185 fathoms was found to be 13°.9 C.; between Bohol and Siquijor, about sixty miles from the volcano, and in 375 fathoms, 12°.2 C.; and at a more northern station in the Philippine inland sea, 11° C. from 250 fathoms down to 700 fathoms. The bottom, two miles from the volcano, consisted of a greenish mud containing many mineral particles of a coarser texture. When the ship had arrived within a short distance of the volcano, we saw before us an irregular truncated cone, rising abruptly from the sea to a height of 1950 feet, according to our measurements. The surface of the eminence was of a rich dark-brown colour, with large patches of light red and grey, forming a striking contrast with the bright green foliage of the hills close by. The torn, jagged edge of the crater was only now and then visible between the volumes of white smoke which issued both from that orifice and from numerous crevices upon the slopes.

Having landed at the village of Abajo, a collection of huts so much shaken by their terrible neighbour as seemingly to be in hourly danger of becoming a heap of ruins, we

gathered from a Spanish resident on the island, who had watched the formation of the volcano from the beginning, the following details. It appears the birth of this, probably the youngest of existing mountains, dates from the 1st of May, 1871, and it was therefore at the time of our visit not yet four years old. After a number of earthquakes, which lasted over six months and were felt as far as Zebu, an eruption took place at a level spot not far from the sea shore, and at the foot of the old volcanoes of the island. The earthquakes then ceased, and successive eruptions of more or less magnitude, since the above date, resulted in the accumulation of the huge cone which stood before us. The consequences to the unfortunate inhabitants of the island, previously noted for its fertility and its large production of Manilla hemp, sugar, and tobacco, were most disastrous. The population, said to have amounted to 25,000, we found reduced to about 1000. The capital city, Catarman—formerly situated to the southward of the site of the new volcano, and boasting a population of 11,000 inhabitants—had disappeared, with the exception of some fragments of masonry. Lately, the mountain had made further additions to its bulk in the same direction, and was just then invading the cemetery of the old capital. The once fertile fields were deserted, and falling back into a state of jungle; while for miles on either side of the volcano, and in the path of the monsoons, the trees were blighted and the vegetation destroyed by the sulphurous exhalations. The volumes of steam emitted by the volcano are largest in the early morning, when the air is cooler, and the condensation, on that account, more rapid. When, towards nightfall, we retreated from this scene of one of Nature's most terrible visitations, the red gleam of the volcanic fires could be distinctly seen in the clefts of the mountain.

The last days of the month of January found H.M.S. "Challenger" at her old anchorage off Zamboanga. On the 3rd of February we crossed the strait to Puerto Isabella on Basilan Island to renew our store of coal, returning to Zamboanga on the 4th. Adjoining the southern shore of the channel, between the above-named Spanish settlement and the island of Malamani, is the lake-village, inhabited by Moros, of which I present a coloured sketch. The numerous flagstaffs, without which the dwelling of a Moro would not be complete, all displayed their bunting in honour of a wedding, and the bridal boat, which showed a large white and red standard, and bearing the bride sheltered under a white canopy, was just crossing to the village, as I transferred the scene to paper, from the Fuerte de Santa Isabella.

On the 5th February we left Zamboanga, and bade farewell for a time to what is conventionally called the civilised world. We were now shaping our course towards regions where ships, large or small, are seldom met with, and the geography of which is far from being completed, our charts showing sundry islands and shoals that were not to be found, while such as exist proved to have been incorrectly laid down. Happily the corrections which the "Challenger" had an opportunity of making did not, as has often been the case, entail the loss of the ship or of the lives of any of its inmates. Passing southward of the wide bay which separates the two large peninsulas of Mindanao, we entered, on the 9th, the strait which divides the south-eastern extremity of Mindanao from the group of the Sarangani Islands, the latter rising from the sea with steep precipitous shores, though of no great elevation, the

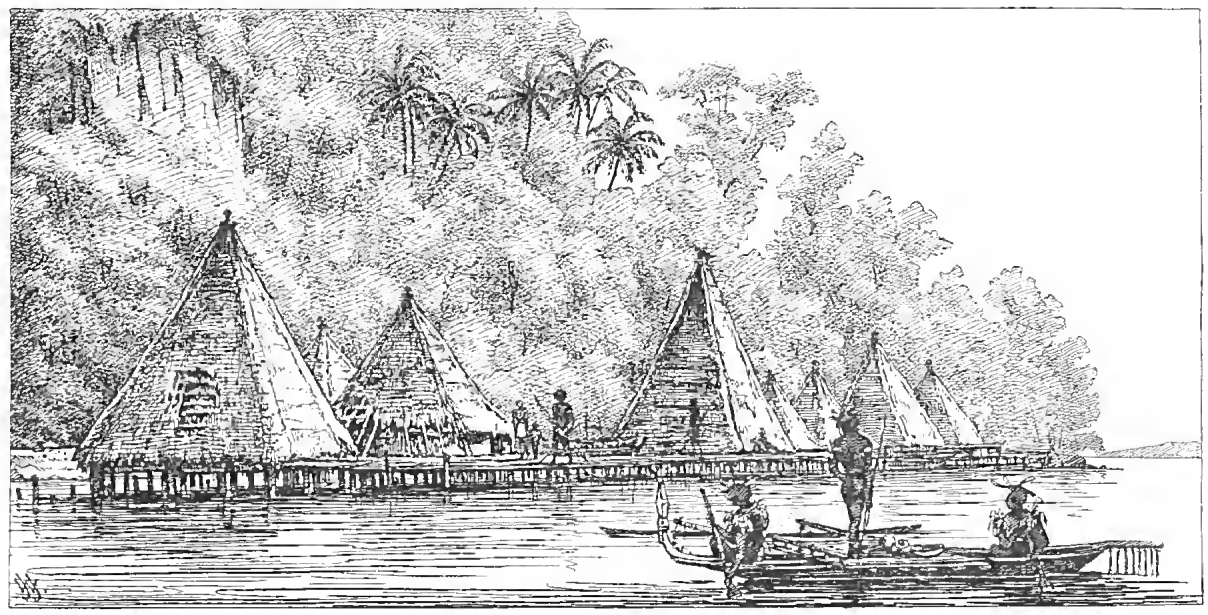
former densely wooded and disclosing a magnificent panorama of mountains. Certain islands said to lie to the eastward of the strait were looked for in vain, and we proceeded towards the Meangis or Menangis Islands. While dredging on the 10th in sight of this low-lying group and of the mountainous Karekelang, the largest of the Tulur Islands to the southward, a boat came alongside, manned by brown-skinned men, their hair pulled back and tied in a top-knot. On the 16th we sounded in 1650 and in 2000 fathoms, near the spot where Carteret Reef is marked in the ordinary charts. The latter also show a line of reefs pointing to a submarine elevation extending from Papua towards the Pelew Islands; but possibly further research may prove this to be also fictitious. Our attention on the 20th was called to a quantity of driftwood strewn about our track, including large trees, which lifted their blackened branches in the most grotesque manner above the sea-surface, and seemed to have been in the water for a long time. We were now nearly due north of the delta of the large river Ambernoh or Ambermo, which drains the northern slopes of the lofty central range of Papua, and empties itself into the ocean near Point d'Urville. Probably the trees just mentioned had been carried down to the sea by this great river, of which as yet very little is known, but which may at some future time, perhaps not far distant, be one of the great commercial highways into the interior of Papua. On the following day H.M.S. "Challenger" crossed the Equator for the third time since her departure from England. Numerous pieces of driftwood, with birds perched on some of them, denoted the vicinity of the great unexplored continent whose shores we were approaching.

HUMBOLDT BAY.

A wet cloudy morning prevented our obtaining an earlier view of the coast of Papua, but shortly after noon on the 23rd the weather cleared up, and the two steep promontories—Point Bonpland on the left, and Point Caillé on the right—which define the entrance to Humboldt Bay lay before us. Still further to the left Mount Bougainville lifted its head above the clouds, confronted on the far right by the serrated ridge of Mount Cyclops. We found ourselves, as it were, at one of the great gateways of the unknown land. When the "Challenger" anchored just inside the heads, darkness had already come on. Nothing was to be seen in the direction of the land except a number of lights or fires, having in the distance very much the effect of the gas-lamps of a seaport town. Later in the evening, as we strained our eyes and ears to catch some sign of life, the gradually approaching sound of paddles was heard. As soon as the native canoe—for such it was—came alongside, every effort was made to induce our visitors to step on board; but, as they persisted in their refusal, we burnt a couple of blue lights, whereupon an extraordinary sight was visible. The canoe contained two dark, brown-skinned, woolly-haired savages, dressed in little else but a few ornaments. The head of one was encircled with a crown of bright scarlet flowers, while the hair of the other was stuck all over with large white feathers. As they kept repeating a word which sounded very much like "Segāh, segāh!" some bundles of cigars were fixed to the end of their long fish-spears, and they proved their acquaintance

with civilisation by immediately lighting them with some smouldering embers. So far, we had succeeded in establishing friendly relations with the natives of Humboldt Bay, although their representatives could not be tempted to set foot on the deck of the "Challenger;" and after reconnoitring the ship all round, they disappeared in the darkness.

The rising sun of the 24th revealed one of the most interesting spectacles which it had been our good fortune to witness during our whole voyage. It was a fine breezy morning, with a few showers passing in the distance. Behind us Point Bonpland and Point Caillé lifted their grey cliffs into the cool morning air, while in front the thickly wooded promontories of the bay dipped their green edges into the white foam of the surf. All round our good old ship were gathered about eighty canoes, each manned by half-a-dozen savages in full war-paint, and mostly armed with bows and arrows. We intended to anchor at a point further up the bay. As soon as the screw began to turn, some of the natives were seen to point their arrows at it, as if they expected some terrible monster to rise out of the water. The "Challenger" slowly proceeded amidst the host of warriors, who endeavoured to keep up with her, while intoning their low mournful war-song, rendered more weird by the sound of the conch-shell. When we had reached our new anchorage several attempts were made to effect a landing; but the natives assumed a hostile attitude, attacking the boats with the evident intention of plunder, and making a show of resistance by pointing arrows at officers and sailors. Strict orders had been given by Captain Thomson that no force should be used, except under circumstances of extreme urgency and in self-defence. The surveyors, indeed, succeeded in landing on a small deserted island for the purpose of taking sights, and later in the day another part of the bay was explored with the help of the steam-pinnace, which the savages attempted to follow, but were of course unable to keep up with. This was near a village situated behind Point Caillé, and presenting a perfect example of a lake-village of primitive type, more correctly described by the German term "Pfahlbauten." Substituting wattles for palm-leaves,



VILLAGE IN HUMBOLDT BAY.

we seemed on our approach to have before us a fac-simile of the lake-dwellings discovered in the Lake of Zurich and other Swiss lakes, and an actual illustration of the stone age, for the natives of Humboldt Bay were wholly unprovided with iron, their hatchets, similar in shape to those of the primitive races of Northern Europe, being pointed with a hard, green-coloured stone, capable of nearly as high a polish as jade. By the time the pinnace had arrived close

to the platform, the village seemed deserted by its inhabitants, with the exception of two men, who by frantic gesticulations, and by aiming their arrows at us, expressed their objection to any further approach. Apparently impressed by our peaceable demeanour, their fear and rage, however, soon subsided so far that they were induced to lend their own services, and the use of their canoe, for the purpose of bringing the exploring party on shore at a spot to the left of the village, where the water was very shallow. Having shot a few birds, and collected some plants, all returned safely on board the pinnace. The two men were much gratified by the few presents which they received, and it seemed probable that with time and patience we might have come to a better understanding with the natives of Humboldt Bay. Their attitude was more probably the result of fear and terror inspired by the arrival of so large a ship than of any mere savage hostility. But having only just commenced a long cruise, we had not sufficient time at our disposal for overcoming the difficulties in our way, and the project of devoting a few days to the survey and exploration of Humboldt Bay had to be given up. It looked like an ignominious retreat before a handful of men whom we choose to call savages, but whose home we had no right to intrude upon except with their consent. The exploration of Papua, too, was not the object of our mission, and we were, moreover, determined that, for as much as lay in our power, the records of the "Challenger" Expedition should not be disgraced by the slaughter of men who, considering the immense superiority of our weapons, were virtually defenceless. To fire—without absolute necessity—upon a naked savage, armed with bow and arrows, savours much more of cowardice than courage.

Meantime, although none of the natives could be induced to come on board, a brisk trade had sprung up between the ship and the swarm of canoes surrounding it. To see them depriving themselves of their weapons and ornaments, the result of much toil and inventive skill, and handing them over to us in return for a few inches of rusty hoop iron, was a singular sight, and could not fail to impress us with the immense value which this metal must have in the eyes of a man hitherto compelled to spend month after month in chipping out his canoe from the trunk of a tree with a stone hatchet or the sharp edge of a shell. If asked to decide upon the relative values of a lump of gold, a diamond, and a rusty nail, he would, without hesitation, give the preference to the latter, as being of infinitely greater use to him. Seeing that iron was the great object of their desire, I conjectured that the word "segāh," the exact meaning of which we could not ascertain, might be the name given by them to this useful substance. It might easily have been shown that the great difference between the "Challenger" and the frail canoe alongside—between the advanced civilisation represented by the one, and the primitive civilisation typified by the other—rested chiefly upon the fact that the race of men on board the big ship had been for ages in possession of iron, while those of the canoe had hitherto remained ignorant of the existence of this king of all metals, or at least destitute of means and opportunities of procuring it.

Laden with the "spoil of the Egyptians," whose store of bows and arrows, three-pronged

fish-spears, carved paddles, stone hatchets, bone daggers, ear-rings, nose ornaments, necklaces, breast-shields, bracelets, and wigs we had no doubt considerably reduced—I fear the next gathering of the warriors of the tribe must have fallen short of its usual splendour—we steamed, before sunset, out of Humboldt Bay. This wide and commodious harbour, easily defensible by a few forts at its entrance, which is about a mile and a-half in width, and situated in a fertile and apparently healthy district at the foot of the lofty ranges of Mount Cyclops and Mount Bougainville, is marked out by nature as an important starting-point in the future colonisation of Northern Papua. Its distance from Ternate is little more than 800 miles, divided into nearly two equal parts by the Dutch settlement in Geelvink Bay, while the navigation presents no unusual difficulties.

The accounts of the earliest discoverers of the different portions of Papua tally exactly with the experience of those on board H.M.S. "Challenger," the natives showing themselves friendly and hospitable in the face of good treatment, shy and hostile where either experience or tradition had made them acquainted with the deadly effect of fire-arms. Europe has, during the last three centuries, undergone a series of the most astonishing transformations, yet no perceptible change seems to have taken place in the habits, customs, and outward appearance of the natives of Papua. One of the first European navigators in these regions, Grijalva (1537), naïvely describes them as follows:—"The natives are men with woolly hair; they eat human flesh, are great rascals, and given to such wickedness that the devils go with them by way of companions." The Dutch navigator Schouten (1616) says of them:—"The inhabitants had short and woolly hair; they wore rings in their ears and nostrils, feathers on the head and on the arms, strings of boars' teeth on their necks and on their noses, and a large ornament on their breast. They used betel, and were subject to several diseases and deformities."

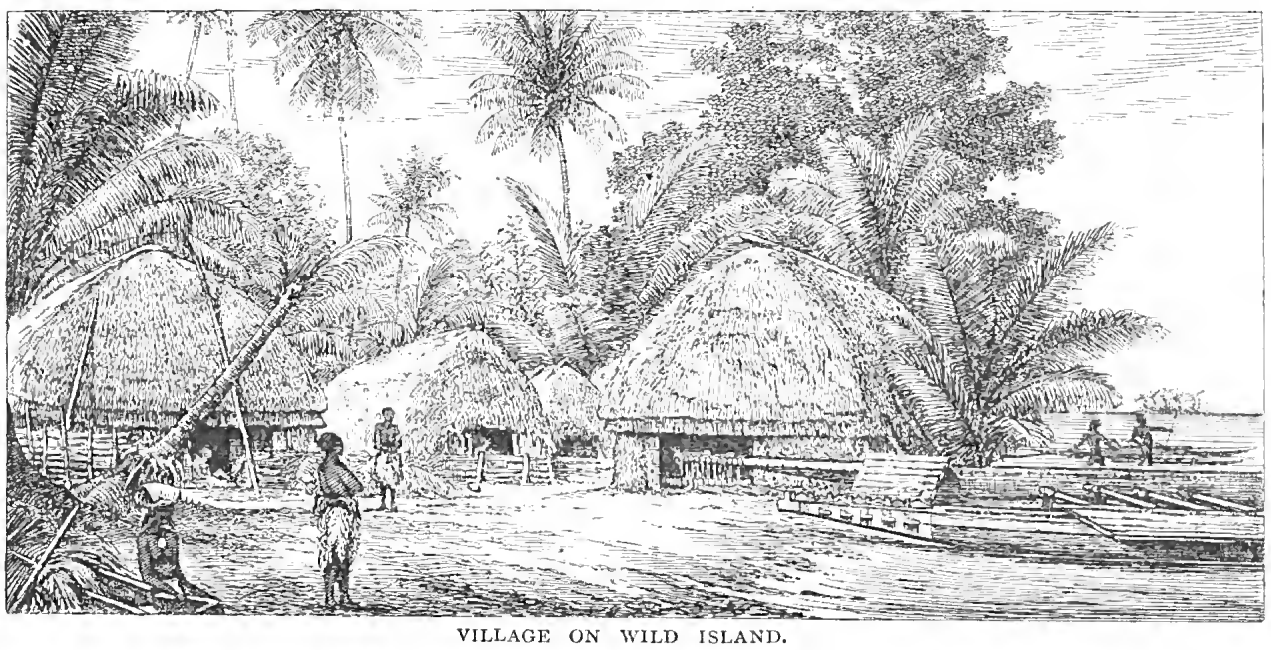
Humboldt Bay was discovered and named by the French navigator Dumont d'Urville, commanding the "Astrolabe," in the year 1827; but he was prevented by the loss of his anchors from making a proper survey. He named Mount Bougainville after his predecessor, who, in 1768, had visited this part of the coast.

ADMIRALTY ISLANDS.

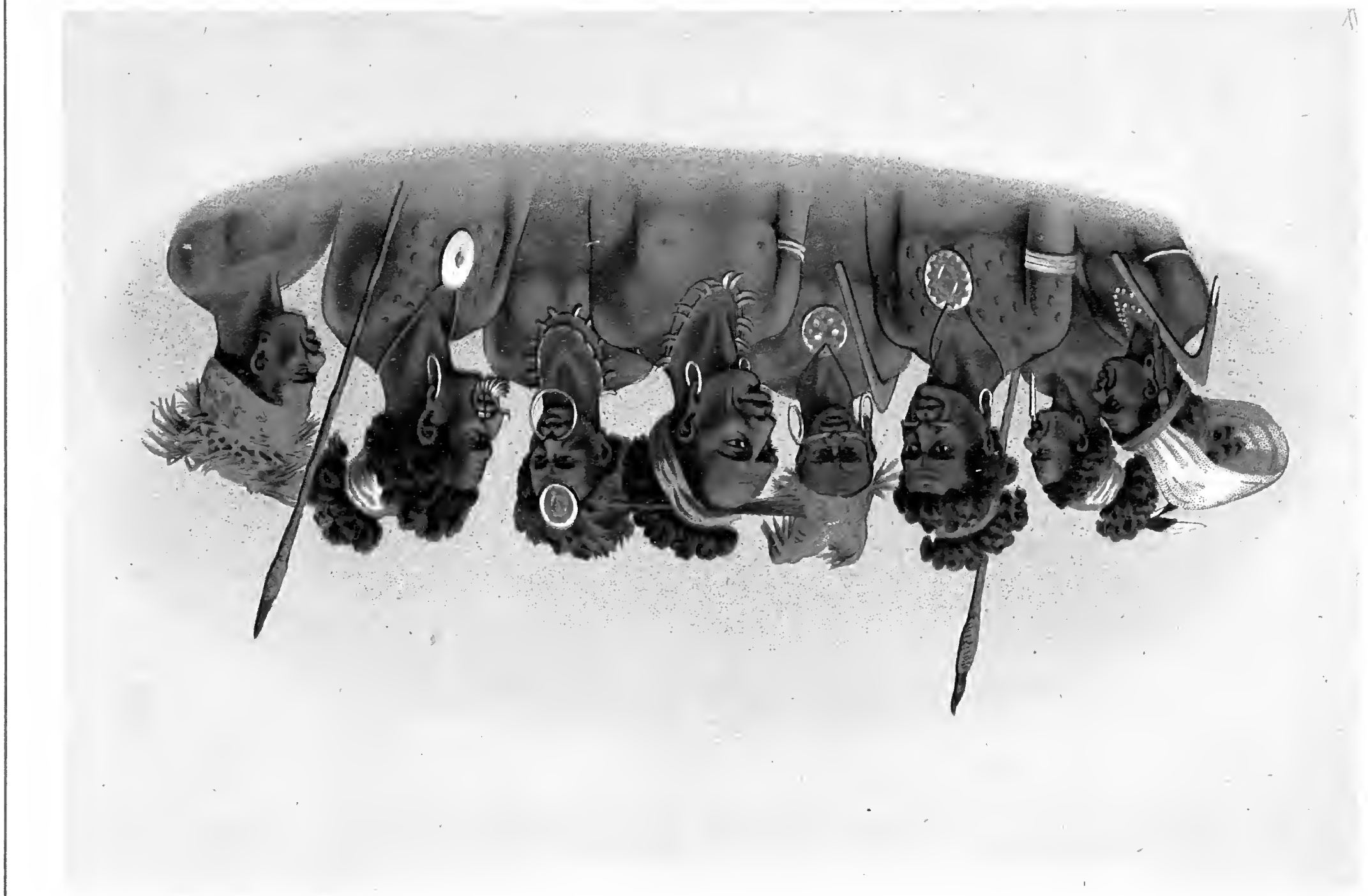
On the 26th we sighted Matty Island about ten miles to the northward; on the 28th Roissy or Rossy, the most northern of the Schouten Islands; and towards sunset on the 2nd of March the group of the Hermit Islands was just visible above the horizon about twenty miles to the north-west. The following day turned out rainy and misty, and we had some difficulty in making the nearest of the Admiralty Islands, our next destination. Concluding that we had crossed the meridian of the group of small islands which, according to the chart of D'Entrecasteaux, surround the north-western extremity of Admiralty Island, the largest of the group, we steered towards the south, and shortly after, the weather clearing up, we found ourselves close to the objects of our search. The islands which now lay before

us, covered with fresh green foliage down to the water's edge, were but the projecting portions of a long crescent-shaped coral-reef which skirts the north-western end of the mainland. Not having received any name from their first discoverer, D'Entrecasteaux (1792), our surveying officers named the reef after him, while the spacious harbour inside the reef was called Nares Harbour, in honour of our former captain. The chain of small islands situated on D'Entrecasteaux Reef was distinguished by the names of the members of the Civilian Scientific Staff, and in this manner the writer of these pages became the titular owner of one of the Admiralty Islands; and it turned out that he had drawn a prize in the lottery, for Wild Island proved to be one of the inhabited islands of the group, and, being situate at the entrance to Nares Harbour and close to our anchorage, we had frequent opportunities of visiting it. As we were proceeding along the outer edge of the reef, we saw a number of canoes under sail approaching through the surf. When close to us, the natives within them lifted up their arms, holding in their hands plates of tortoise-shell, as if anxious to commence trade forthwith. We did not stop, however, and, the canoes following in her wake, H.M.S. "Challenger" entered Nares Harbour in seeming triumph, attended by this novel escort.

We soon noticed a marked difference between our new friends and the natives of Humboldt Bay, not only as regarded their physical appearance, their favourite weapons and ornaments, but in their conduct towards strangers. Although somewhat shy at first, we ultimately persuaded them to come on board, and, excepting one or two critical moments when a conflict seemed to be impending, our relations during our stay, from the 3rd to the 10th of March, continued on a most amicable footing. All day long the ship was surrounded by a swarm of canoes, and the noise of the shouting, although each side hardly understood one word of the other's language, was deafening. A circumstance that struck me particularly was that, like the birds, the islanders appeared at sunrise and disappeared at the coming on of night. At early dawn we saw them fishing on the reefs, getting a supply for the day's dinner—they were essentially a race of fishermen, capital navigators of their long, strongly-built canoes, most expert divers and swimmers—and after sunset nothing more was seen or heard of them, except on one or two occasions when the distant sound of their drums betokened some high festival. As in Humboldt Bay, no woman or girl, of whom they seem very jealous, was ever seen on board a canoe; but on shore the females moved freely about,



VILLAGE ON WILD ISLAND.



and, to judge by appearances, did not seem to suffer from any sense of inferiority. There was a decided difference, however, in some respects. While the men prided themselves on their long woolly hair, tied above their heads and forming a bunch like the crest of a helmet, the hair of the married women was cut quite short. The strong sex also usurped all personal ornament, such as ear-rings, nose-rings, combs, armlets, necklaces; the adornment of the fair sex being reduced to some rough tattooing and an apron of leaves tied round the waist.

The natives of the Admiralty Islands, like most Polynesians, display a certain amount of skill in carving, as shown in the accompanying illustrations. This rudimentary knowledge of art is the more surprising when we consider the imperfection of the tools at the artist's disposal, often but the sharp edge of a stone or shell. Several huts on the island nearest our anchorage were adorned with carved door-posts, which in one instance bore the shapes of a human male and female. These were probably idols, and resembled the sculptured work which has been discovered elsewhere in Papua and the surrounding islands. I have reproduced them with a few immaterial alterations. All the carvings on the door-posts, the prows of canoes, the wooden vessels, were painted in white, red, and black, which seemed to be the familiar hues—probably, indeed, the only tints at their disposal. The handles of their large wooden bowls, some of which were carved even more elaborately than those here depicted, exhibit a perception of form and proportion much in advance of the rude attempts of many other semi-barbarous races, both ancient and modern. Besides the human figure, we also found representations of birds, lizards, and fishes; and it is to be observed that the predominance of the straight line affords evidence of the imperfect tools at the command of the native artist.

My colleague on the Civilian Scientific Staff, Mr. H. N. Moseley, devoted special attention to the physical and moral pecularities, the language, customs, habits, dress, and implements of the natives of Wild Island, and the highly interesting results of his investigations are embodied in his paper published in the *Journal of the Anthropological Institute* for May, 1877, and illustrated by numerous drawings. He has left but little to be gleaned in the field he has so thoroughly explored.

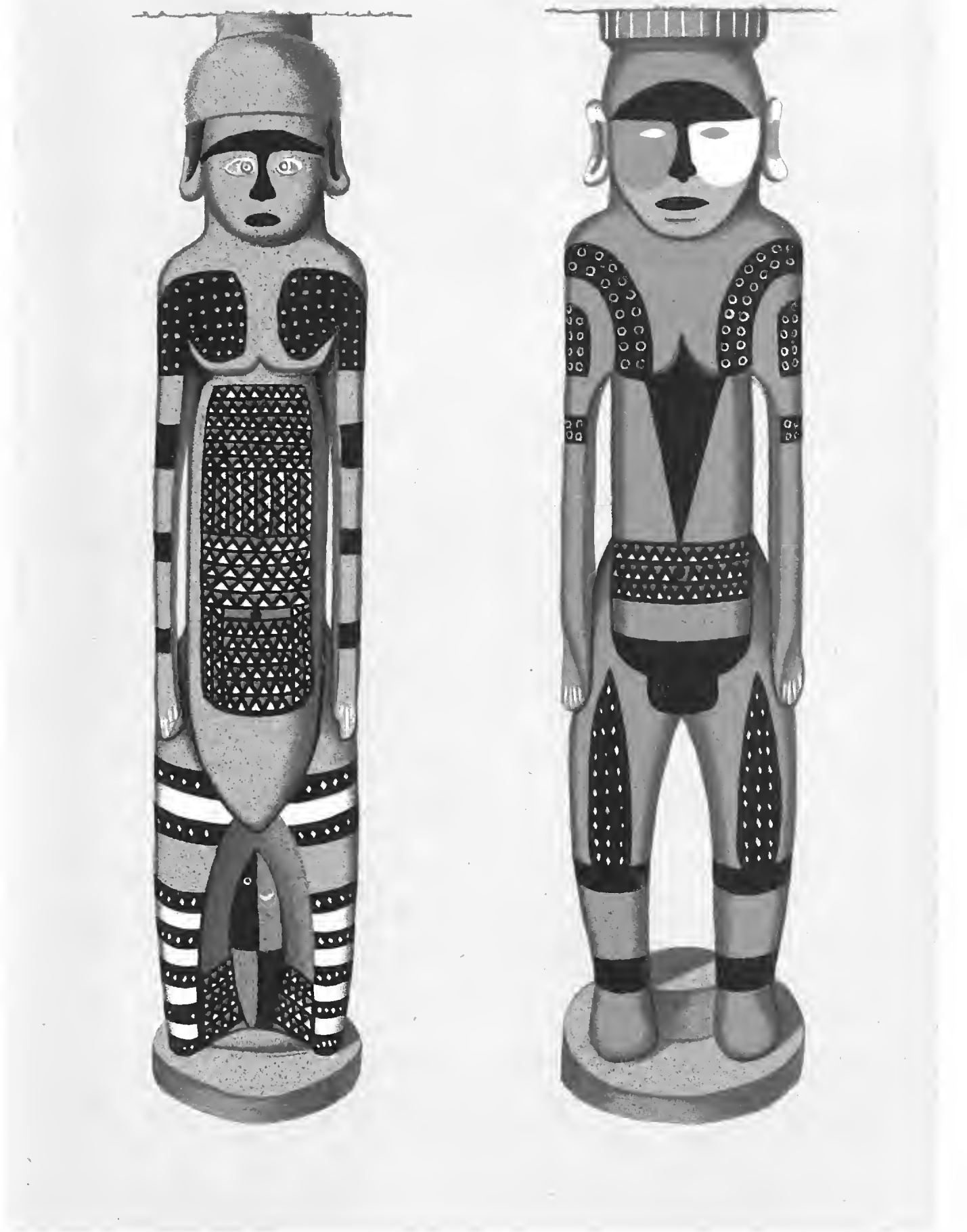
On the 8th the pinnace started for D'Entrecasteaux Island, situated on the reef to the westward of Suhm Island. About five miles further, on a separate reef, in a W.S.W. direction, are Murray, Moseley, and Buchanan Islands. We had taken with us a pair of goats, intended as a present to the inhabitants of D'Entrecasteaux, but found, after landing, that they strongly objected to accept our gift, for reasons which we were unable to guess; so the animals were landed on a neighbouring island, which was not inhabited, but where they would find plenty of food. Our savages, who rear pigs, may possibly have changed their mind since our departure, and adopted the two outcasts. While this matter was giving rise to a lively discussion on the beach, in which the contending parties did their best to supply the want of a common language by shouts and gesticulations, I had wandered inland among the trees in search of the village situated on the opposite side of the island, and soon lost my way. A native who had guessed my intention, as well as perceived my difficulty, beckoned

me to follow him, and away we went at a rapid pace through the wood, over the stile in the tall palisade which surrounded the village, and along its clean-looking paths, strewn with coral sand, to his hut, from which he brought out a log for me to sit on. Here, with my new friend beside me, I soon found myself surrounded by a crowd, mostly women and children, as nearly all the men were at the beach. Happily I had the means of ingratiating myself by distributing the much-coveted beads, with which I had filled my pockets. My host, who appeared to be a man of note, seemed a little displeased at being left without his share. If the crowd, gathered in a semicircle before me, stared with wonder at the first white man they had ever seen—and there is no record of these islands having been visited by a European ship since the time of D'Entrecasteaux—I was not a little uneasy at being made the sole object of their attention, and might have felt rather nervous had I known that they were accustomed

"To eate the flesh of men whom they mote fynde"—

as subsequent discoveries gave us strong reasons to suspect. On one occasion, when enquiring by pantomime whether they would like to eat Sam, a Newfoundland dog, and a universal favourite on board the "Challenger," they expressed great disgust; but when we pointed to ourselves, their delight at the idea seemed unbounded. The total absence of graves, as well as the discovery of human bones mixed with the bones of animals used for food, were circumstances equally suspicious. When some of the natives found that skulls were a *desideratum* with our naturalists, they brought a number of them to the ship, and exchanged them for hoop iron, knives, and hatchets. I do not think it would be libellous to say that for a sufficient consideration they would have parted with their own living relatives, and evidently would have had no objection to sell the bones of their ancestors.

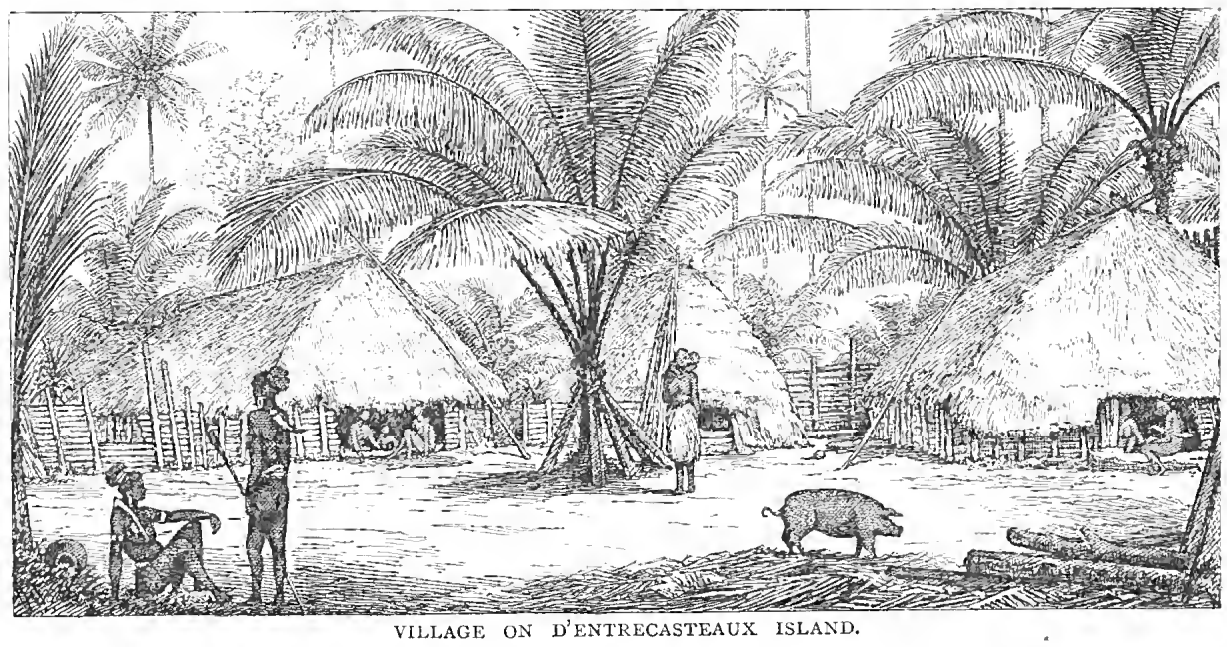
On our first arrival the natives apparently believed that our white complexion was the result of paint—judging at least from the extreme curiosity with which they examined and felt the skin of our faces, arms, and legs, as if to satisfy themselves that they were not "made up." They are very fond of painting themselves. The individual with the big shock of woolly hair, represented in the sketch, afforded one day immense amusement, by appearing with his body entirely painted in green and scarlet, the colours being arranged in large elegantly-curved patches. It seems our tars had presented him with a few pots of paint. This same young man seldom left the ship's side, and was, indeed, a general favourite. Our attention was directed to him because, unlike the rest, he did not tie up his hair, nor did he chew betel, so that he was the only man who, so far as we observed, could boast of having a perfect set of white teeth. Moreover, he was the most good-humoured, amiable-looking savage we had yet met with.



From these peculiarities, I suspect that he may have belonged to a different tribe from the rest of the Wild Islanders.

To return to my visit to D'Entrecasteaux, after having satisfied the curiosity of the villagers, who found new subjects of astonishment in my companions, I proceeded to sketch the village, my host watching every line with the greatest attention. On my showing him how to use the pencil and india-rubber, he added some confused scrawls to my sketch-book, amidst the ejaculations of his friends, to whom he imparted the knowledge just acquired. When one of them chanced to step in front of me, he ordered him out of the way; and certainly, when I remember all his attentions from the moment we met, I must describe him as the politest of cannibals. I had the satisfaction of seeing him rewarded with the gift of a hatchet, which may serve to remind him of his first lesson in drawing.

The inhabitants of D'Entrecasteaux Island seemed to occupy a higher social scale than the poor fishermen of Wild Island. The village of the former, numbering about thirty huts, is defended by a palisade fifteen feet high, having two entrance-stiles, one leading down to the beach, the other into the interior of the island. The dwellings are also more solidly built with walls of wooden logs covered in with a high thatched roof. The pathways are neatly laid with white coral sand, and we even noticed some attempts at ornamental gardening. A young cocoa-nut tree planted in the centre of the principal open space was protected by a sort of railing.



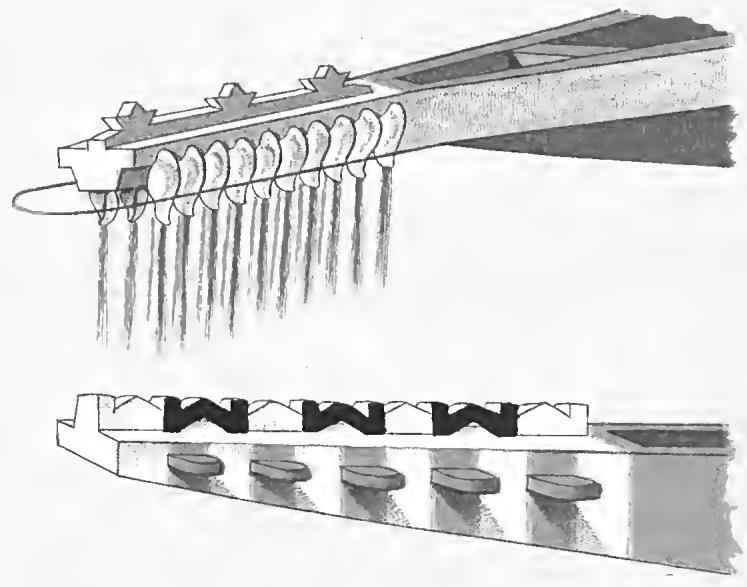
VILLAGE ON D'ENTRECASTEAUX ISLAND.

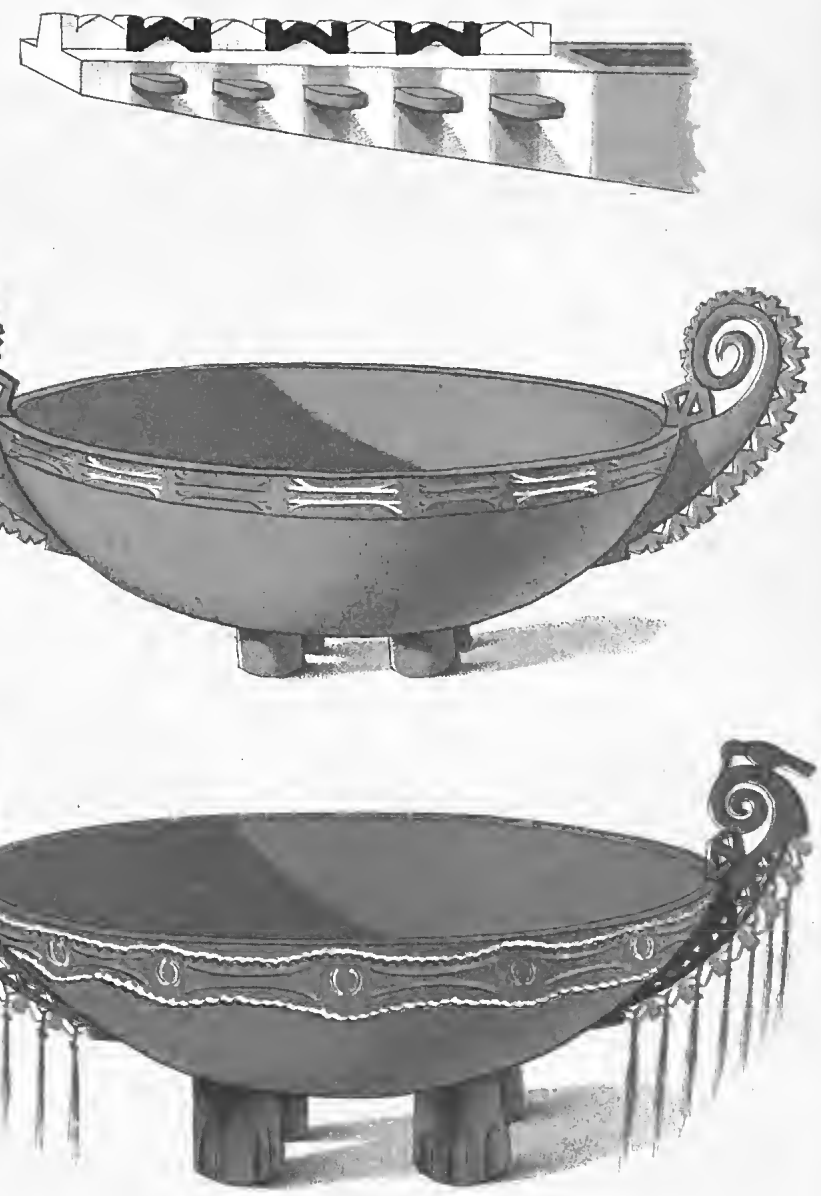
Good-humoured and hospitable as these natives generally are, the most trifling incident, and one which may completely escape the attention of the traveller, may instantly transform them into fierce savages filled with ungovernable rage. Though they may present themselves unarmed, their weapons are never far off, and before the stranger has time to turn round, the erewhile peaceful crowd is changed into a swarm of demons, yelling with fury, flourishing spears and hatchets, their bloodshot eyes glaring like those of tigers. They combine the simple dispositions of a child with the fierce passions of the man, and the transition is instantaneous. One day, while a number of men and boys were scrambling for a few strings of blue beads, one of them, a fine young fellow, not having succeeded in obtaining his share, flew into a rage, and, seizing a long pole, hurled it with such force into a hut close by as would have caused the instant death of any one who happened to be in the way. As he stood poising his weapon, he looked, with his fine muscular limbs and crest of woolly hair, a

living model of an ancient Greek warrior such as the painter David loved to represent. I could not help smiling at the absurdity of one of the finest men of his tribe becoming so enraged as almost to commit murder because he had failed to secure a handful of beads. He saw the smile and returned it, having completely dismissed the "fire-eyed fury" which had inspired him a moment before. It was generally remarked that their conduct was irreproachable as long as cupidity and envy were not excited by the distribution of presents. Amongst naked savages, the social distinctions which exist between the rich and the poor, the chief and the common man, or may be the slave, are—to the European—indistinguishable, and it may happen that a gift of supreme value in their eyes is bestowed upon the latter, while the former, who stands close by, is sent away empty-handed. Whether it was owing to such a cause, or that they wished to secure all the articles in our possession, I know not; but when we were gathered on the beach of D'Entrecasteaux Island waiting for the boat, we found ourselves surrounded by an angry crowd. Some were flourishing spears and hatchets, and exciting their comrades to the attack; others waded into the water, and seized upon the boat in order to prevent our departure. Our tars quietly knocked them on the fingers, and we were soon beyond reach of their weapons. Happily these islanders have no bows and arrows, otherwise a shower of the latter, probably poisoned, might have selected one or more victims amongst us.

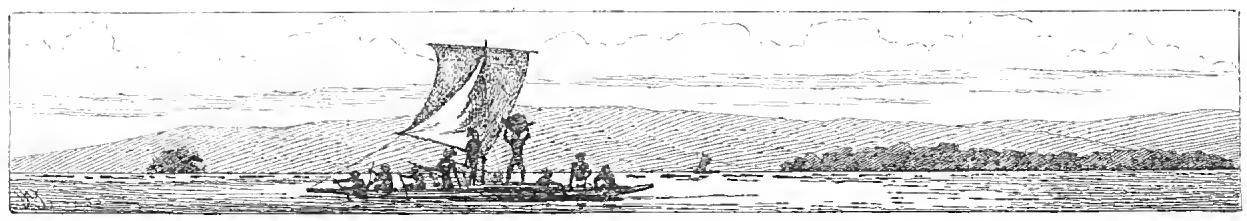
The skin of the Admiralty Islanders is decidedly of a darker, more sooty brown than that of the natives of Humboldt Bay. The not unfrequent occurrence of a Jewish cast of features was a subject of general remark on board. It is not easy to express in concise terms the difference observed between varieties of the same human race, although such difference may be patent to the most superficial eye. Few would confound an Englishman with an Irishman, a man from Derry with a man from Cork, a Scotch Highlander with a Lowlander, nor would a Frenchman mistake his countryman from Marseilles for one from Normandy; yet probably no two observers would agree as to the precise characteristics which distinguish the one from the other, for in each case two individuals might be found, one belonging to each variety, in whom the points of difference are extremely vague. The human mind, by an unconscious process of integration, is apt to sum up the numerous more or less definable differences which exist between races and varieties of races, and to create for itself, as the result of experience, a representative type, which can no more be confounded than a camel can be mistaken for a horse. It is these representative types which naturalists have termed species, genus, variety, &c., although they have not yet been able to agree as to where the one ends and the other begins. A comparison between the two groups of natives from Humboldt Bay and from the Admiralty Islands will best illustrate the above remarks. They are founded upon sketches and notes taken on the spot, and, apart from the difference in dress, if such it can be called, there is a clear contrast between the two, although the originals of both belong probably to the same section of mankind—the Papuan or woolly-haired race.

On the 10th of March we bade farewell to this interesting scene, which, as we recall it to our mind, seems rather the creation of a dream than reality. While steaming out of





the harbour, H.M.S. "Challenger" escaped shipwreck almost by a hair's-breadth. A patch of coral reef not more than a few yards square, and which had escaped our attention at the time of entering the harbour in the dusk of the evening, was discovered right in our track, and as the ship was under steam, although moving slowly, it was too late to avoid it. Its depth below the surface proved to be only three and a-half fathoms, little more than the draught of our ship when not heavily laden. Fortunately we cleared the dangerous rock, with the assistance, as it appeared at the critical moment, of a friendly wave which lifted us over. There seemed to be shallow water to the eastward of the rock, which has been called the "Challenger Shoal," so that the entrance to Nares Harbour is in the channel between the latter and Observation Island, a low patch above water covered with a few trees, and forming the eastern end of the great D'Entrecasteaux Reef. The depth in this channel, as well as in Nares Harbour, is from twenty to forty fathoms. Still anxious to trade, our dusky friends had followed us out of the harbour, one of them holding up a large carved wooden bowl; but with the rapidly setting sun we soon lost sight of each other.



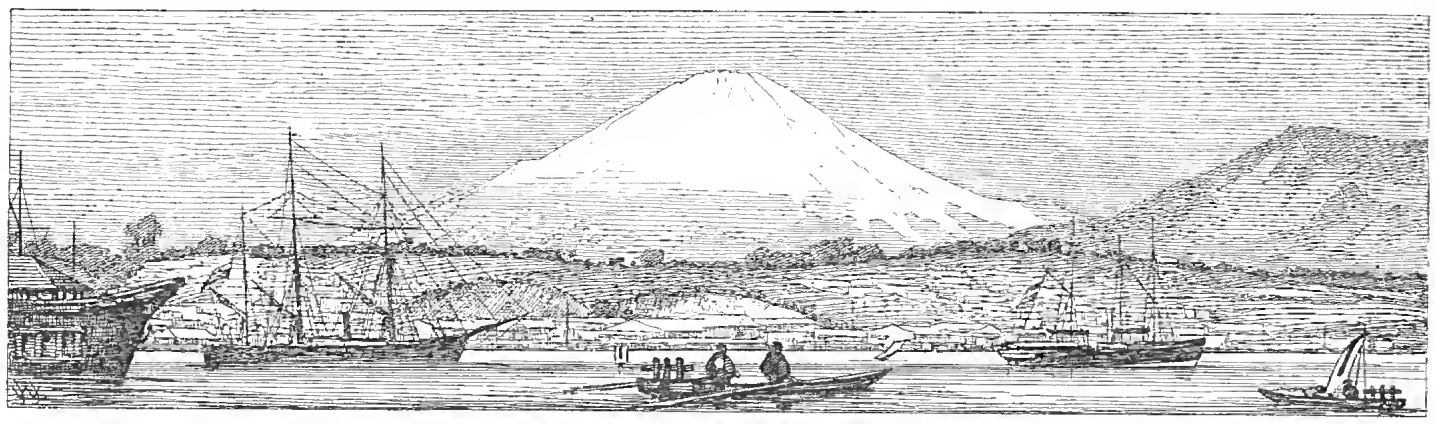
NARES HARBOUR, ADMIRALTY ISLAND.

Our cruise from the Admiralty Islands to Japan, a distance of about 2500 nautical miles, occupied more than a month, and was rendered very trying, both to our temper and our health, by the great heat which prevailed most of the time, the frequent calms, and the baffling winds which kept us at a distance from islands we hoped to see and perhaps explore. We had intended, if possible, to examine, on Tinian, one of the Mariana Islands, the remarkable ancient monuments, the presence of which in this remote part of Polynesia has created much interest among archæologists.

The most notable event of this cruise was the discovery of the greatest ocean-depth as yet ascertained by soundings taken with the utmost care, and the results of which can be considered trustworthy. On the 23rd of March we stopped in lat. 11° 24′ N., long. 143° 16′ E., and about midway in the narrow sea which separates Guam Island, the most southern of the Mariana group, from Uluthi, one of the western Caroline Islands. The depth was found to be 4575 fathoms, or about 5¼ English miles. A second sounding, with a weight of 4 cwt. attached to the sounding-line (we had only used 3 cwt. in the previous sounding, not expecting so great a depth), gave 4450 fathoms, or 26,700 feet. The rod of the sounding-machine contained a quantity of fine red mud or clay. The bottom-temperature, corrected for depth, was 1° C., and three out of the four thermometers sent down in the two soundings returned to the surface crushed to atoms by the enormous pressure to which they had been exposed, the glass of the tubes being reduced to a fine white powder. These soundings show that the depths of the ocean, as yet ascertained, do not exceed the height of the loftiest mountains, that of Mount Everest, in the Himalayas, having been estimated at 29,000 feet, while still higher summits have been reported in the same region. It is necessary

to add that our two soundings described above do not refer to exactly the same spot, the ship having drifted in the interval, though only a short distance.

In the afternoon of the 6th April, when westward of the Bonin Islands, we observed an eclipse of the sun, which was due upon that day. Favoured by cooler breezes, we were now rapidly approaching the coast of Japan. On Sunday morning, the 11th April, the



YOKOHAMA.

snow-covered cone of the celebrated Fusiyama (12,450 feet), so often figured by the Japanese painters on various objects of ornament and utility, rose before our admiring gaze, and, sailing up between the picturesque shores of the Uraga channel, H.M.S. "Challenger" dropped her anchors at 5 p.m. in the Bay of Yeddo, and in the midst of the shipping which crowded the port of Yokohama.

JAPAN.

After the usual eager look-out for the boat with the Union Jack at its stern which was to bring the home mail—seeing it at last alongside with its bags full of letters and newspapers, and receiving the ever-welcome messages from home—fraught though some of these might be with "dole" as well as with "delight"—we hastened on shore to see Japan and its people. We remembered the Japan of our youth, as depicted in old books of travel —a land of mystery, leading a life apart from all other nations, and still continuing in a state of semi-barbarism, not very unlike the Europe of the Middle Ages, with its castles and barons, its troubadours and pilgrims—a land which to endeavour to penetrate was certain death to the adventurous traveller. We found it in the throes of a great revolution, both political and social, casting aside the shackles of time-honoured traditions, and, as is unfortunately the case with most revolutions, uprooting not only the noxious weeds which had grown up in the course of ages, but also the noble oak which had needed centuries to bring it to maturity. We remembered the gallant two-sworded warrior of Japanese romance in helmet, coat of mail, and fierce-looking mask; we found him trying, not figuratively but in reality, to force his strong, angular frame into the strait garments and tight boots of Western civilisation. However, it was to the disestablishment of this roaring swash-buckler—who was wont, after imbibing an undue quantity of "sake," to display his prowess upon the defenceless foreigner—that we owed the facility and perfect security in travelling which so much enhanced the enjoyment of our excursions into the interior.

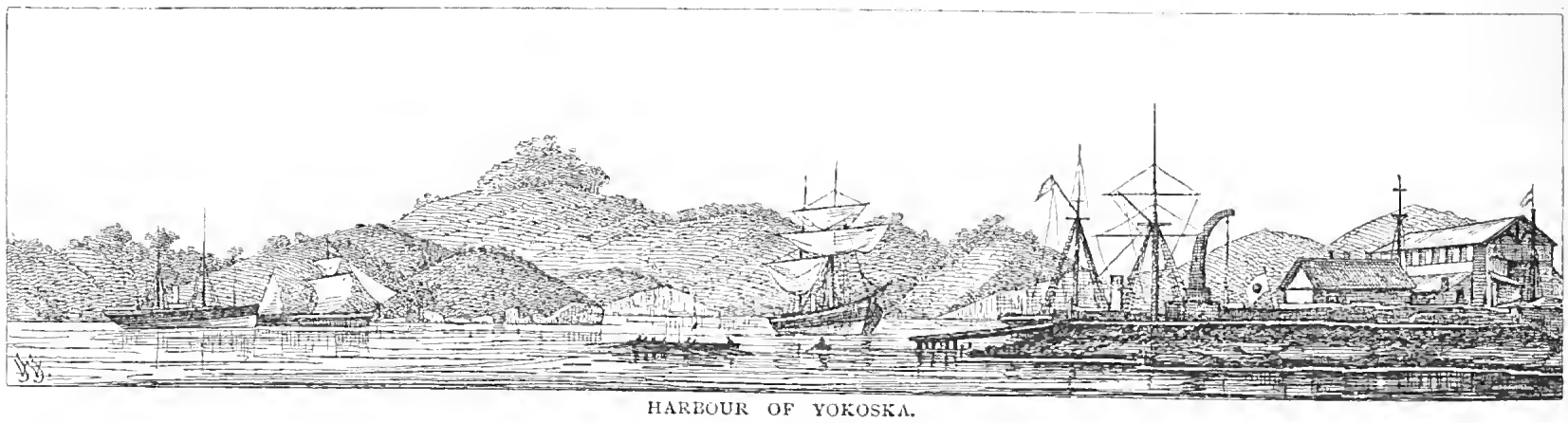
Yokohama is built between the shore and a range of low hills dotted over with trees and houses, and overlooked, from a distance of about fifty miles, by the snow-capped cone of Fusiyama. The southern end of the town is the quarter occupied by foreigners. It contains the residences of the various consuls, a club-house, some fine private buildings, and shops. The general aspect is one of respectability and dulness. The high ground immediately beyond is sprinkled over with pretty villas, and is further adorned by a tastefully laid-out public garden. The Japanese quarter forms the northern and more lively section of the town, and extends as far as the terminus of the railway which connects Yokohama with Yeddo, now called Tokio, distant only about fifteen miles. My first sensation on entering the native quarter was that of having suddenly grown taller by several inches, or of having stepped into a second Liliput. The small, neat, one-storied dwellings of the Japanese, and the narrow streets, are quite in keeping with their diminutive inhabitants; and the whole scene, quaint as it is novel, produces a strange impression upon one accustomed to the wide streets and many-storied houses of European cities. The Japanese, like the French, with whom they share many characteristics, are—more especially the women—somewhat short of stature. The young girls, in scarlet petticoats, with broad sashes fastened at the back in a large bow, their carefully-arranged hair decked with silver and gold pins and artificial flowers, look, as they shuffle across the street upon their clumsy clogs, like overgrown dolls just escaped from a toy-shop.

JAPANESE GIRLS.

The people strike one at first as being very sociable, polite, intelligent, good-humoured, and remarkably fond of out-of-door life. Visiting temples, theatres, tea-houses, public baths, and shops, they seem to be ever going to and fro; yet in the thickest crowd there is no pushing, no trace of ill-temper or rudeness, no offensive curiosity in the case of a person whose garb marks him as a foreigner; on the contrary, everything is quiet and decorous. Compared with most other nations, Japanese dress and houses are conspicuous for cleanliness. The official classes seem to have adopted the European style of dress, in which they show by no means to advantage. The majority of the people still adhere to their native costume, although some of the more advanced have decided in favour of the wide-awake, the Western umbrella,

and short boots with side-elastics. The wealthy often add a watch and chain to their personal adornment.

The numerous curiosity-shops of the Japanese quarter afford a never-failing source of amusement and instruction to the visitor to Yokohama, who feels attracted as much by the variety and artistic merit of the objects offered for sale, as by the uniform civility, patience, and good-humour of the tradesmen. Some of these shops are stocked with second and third rate articles of European manufacture. A comparison of such with the shops exhibiting Japanese goods leads to conclusions by no means flattering to the over-praised civilisation of the West. The native stores, with their stock of bronzes, porcelains, lacquer-ware, carvings in wood and ivory, are museums of art which the most accomplished artist of Europe would think it no condescension to enter for the purpose of study. The contents of the importer's bazaar, while they prove the undeniable superiority of European mechanical appliances, betray a poverty of artistic resources and a misapplication of ornament which are rather humiliating. If, in consequence of our advance in physical and mathematical science, and in the mechanical arts, there are many things which the Japanese may learn from us—and they have already displayed a surprising facility in adopting and working our most useful inventions, such as the railway, the telegraph, the printing-press, the sewing-machine, &c.—they will amply repay us by giving to our workers some much-needed lessons in the art of design and ornamentation. The Japanese show superior skill in the free adaptation of natural forms, whether borrowed from plants, animals, the human figure, or landscape, for decorative purposes. Like other Eastern nations, they excel us in the difficult art of covering a plain surface with a tasteful combination of lines and colours, and, with very few exceptions, the creations of the Japanese artist are unsurpassed for the wonderful patience and exquisite finish displayed in the execution of even the minutest detail. The vendor of European goods may possibly have looked with a feeling of superiority upon his neighbour the dealer in Japanese *bric-à-brac*, and might have been greatly surprised had he known that the traveller who had just passed his door felt thoroughly ashamed at the contrast between cheap gaudiness on the one side and real artistic merit on the other.



HARBOUR OF YOKOSKA.

On the 27th April our vessel left Yokohama for repairs, and proceeded to the Japanese Government dockyard at Yokoska. The latter is situated in a quiet secluded bay about twelve miles to the southward of Yokohama, and in the midst of finely wooded hills,

which afford splendid views of the neighbouring bays, islands, and promontories—perhaps one of the fairest scenes in a land eminently rich in natural beauties. On a hill which overlooks the extensive range of dockyard buildings, stands a villa which was pointed out to us as the occasional residence of the Mikado. His Imperial Majesty is said to take a strong interest in the progress of the works of which the future navy of Japan is to be the result. As soon as our good ship lay high and dry in the dock, handed over to an army of tars and workmen, we scattered in all directions, each bent on his own purpose—some to botanise, some in search of game, others to make observations, or to sketch, or simply to enjoy the luxury of treading the "sure and firm-set earth." One of the first visits paid by some of us was to the workshops in the dockyard. Here we found steam-hammers, boring and planing machines—in fact, all the most recent improvements in the manufacture of iron, managed by Japanese artisans. The foremen and superintendents were chiefly Frenchmen, for as yet the Japanese Government is obliged to entrust the direction of the naval, military, and other departments to foreigners, principally natives of either France or England. In a shed in the dockyard we saw the first steam-engine built by Japanese workmen, and intended for a man-of-war in process of construction in the same establishment—truly an astonishing evidence of progress in a country whose condition not many years ago very much resembled that of Europe in the Middle Ages.

It was on a beautiful spring morning, April 29th, that a number of us started on an excursion to Kamakura, many centuries ago the capital of Japan, but now reduced to the dimensions of a village. The pinnace landed us at Kanasawa, situated in one of the numerous bays which indent the western shore of the Bay of Yeddo. While waiting at the tea-house for porters to carry our provisions, the hostess prepared tea, which was handed round by a little bright-eyed moosmie (girl), all smiles and sunshine. The traveller in the less frequented parts of Japan is still obliged to take his provisions with him, as at the tea-houses—*i.e.*, Japanese inns—excepting a number of mysterious dishes not attractive to a European palate, little else is to be had but tea, eggs, fish, rice, cakes, and sake. The latter, the Japanese substitute for wine, is a mild, bitter-sweet, and almost colourless liquid, prepared from rice. The road from Kanasawa winds through well-cultivated fields, dotted with tidy cottages and farm-houses; at times skirting the base of some rocky bluff crowned with a mass of flowers and fresh green leaves, or following the course of a streamlet, or passing under the shadow of the dark pines.

> "And there were gardens bright with sinuous rills,
> Where blossomed many an incense-bearing tree;
> And here were forests ancient as the hills,
> Enfolding sunny spots of greenery."

The path crosses the range of hills which divides the Bay of Kamakura from that of Yeddo, and, as seems to be the case with most of the ancient highways of Japan, the natural beauty of the scenery is rendered doubly attractive by the quaint-looking temples and monuments which meet the eye at every turn. Considering the novelty of our surroundings, the bright

sunshine of an April day, and the fact that we had left the walls of our floating home behind us, it may be easy to imagine the exuberant spirits and light elastic step with which we crossed the hills of Kamakura, now hastening to see the prospect which the next turn of the road had in store for us, now stopping to ask the polite owner of the wayside stall for a cup of tea—"Dozo-o-cha-kudesai!"

About noon our party emerged on the stately avenue which runs in a straight line from the temple of Kamakura towards the shore. This avenue is an artificially constructed causeway, with a sunk footpath or trench on each side. Considering its probable antiquity, it is a remarkable specimen of engineering skill, and seems to have been a sort of *via sacra*, intended for the accommodation of large religious processions and royal cortéges. The ancient capital of Japan occupied one of those sites which Nature seems to have specially prepared for the purpose to which it is to be applied. Sheltered by hills on the east, north, and west, it commands towards the south a wide prospect over the plain which almost imperceptibly slopes down towards the bay, flanked on each side by steep promontories, so that, apart from the interest which attaches to the remnants of its former greatness, there is something so pleasant and genial in the aspect of Kamakura as to invite the traveller to prolong his stay. Looking up the avenue, we catch sight of the steps, the obelisks, and the stone lanterns which mark the entrance to the temple, while the massive carved roofs of the latter are just visible beneath the venerable trees never absent from the sacred places of the Japanese. Among the treasures exhibited in the holy fane are a number of beautifully-wrought swords, including a pair given by the present Emperor.

As we proceeded along the causeway, one could not but think of the wondrously strange and gorgeous displays of which it must have been the scene in days long past, of the hosts of armed men led by their nobles and princes, and the processions of priests, women, and children, dressed in festive garments, in whose footsteps we were now treading. Striking off to the right, we arrived after a short walk at the village of Dai-Butsu, famous for the colossal effigy which was the principal object of our pilgrimage. Even before we entered the village, the head of the image was visible among the higher branches of the trees, its face shaded from the rays of the afternoon sun; and as we turned into a paved avenue, this symbol of a religion which still counts millions of adherents suddenly rose before us in silent grandeur, sharply defined on its background of blue sky and dark green foliage. The statue is said to have been erected about eight centuries ago by order of a Queen of Kamakura. The following are its principal dimensions:—

	FT.	IN.		FT.	IN.
Height of figure, ...	50	0	Length of nose, ...	3	9
„ base, ...	4	6	Breadth of mouth, ...	3	3
Length of face, ...	8	6	Diameter of thumb, ...	1	0
„ eyes, ...	4	0	„ thumb-nail, ...	0	8¾
„ ears, ...	6	6			

The figure is built up in eight tiers of massive bronze plates, apparently attached to a core, which is itself hollow, and can be entered by a door in the base. The large vases and flowers

placed in front of the statue are also of bronze, the shape of the flowers and buds being beautifully modelled; the tall votive lanterns and the shields placed at the head of the steps are of the same metal. Excepting the stains due to atmospheric action, the statue is as perfect now as on the day when it was first set up, and its extraordinary dimensions, as well as the exquisite finish of its details, give a high idea of the skill of the ancient Japanese in sculpture and in the casting of large masses of metal. Even with the powerful mechanical appliances we possess at the present day, the modelling, casting, and building up of an image of such dimensions would be considered a feat which would tax all the resources at our command. With the tacit permission of the attendants, we climbed up in front of the statue, and some four or five of us comfortably ensconced ourselves in one of the gigantic hands.

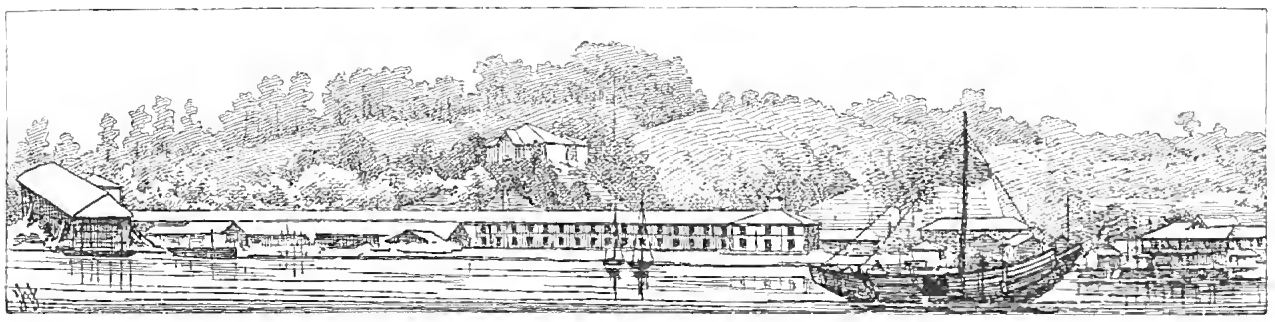
STATUE OF BUDDHA.

The countenance of Buddha expresses a total absence of mental excitement, physical pain, and care for the things of this world. Figures of this extraordinary man—for his followers do not regard him as a deity—usually represent him in his "crowning intellectual act," when he attained to "full knowledge" through long stages of contemplation, "saw the illusory nature of all things, broke the last bonds that tied him to existence, and stood delivered for evermore from the necessity of being born again." As we look up attentively at the broad, massive forehead, the nobly-arched eyebrows, the long, slightly oblique eyes, the straight nose, the full yet finely-cut lips, the round well-shaped chin, we commence to feel a sort of fascination, and that which at the first superficial glance seemed little better than one of those unmeaning faces so often seen on idols, dawns upon us as a masterly realisation of a lofty ideal. The image of Dai-Butsu appeared in perfect keeping with the sunlit landscape by which it was framed in; not a leaf stirred, not a sound was heard, and yet, under this outward semblance of sleep, the whole exuberant life of Nature was peacefully active.

We retraced our steps to Kamakura. Near the point where the road from Dia-Butsu joins the great avenue above described, is the spot where two English officers, belonging to the 20th Regiment, were treacherously attacked and killed. Only about ten years had elapsed since that event, but how great a change must have occurred in the meantime, considering the complete freedom and security with which we were now able to visit the country in all directions, and the friendly welcome we everywhere received! Having rested at the tea-house of Kamakura, we crossed the hills to Kanasawa. Along the roadside and from behind the trees, the children hailed our party with shouts of "Anata ohayo! anata ohayo!" and great was their delight when they obtained an answer in their own language. During our stay in Japan, I had frequent opportunities of observing the happy, playful

temper and careful training of the rising generation. As is the case, however, in most Eastern countries, the boys receive greater attention and a larger share of education than the girls. On the occasion of a second visit to Kamakura, I happened to see the children returning from school. They were walking two and two, with no adult to preserve order, and, on arriving at the crossing near the tea-house, they separated into two parties, which, standing face to face, gravely bowed to each other and then marched off in opposite directions. Subsequently, when on shore at Matsu-hama in the Inland Sea, we entered a village school. The boys were sitting at their desks reading and writing under the eyes of the schoolmaster. Perfect order and decorum prevailed, and on our leaving, the youngsters were drawn up in a line in the courtyard, and gave us a polite parting bow. At another time I strayed into the play-ground of a school at Yokohama, and was soon surrounded by a crowd of pupils. When, at parting, I saluted them in their own tongue with "Sayonara!" I was answered with a correct "Good-bye!" As English is now taught in several schools in Japan, it is probable that their English vocabulary would have compared favourably with our little stock of Japanese. The birth of a boy seems to be the cause of much rejoicing, and the event is made known to the public by the hoisting on a flagstaff of the huge inflated image of a fish, sometimes ten or fifteen feet long. These flying fishes are a very conspicuous feature in the aspect of a Japanese town or village; to judge from their number, there appears to be little danger of a decrease in the population.

H.M.S. "Challenger," having completed her repairs, left the pretty harbour of Yokoska on the 3rd May, and returned to her former anchorage at Yokohama. Our stay at the latter port being limited to a few days, as we had projected a dredging cruise in the Seto Uchi, or Japanese Inland Sea, we took advantage of the interval to visit Yeddo. There are several stations on the railway between Yokohama and the capital, and, as the trains travel slowly, it takes more than an hour to cover the distance of fifteen miles which separates the two towns. But the line seemed to us to be admirably managed, and, judging from the well-filled carriages, the Japanese liked this mode of conveyance vastly. When a train arrived at a station, great was the clatter of clog-shod feet hurrying to and fro on the platform. Yeddo is situated in a richly-cultivated plain at the mouth of the river Todagawa, the branches of which intersect the town in different directions. The densely-populated suburbs cluster round what may be called the citadel of Yeddo, formerly the residence of the Emperor and of the nobility. This forms a large town itself, and is strongly fortified, being surrounded by a deep and wide moat, and ramparts about seventy feet high, overshadowed by majestic old cedars.



VILLA OF H.I.M. THE MIKADO AT YOKOSKA.

There is so much uniformity in the domestic architecture of the Japanese, that—to a

new-comer, at least—one town seems almost a counterpart of another; in the case of Yeddo, however, the unusually wide streets, stately old bridges, and magnificent temples stamp it as the capital of an empire. The city is about eight miles long and four miles broad; but owing to the numerous open spaces, and the large proportion of one-storied dwellings, the population is considerably less than that of a European city occupying only half the above area, and is said to be under half-a-million. Some of the apparently endless streets abound in shops where the art-loving visitor may lounge with pleasure amid an immense collection of works in porcelain, bronze, lacquer, &c.

Among the more remarkable attractions of Yeddo are the temples and the tombs of the Mikados at Shiba. These monuments had recently been seriously injured by fire, but enough remained to convey an exalted idea of Japanese architecture. The long rows of votive lanterns in front of the temple, the massive bronze doors, the richly-decorated floors, walls, and ceilings of the interior, form a harmonious combination of costly materials wrought with an artistic skill unsurpassed by anything of its kind. On several occasions I observed with regret that, in their eagerness to adopt the processes and inventions of Western civilisation, the Japanese are tempted to forsake the traditions of their own admirable art. Who that has seen the temples of Shiba could believe that the native worker would ever exchange his own beautiful modes of construction for the whitewash, plaster, and stucco, and the feeble imitations of classic forms, of the builders of the Western world! A characteristic feature in Japanese buildings, both public and private, is the extensive application of wood in its plain state, neither painted nor varnished. Like his neighbour the Chinaman, the Japanese is an expert carpenter. His lines are faultless, his joinings simply perfection, and he requires neither putty nor pigments for the purpose of hiding bad workmanship. Let us hope that the present rage for innovation in this interesting country will spare the ancient monuments and treasures of art, so that they may serve as an example to future generations.

On the 11th May, H.M.S. "Challenger" left Yokohama for her intended cruise through the Inland Sea. We passed Yokoska, and in the evening anchored in Kaneda Bay at the entrance of Uraga Strait. Next day we steamed into Kamakura Bay, and dredged off Inosima Island in the hope of obtaining some specimens of *hyalonema*. We were not, however, so successful as the native fishermen, who procured them by means of a line and hook. On the 13th, as we proceeded along the south coast of Nipon, we encountered heavy weather. After dinner, when we had formed our usual gathering round the lantern on the main deck, chatting and smoking, a sea burst in through the port, and a mass of water about five feet high fell right in the midst of our circle, scattering its members in all directions amidst roars of laughter. Towards noon on the 14th, when off the Cape of Idsumosaki, and after ineffectual attempts to breast the gale, we made for the land, and in less than an hour we lay safely at anchor in the smooth waters of Oosima Harbour, the sun beaming down from a cloudless sky upon one of the prettiest landscapes it has been our good fortune to behold. At the foot of green hills, backed up by higher ranges in the distance, clustered the brown roofs of the village of Hasingui, just opposite our anchorage. A long line of

fantastically-shaped rocks, some of them crowned with foliage, extended from the village into the harbour, forming a natural breakwater,

> "Which to the maine doth his broad backe oppose,
> Whereon the roaring billow cleaues and brakes."

On landing, we walked along the shore to the walled town of Kusimoto, which, with its tidy houses and clean streets, is a fair sample of a quiet provincial town. How we poor storm-tossed sailors envied the people whose privilege it was to pass their peaceful lives in this charming and scarcely known corner of the world! Our way back led us through cultivated fields and through a glen along the banks of a stream. The hillsides were glorying in the fresh verdure of spring, adorned with large blue violets and rosy bunches of azaleas. In one part of the glen we had to be carried over the river on the shoulders of men; at another place we performed a feat akin to rope-dancing, by crossing one of those airy bridges frequently met with in the mountain districts, consisting of a few pieces of timber loosely placed side by side, and some fifteen feet above the water. When, after ascending a steep rocky path, we reached the summit of the glen, the whole harbour and island of Oosima, the Pisayama Rocks, and the village of Hasingui burst upon our view.

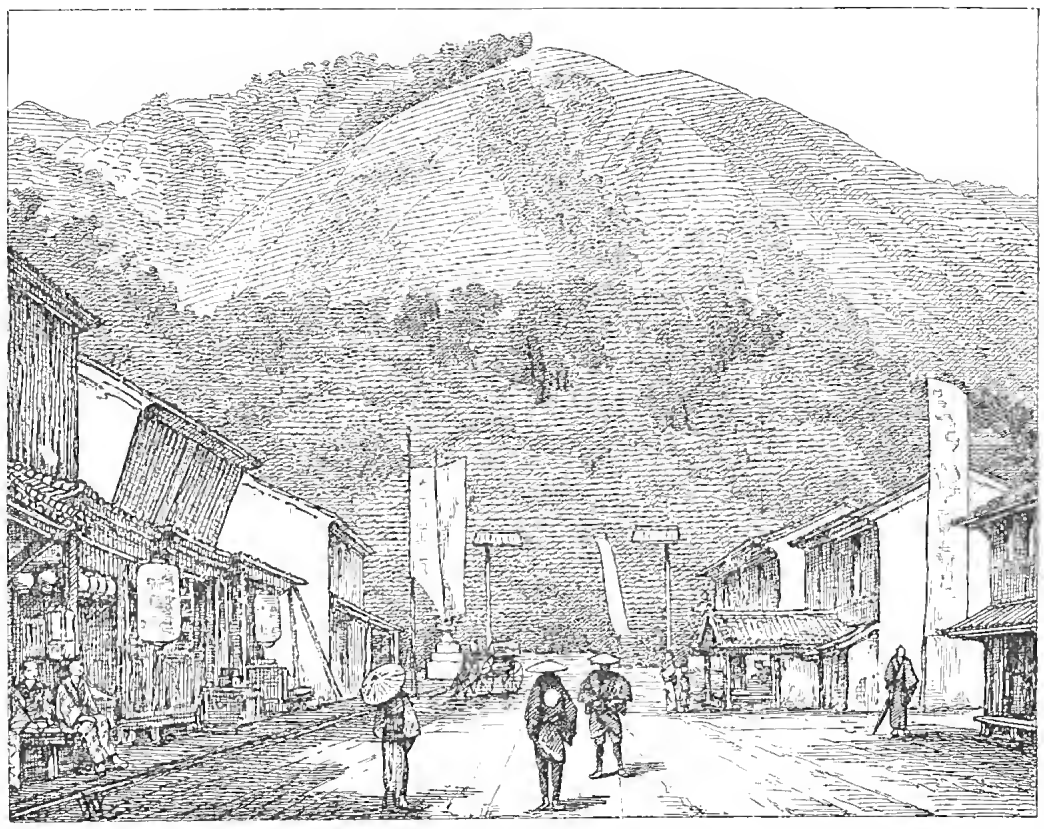
KOBE.

Early on the 15th we left this pleasant spot, and, putting on full steam, we soon doubled the cape which had baffled us the day before. Proceeding up the wide inlet between Nipon and Sikok, we passed about noon through Isumi Strait and entered the Gulf of Oosaka, where, before sunset, we anchored off the towns Kobe and Hiogo. The former is the chosen residence of Europeans, whose substantial dwellings, including the house of the British Consul, adorn the esplanade fronting the sea. The latter is an old Japanese seaport, and is only separated from Kobe by the bridge which spans the railway to Oosaka. This bridge is always occupied by a crowd of peasants and pilgrims, to whom the sight of the fire-horse, with its dragon-like tail of railway carriages, is as yet one of the wonders of the day. Oosaka is a large commercial city—the Birmingham of Japan—and is situated in the opposite corner of the gulf.

A walk through the native quarter of Kobe, or through the busy streets of Hiogo, affords the same source of entertainment and of constant surprises as at Yokohama or Yeddo. Everything which meets the eye of the traveller—the faces and dress of the people, the style of the houses, the thousand objects exhibited for sale—are all, even in the minutest detail, so different from what he has seen elsewhere, that he is often tempted to ask himself whether he is not walking in a dream. Apparently a large proportion of the people can feed on "the dainties that are bred in a book." At all events, there is always a crowd gathered in front of the book-shops, eagerly perusing the illustrated pages of some popular tale or romance, or looking at the caricatures suspended outside. In some of the latter, the European in his strange garb is beginning to make an appearance, to the intense amusement

of the Japanese, who, humorous and witty as they are, enjoy a good joke immensely. Their artists possess no mean skill in catching facial expression, and their lighter style reminds one of Chaucer and the humorists of the Middle Ages. The *nez retroussé*, from the frequency with which it is met with, may be accounted a national characteristic; hence the Japanese ideal rigorously demands a straight long nose, with which mark of beauty all the heroes and heroines of their popular tales are depicted.

To say that the environs of Kobe are picturesque is to utter a truism, for the islands of Japan seem to have been created for the special delight of the lover of scenery. Within half-an-hour's walk from the town are two fine waterfalls, much resorted to by pilgrims, who come from a distance to bathe in the pool at the foot of the falls. The place abounds in tea-houses for the accommodation of visitors, and the grounds are neatly laid out in terraces and beds of flowers. The falls plunge down over the declivities of a spur of the lofty mountain-range which stretches in a northerly direction towards Miako. On one of its highest summits, Mount Mayasan, 2490 feet high, stands the Temple of Thira, generally called the Temple of the Moon. A perpetual stream of pilgrims is seen ascending the steep slopes of the mountain to kneel at the shrine of the divinity. The path leads through magnificent forest scenery, and terminates, to the despair of the exhausted traveller, in a flight of over 200 stone steps. Happily, when he has accomplished about half of his task, which would test the stamina of a member of the Alpine Club, he may step into a tea-house, where the attendant moosmie will refresh him with a cup of tea or sake. Arrived at the topmost step, he sees before him a wide open space surrounded by temples. The one on the right seems to be the principal fane, and is remarkable for its double pagoda-like roof and fantastic ornamentation. In a turret on the left hand is suspended an enormous gong, the deep sound of which can be heard long before the visitor arrives at the summit. The extensive view from the top of the stairs, which embraces the whole Bay of Oosaka, is ample reward for the fatigue incurred in the ascent.



ROAD TO THE WATERFALLS, KOBE.

The road to the Falls of Kobe passes near a fine old temple completely hidden in a grove of trees. We used to call it the Temple of the White Horse, on account of one of these animals, with a pure white coat, being exhibited in the courtyard of the temple, seemingly dependent for its sustenance on the contributions of worshippers. The poor creature, looking

sad and dejected, or rather half-idiotic, would no doubt have preferred to crop the grass in some green meadow to being perpetually held up as an object of curiosity or admiration, shut up in a narrow stall. Not far off, a monkey in a cage was a perpetual source of merriment to the crowd. We could not ascertain whether these animals were attached to the temple merely as objects of curiosity, or because of their connection with some superstitious belief. They reminded one of the sacred animals which, according to Herodotus, used to be kept in the temples of ancient Egypt.

The railway which connects Kobe with Oosaka—probably is now being continued towards Miako, the former residence of the Mikados—traverses a well-cultivated plain, affording evidence of the great perfection to which agriculture has been carried in this country. The whole plain, which stretches many miles inland, is not merely a combination of tilled fields such as we see in Europe, but may be better described as an immense garden. Nothing can exceed the patient toil and skill with which every inch of ground is made to grow food, or the regularity and neatness with which the watercourses are laid out, so that not a drop of water may be wasted. Besides their wonderful proficiency as farmers and gardeners, the Japanese are remarkable for their love of flowers. They seem to be a necessary of life, and are met with everywhere, in the temple as well as in the poorest shop, in front of the cottage and the farm-house, in the children's hair, and the very babe carried on its mother's back is seldom without a small branch covered with blossoms. How largely designs of flowers enter into the decoration of the dresses, the ornaments, and the household articles of the people generally, is well known. It is probably this trait in the national character which, more than anything else, has won for them the admiration, I may say the affection, of all who have come in contact with them. It sums up, in truth, the most prominent features of the Japanese mind. The active worker revels in all that pertains to form and colour, and may be termed a born artist; indeed, if culture consists in the art of surrounding the necessarily commonplace exterior of life with

JAPANESE MANNERS.

associations of grace and beauty, then we cannot refuse to the Japanese the honour of being a highly-cultured race.

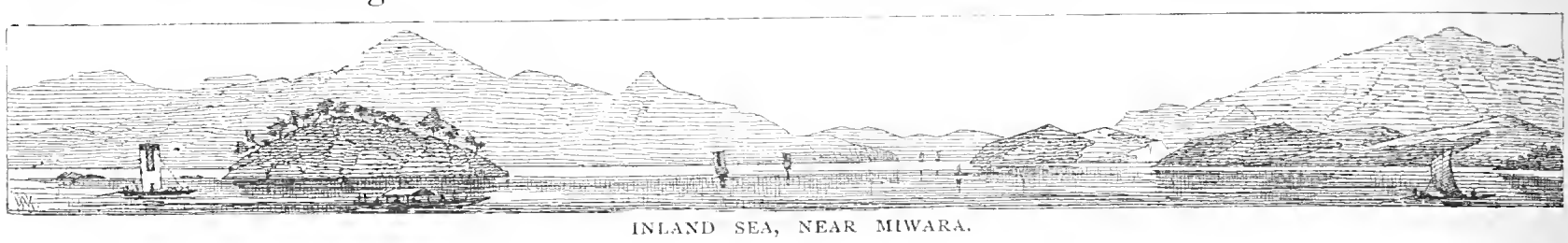
Oosaka is situated at the mouth of the river which forms the natural outlet of the large Lake of Biwako. On the banks of the stream rise the modern buildings of the Imperial Mint, erected under the superintendence of Europeans. The coins formerly in use were generally square-shaped, rounded off at the corners, and having a hole in the middle, so that a number of them could be strung together. These are now being replaced by round coins, and also by paper money—a doubtful improvement when employed for small change. On the country being first opened to foreigners, the old Japanese silver and gold coins, owing to their intrinsic value, were exported on a large scale. This, though inevitable, seemed a peculiar way of repaying the hospitality just granted. Crossing an iron bridge of recent construction, we entered the busy streets of Oosaka, which extend for a great distance along the river, and lead towards the north, to a large castle garrisoned with troops. Our curiosity drew us through the gate of the fortress, but further advance was soon stopped by a sentry with fixed bayonet. The modern army of Japan has been equipped and drilled chiefly under the superintendence of French officers. Hence the soldiers resemble in outward appearance those of a French line regiment, and are of about the same stature; but, although short, they look strong and healthy, show steadiness and endurance on the march, are obedient under discipline, and, as they have already shown on several occasions, can offer an excellent front to an enemy. Moreover, the national character, especially as regards the upper classes, is strongly imbued with the martial spirit. Great feats of personal courage are a favourite theme of the Japanese romancers.

The journey from Oosaka to Miako may be made by boat, or in one of those small two-wheeled conveyances recently introduced from America, called "jinriksha." The latter seem to have quite usurped the place of the old-fashioned palanquin. They resemble an invalid chair, provided with a hood as a protection against rain, and are drawn by strong muscular men, one in front between the shafts, and another pushing behind when the road is steep or great speed is desirable. In warm weather these men work almost without clothing. They will travel at a quick pace, and at the rate of thirty miles per day or more. We found them on all occasions civil and good-humoured, and their patience and endurance are extraordinary. Nevertheless, in spite of their great strength, the work is found to be very exhausting, and is said to shorten their lives. No doubt the introduction of railways, tramways, and other means of conveyance will, after a while, abolish this rather unseemly kind of labour.

At the time of our visit, an exhibition of native products was open at Miako, in imitation of similar displays in the Western world. Most of our readers will remember the sensation created by the Japanese departments in the recent exhibitions at Vienna and at Philadelphia; I need not, therefore, dilate upon the treasures of art and the marvels of manufacturing skill which this nation can offer to the admiring spectator. Miako is the Rome of Japan, and, as regards the number and quaint beauty of its temples, and the charm of the surrounding scenery, it possesses strong attractions for the traveller.

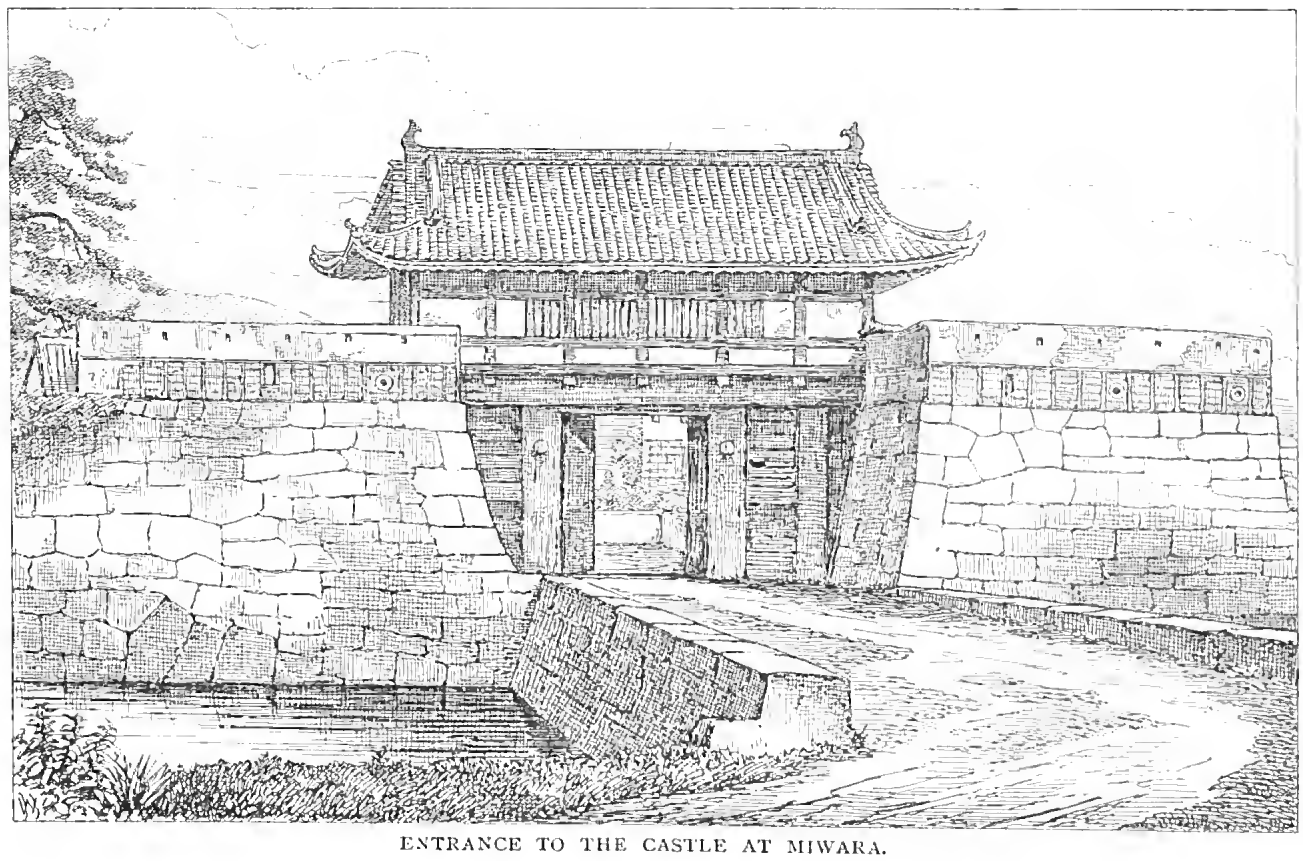
SETO UCHI.

Early on the 26th May, our good ship left Kobe for a cruise through the Inland Sea. A glance at the chart will show that the latter consists of a series of almost land-locked basins, strewn with numerous islands, and communicating with each other by narow straits. Two arms of the sea, divided by the island of Sikok, connect the Seto Uchi with the Pacific Ocean in the south, while Simonosaki Strait, in the west, joins it to the Strait of Korea. The total length of the Inland Sea from east to west is about 250 miles. We had



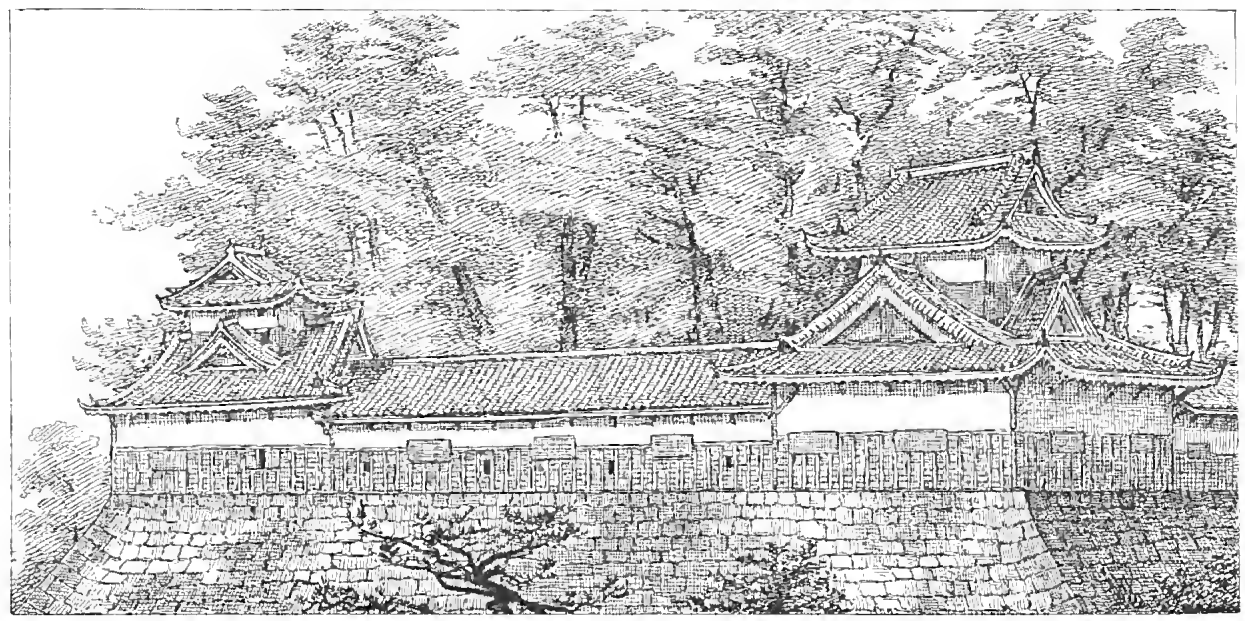
INLAND SEA, NEAR MIWARA.

heard so much of the natural beauty of this Japanese Mediterranean that we could not check a feeling of disappointment when, on entering it for the first time, we saw little else than a wide sheet of water, dotted over with sails and fishing-boats, and bounded in the distance by ranges of bare-looking hills. The extent to which the latter had been stripped of their natural clothing of forest, as well as the large patches of cultivated ground—some of the elevated islands we passed being covered with crops up to their very summits—seemed to indicate that the shores of this sea must for ages have been the home of a numerous population. The whole region has the appearance of having been formed by the sinking of the land—a phenomenon almost to be expected in a country subject to frequent earthquakes and volcanic eruptions. During our progress, however, we discovered several pretty nooks and corners, peaceful-looking villages cosily sheltered in some quiet secluded bay, and many fine vistas of sea and mountain which might well have tempted a painter to enrich his sketch-book with scenes of rare beauty. The cruise did not extend to the western half of the Seto Uchi, which is said to possess superior attractions, our destination being Miwara, situated in the north-west corner of the central basin. On the morning of the 27th



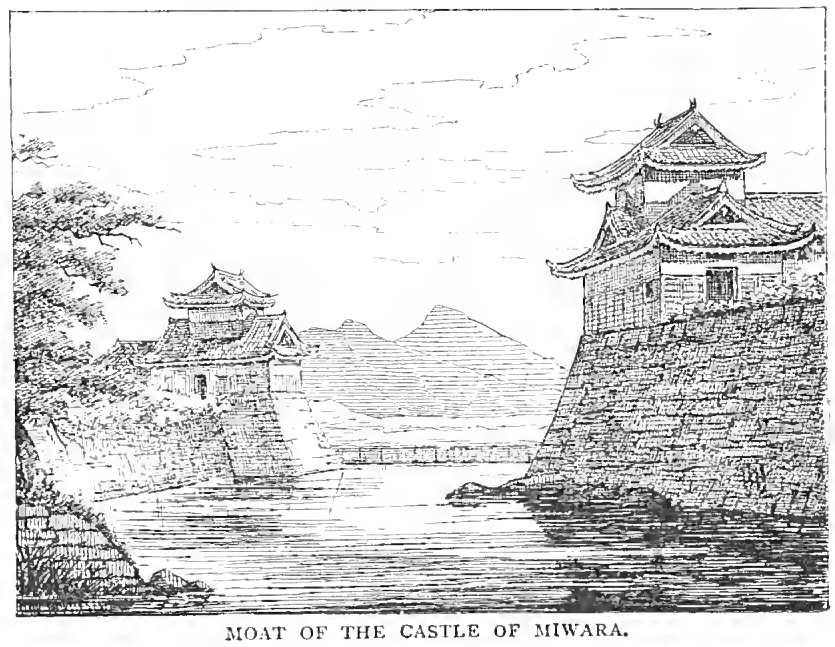
ENTRANCE TO THE CASTLE AT MIWARA.

H.M.S. "Challenger" was at anchor off Matsuhama, a small village to the eastward of Miwara. A pleasant walk past farm-houses and cultivated fields brought us to the latter place, apparently a small provincial town, built under the walls of the castle of the Daimio, or Japanese noble, who, previous to the Revolution, lived here surrounded by all the pomp and splendour of a mediæval court.



CASTLE OF MIWARA.

The castle is protected on all sides by a wide and deep moat, and covers a space of about a square mile, accommodating a garrison of several thousand men. The numerous towers or forts which defend the wall, as well as the citadel, rest upon a massive foundation composed of large blocks of stone roughly hewn, resembling the so-called "Cyclopean" remains of Europe. The superstructures, here and there pierced with loopholes for the use of archers, are less solid—in fact, a mere framework of timber filled in with lath and plaster, and covered with the heavy but picturesque Japanese roof. We noticed on the wall what seemed to be portable wooden shields, made of a few boards, and supported in a slanting position by a single prop behind. With certain improvements, such as the addition of a sheet of iron, such shields might, on occasion, do good service in protecting soldiers from the deadly effects of the breech-loader. By combining a number of them together, a breastwork might be extemporised in a few minutes. The Castle, overshadowed by a grove of fine old trees, occupies the north-west corner of the fortress; but it was at the time of our visit falling into ruin, and probably in a few years this imposing specimen of ancient Japanese fortification will have disappeared.



MOAT OF THE CASTLE OF MIWARA.

Formidable as these strongholds—which are scattered over the face of Japan—must have been in times past, the introduction of modern artillery has of course rendered them useless. Their solid foundations indeed might still support the heaviest guns; but it is to be hoped that the new-born empire will not imitate Western nations in that wasteful rivalry of costly armaments which has an increasing tendency to involve empires in frequent wars, and finally put an end to the boasted civilisation of Europe.

Retracing her course through the Inland Sea, H.M.S. "Challenger" returned to Kobe on the 29th. In the first days of June the native quarter of that town was full of excitement, caused by the festivities and ceremonies in connection with the dedication of a new temple. There were processions in the streets, and a crowd of holiday-folk was all day long ascending and descending the road which led to the recently-erected sacred buildings. These occupied a terrace on the slope of the hill above Kobe, and commanded a magnificent view of the town and the bay. Following the crowd, we soon came in sight of the temple, which, in outward appearance, formed a remarkable contrast with the old-fashioned shrines, having evidently been designed under the influence of the new ideas—the offspring of the recent revolution. There were white-washed walls, two large columns gilded from top to bottom, and what seemed to be an imitation of a Gothic window filled with stained glass, red and blue. Surely such examples of Western art had never before been seen in a Japanese temple! Judging, however, from the numerous happy and contented faces by which we were surrounded, the people seemed to be rather proud of their architectural achievement. We arrived just in time to witness some dances which formed part of the ceremonies of inauguration. We had previously noticed in the crowd a number of damsels gorgeously arrayed—scarlet petticoats, white dresses trimmed with scarlet and gold, a large black satin bow behind; a blue and white hat as flat as a dish, tied with black ribbons round the chin, and adorned with large artificial flowers, red, white, and silver. Their faces were painted white, eyebrows black, lips red, and a red dash adorned the corner of each eye. These young girls assembled in a room adjoining the temple, and, all standing in a line, performed some very graceful dances, while several men, quaintly disguised, acted as *maîtres des cérémonies*. The performers, to the number of some twenty or thirty, would advance and retreat together, and every movement was executed with the greatest unanimity and precision. The effect produced by the many-coloured dresses and ornaments of the performers was almost dazzling. After each dance they turned their faces to the wall and their backs to the audience, which, composed of men, women, and children, sat on the floor, talking, laughing, smoking, and dividing their attention between the dancing-girls and the strangers in European garb who were present. On the terrace below the temple a number of tea-shops had sprung up, where the good-tempered, social Japanese, always glad of a pretext for holiday-making, could be seen enjoying their cup of tea or sake. No one in the guise of a soldier or policeman was visible, and there was no trace of that coarseness and rudeness too often observed in popular gatherings in countries laying claim to a high standard of civilisation.

Our pleasant sojourn at Kobe ended with a ball given at the residence of the British Consul, and attended by all the notabilities of the town. The stately esplanade—at a later date almost destroyed by the furious sea during a typhoon—that evening looked its very best under the bright rays of the full moon, the "Challenger" and the "Mosquito" adding brilliance to the scene by a display of lamps, rockets, and blue lights.

We left the Bay of Oosaka on the 2nd of June. The return voyage to Yokohama

proved almost as stormy as the cruise outward. We were able, however, on the 4th, to obtain a sounding in 2675 fathoms, about sixty miles to the southward of Cape Idsumosaki, and to make some observations on the temperature of the Kuro-Siwo Current. This great current of warm water is the equivalent in the North Pacific Ocean of that warm current in the North Atlantic well known as the Gulf Stream; and as the latter flows in a north-easterly direction, and at some distance from the coast of the United States, so does the Kuro-Siwo flow in the same direction, and at some distance from the south-east coast of Japan. Its temperature on the 4th of June was also the same as that which we had observed in the Gulf Stream on the 1st of May, 1873—namely, 23°.9 C. The temperature of the water inside the current and in the bays and gulfs of the island of Nipon was, during our visit, as much as 8° or 10° below that of the Kuro-Siwo—a difference probably due to the existence of a cold counter-current pressing up against the coast of Japan, just as the Labrador Current flows between the Gulf Stream and the coast of the United States.

Upon our return to Yokohama on the 6th of June, His Majesty the Mikado announced, through Sir Harry S. Parkes, the British Minister, his pleasure to receive a certain number of the officers attached to the Expedition. Accordingly, on the 10th, Captain F. T. Thomson, Commander S. J. L. P. Maclean, Lieutenant George B. Bethell, Sub-Lieutenant Lord George Campbell, Professor C. Wyville Thomson, and the writer, waited upon His Excellency the British Minister at his residence in Yeddo, and thence proceeded to the Imperial Palace. Escorted by mounted guards attached to the Embassy, we drove through the wide streets of Yeddo—or Tokio, as it is now called—till we reached the palace; not the old palace in the citadel which had been recently injured by fire, but one situated outside the ramparts. Here we were introduced by Sir Harry Parkes to the Mikado's Ministers, who were attired in uniforms. The room in which they received us was simply but elegantly furnished in European style, Japanese art being represented by a large screen in white and gold. Sir Harry Parkes having been received in audience by His Majesty, our turn came to be presented. We traversed several rooms and an open gallery commanding a view of the palace grounds, and were finally conducted to the reception room—an oblong space, carpeted but without furniture, and enclosed by screens or partitions such as are used in Japan to divide one room from another.

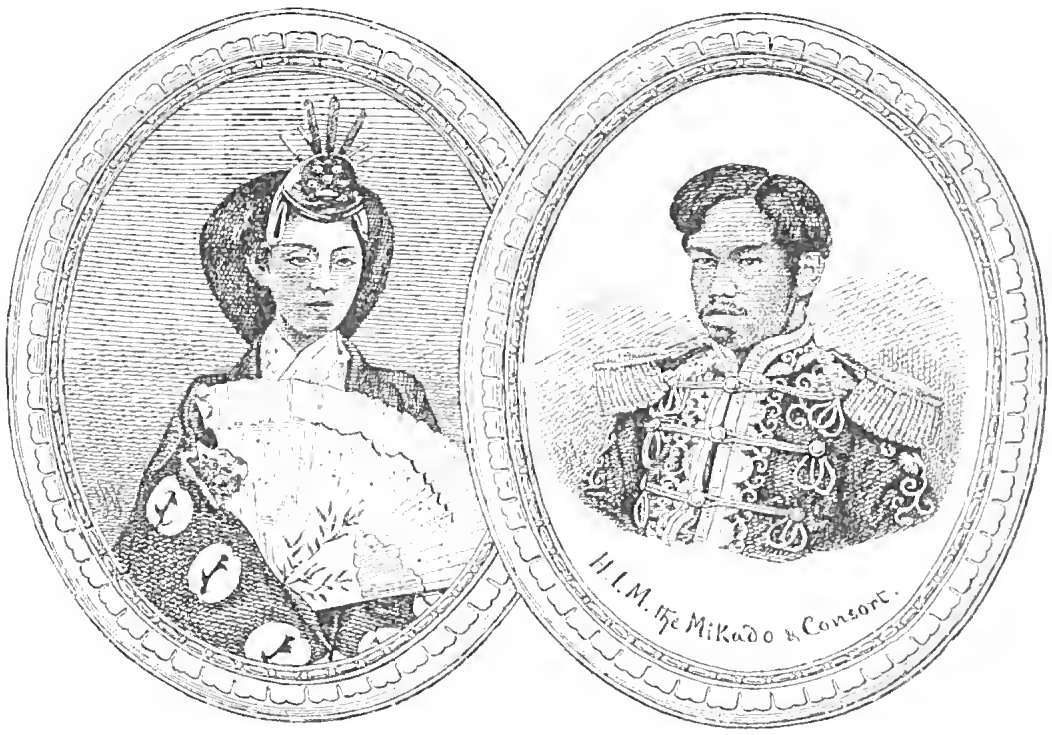
On entering, we saw His Majesty standing at the upper end of the apartment. He was uncovered, and wore a uniform of Western fashion richly adorned with gold lace. Sir Harry Parkes, through an interpreter, explained to the Mikado the object of the "Challenger" Expedition, and then we were severally introduced by the British Minister. The Mikado, in his reply, graciously alluded to the interest he felt in the success of our work, and concluded by wishing us a safe return home.

Not many years ago, the person of the Mikado, whom custom and tradition had surrounded with almost divine attributes, was considered too sacred to be looked on by mortal eyes, even those of his own subjects; and the remembrance of this fact made the occasion of our presentation doubly interesting. The extraordinary changes, social as well as political,

which have marked the commencement of the reign of the present Emperor, and the rapid strides which Japan has made towards placing herself on a level with the civilised nations of the West, will always rank amongst the most remarkable events in modern history; nor can we doubt that this nation, for ages separated from the rest of the world, will henceforth form one of the most interesting members of the human family.

On the 14th, the Director of the Civilian Scientific Staff delivered a lecture before the members of the Asiatic Society of Japan, on some of the most noteworthy discoveries made during the voyage. The lecture, which was illustrated by diagrams, engaged the attention of a large audience, comprising the British Minister, the Japanese Ministers, and many of the Europeans residing in Tokio and Yokohama. On the following day a number of visitors assembled on board the "Challenger" to witness operations with the trawl, for which purpose the ship went out into the bay. The trawl was lowered in about fifty fathoms, and when hauled in after a short time was found to contain fish, shells, seaweed, and the usual submarine deposits. The day was rough and squally, but, happily for our guests, the weather moderated, and they returned to shore much pleased with their cruise.

During our stay in Japanese waters, a young man named Nishi was attached to our company as interpreter. Amply endowed with the desire for seeing and learning which characterises his countrymen, his polite manners and anxiety to oblige made him a favourite with every one on board.



Chapter VIII.—From Yokohama to Valparaiso.

THE day of our departure from fair Japan had arrived. At 3.30 p.m. on the 16th of June, H.M.S. "Challenger" steamed out of Yokohama Bay. It was a beautiful afternoon, and as we glided down the Gulf of Yeddo, a golden sunset lighted up the hills of Yokoska and Kamakura, reminding us of the pleasant hours we had spent in exploring the flowery valleys and glens of Nipon. Next day the land was out of sight, and a cruise of 4500 miles over the waters of the wide Pacific lay before us. Only he who, day after day, it may be for months, has marked off on the chart the short span run by the ship during the past twenty-four hours, can have an adequate conception of the immensity of the ocean. To the sailor, the land, with all it contains—its plants, animals, human beings, cities, fields, and mountains—seems a mere accident. For weeks and months his eyes have scanned the level horizon, delighted if perchance he espied a distant sail, or the long dusky line of smoke denoting a far-off steamer. Some morning, with the first rays of the sun, a faint crooked line appears above the waves; it is land, and he thanks Providence for having spared him to see it once more. As his feet touch the solid ground, a delicious sensation possesses him. Every object around—"the league-long roller thundering on the reef," the shore, the houses, the people, the running river, the green hills—seems as if created anew, and for his special enjoyment. A little time, all too quickly gone, and he finds himself again in his watery home. Nothing is changed—it is the same blue, restless sea; the same sky, with its sun, moon, stars, and scudding clouds; the same albatross poising itself on its broad wings alongside the ship; the same shark warily cruising in the vessel's wake, ever watching for its prey—and all he has lately seen on shore mentally appears like the insubstantial fabric of a dream.

The bed of the sea deepens rapidly off the east coast of Japan. Thus, on the 17th, we sounded in 1875 fathoms, at a distance of only forty miles from the nearest point on the coast; and on the 18th found a bottom in 3950, or nearly 4000 fathoms, about 170 miles to the eastward of Cape Inaboyesaki. Next day's sounding was nearly as deep—namely, 3625

fathoms, or over four English miles. Apparently we just touched the southern extremity of the 4000-fathom hollow not long before discovered by the officers of the U.S.S. "Tuscarora." This is the greatest depression as yet ascertained—the deepest wrinkle, so to speak, on the face of old Mother Earth. It extends for a distance of over 600 miles in a north-easterly direction, from the latitude of Inaboyesaki to that of Urup Island in the Kuril Archipelago, and follows the coast of Nipon and Yezo at an average distance of about 120 miles. This depression continues to near the western end of the Aleutian group, but its total length and breadth are as yet unknown. Further to the eastward, along the track of our ship, the depths were under 3000 fathoms, and on the 2nd of July bottom was found in only 2050 fathoms. This last-mentioned sounding marks the north-western extremity of the submerged area which, at its south-eastern end, culminates in the volcanic peaks of the Hawaiian group.

The early part of our cruise by no means justified the character implied in the name "Pacific," as the weather was rather stormy, and the atmosphere damp and laden with mist. In consequence, we lost several trawls and about 10,000 fathoms of dredge-rope. Thanks to a few successful hauls, we obtained some animals new to science; but the most singular objects brought up from the bottom of the sea were a large quantity of round stones or nodules of various sizes, externally resembling potatoes. On examination, they were found to be composed of concentric layers of manganese and oxide of iron, which seemed to have accumulated round an original nucleus of a different substance. In one instance this nucleus proved to be an immense shark's tooth, whence we may conclude that these nodules are formed at the bottom of the sea, but the exact manner of their formation is still involved in obscurity.

On Sunday, the 4th July, we crossed the meridian of 180° long., not for the first time during the voyage, for about a year before, from the 10th to the 24th July, on our cruise from New Zealand to the Tonga Islands, we were sailing to the eastward of this meridian. On the present occasion, however, we had to change our date in order that our time should be behind instead of before Greenwich time. So the following day, which should have been Monday the 5th, was made Sunday the 4th; and thus we had the rare experience of having two Sundays in one week.

Among the vicissitudes of life at sea, there is one which, setting aside danger to life and limb, is attended with more discomfort than any other—it is when the sea makes an inroad into a sleeper's cabin. Tempted by the fine calm evening, the unwary voyager, when going to rest, leaves the scuttle open. During the night the wind freshens, or the ship goes on another tack. Suddenly the unhappy victim awakens just in time to see a silvery cascade, faintly illumined by the light of the stars, leap in a broad stream over his couch, and transform the floor of his little cabin into a pond several inches deep; and, even though a helping hand may be near to stop the deluge, he is condemned to spend the rest of the night huddled up in some corner of his little domain which perchance has been left dry, accepting his misfortune with the best grace he can command.

On the 15th, having arrived near the meridian of the Hawaiian Islands, we shaped our course towards the south; but with the approach to the tropics we lost the breezes which had hitherto favoured us, and during the next ten days but little progress was made. Since our departure from Japan we had been sailing night and day in the company of a flock of albatrosses, numbering about a score. Being readily caught with line and baited hook, these afforded a never-failing source of amusement to our sportsmen. The graceful flight of this bird constantly arrests attention, attracted by the mystery which still surrounds the powers by which it is enabled literally to ride upon the storm, or else to suspend its ponderous body in mid-air with outstretched, almost motionless wings. We noticed that, on getting into the warmer water of the tropics, the albatross left us on the same day that the shark made its appearance for the first time. Thus the king of sea-birds and the tyrant of the waves have divided the ocean-world between them, and the boundary-line which separates their respective kingdoms is a certain limit of temperature. The albatross may have another reason for avoiding the regions inhabited by the shark. The bird often rests for hours on the surface of the sea, and probably sleeps in that position, so that it runs the risk of being snapped up by a shark while in a dormant state.

During this long cruise of several thousand miles we sighted only one vessel, one of the regular line of steamers running between San Francisco and Yokohama.

THE HAWAIIAN ISLANDS.

"Groves that bloom in endless spring
Are rustling to the radiant wing
Of birds, in various plumage bright
As rainbow hues, or dawning light.
Soft-falling showers of blossoms fair
Float ever on the fragrant air,
Like showers of vernal snow;
And from the fruit-tree spreading tall
The richly-ripened clusters fall
Oft as sea-breezes blow."

The rising sun of the 27th July presented to us the little island-world rendered familiar to every reader through the accounts of Cook, La Pérouse, Vancouver, and other illustrious navigators. To our right we saw the long serrated ridge of Oahu; in front, the island of Molokai; while far to the south-east the towering mass of Mauna Haleakala, the extinct volcano of Maui Island, was just visible beneath the morning clouds. At the first glance the land looked barren and desolate, especially Molokai, which seemed to be a heap of volcanic mud thrown up only yesterday from the bottom of the sea. On approaching nearer, a faint tinge of green—the first sign of vegetation—began to overspread the red slopes of Oahu. The eastern end of the latter island is fringed with several small extinct craters, and, having rounded one of these, known under the name of Diamond Hill, we entered the harbour of Honolulu.

The present capital of the kingdom of Hawaii bears numerous traces of its recently-acquired importance as a commercial station in the Pacific Ocean. Placed as it is in the centre of the traffic between America, Asia, and Australia, its geographical position points it out as the centre from which will radiate, in the not very distant future, the submarine cables connecting San Francisco with Yokohama, Hong-kong, Manilla, Fiji, Sydney, Wellington, and Melbourne. Close to the harbour are the wooden sheds and warehouses of the commercial section of the town. Beyond them appears the massive square tower and commanding façade of the new palace of King Kalakaua; a little more to the right, the tower of the Protestant church or cathedral—for there is a Bishop of Honolulu; while on the higher ground above the town, half-hidden among the trees, may be seen the residences of the wealthier inhabitants. The hospitality dispensed at these pretty villas has become proverbial, and the fresh green of the grounds by which they are surrounded, adorned with trees and flowering shrubs imported from America, Japan, China, and New Zealand, contrasts agreeably with the sandy plains and sunburnt hills of Oahu. Immediately behind the town is a small extinct crater called the "Punchbowl." From the most elevated part of its rim waves the striped flag of the Hawaiian kingdom, above a saluting battery composed of four old ship's guns. The view from this point is very fine, embracing the town of Honolulu, the bay, the distant crater of Diamond Hill, and the village of Waikiki, with its neat little church. Honolulu boasts of a fine hotel, managed on the American system; and it may be noted that the customs and manners of Hawaiian society are, as might be expected, much influenced by the proximity of the great Republic of the West.

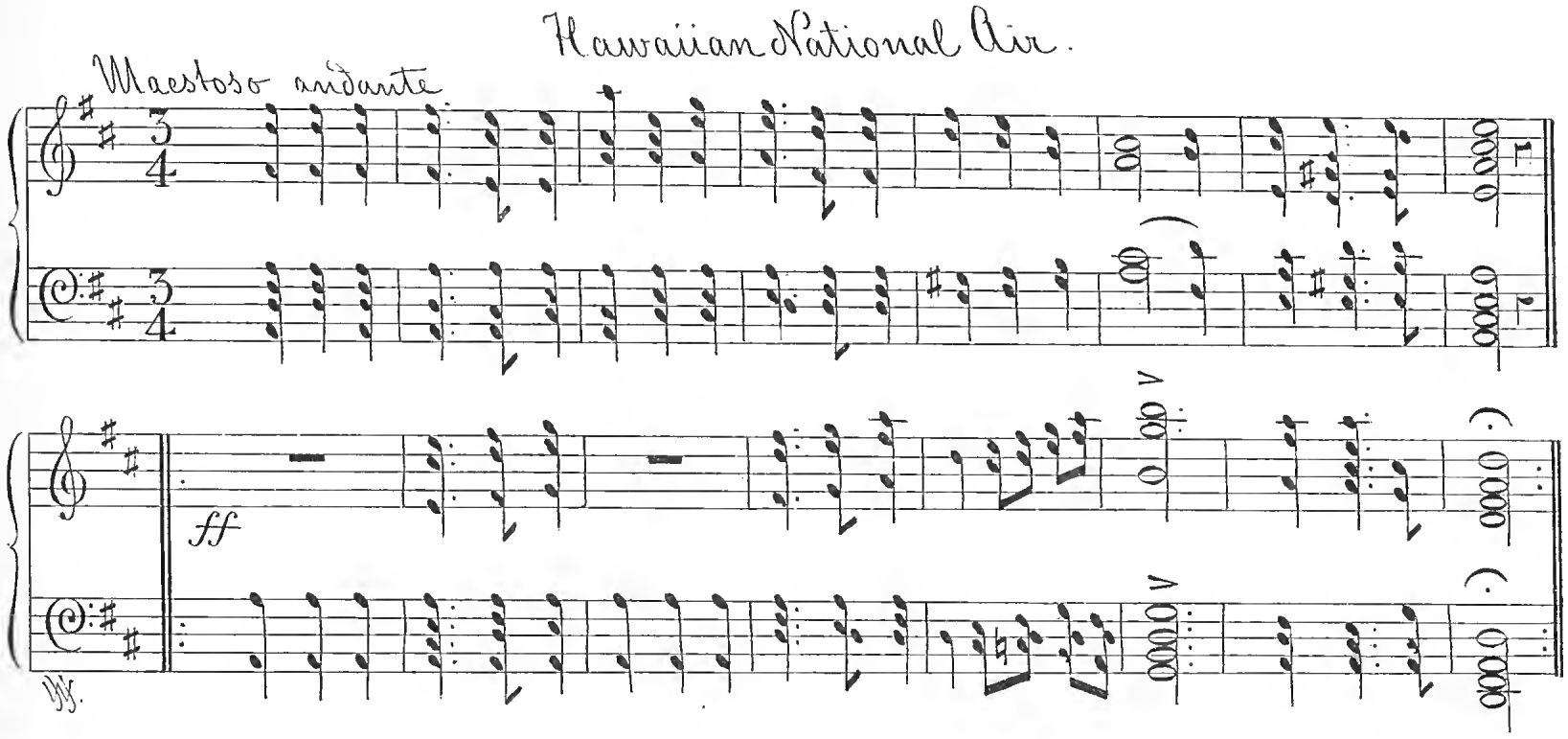
Two days after our arrival, a line of carriages, containing a number of officers from H.M.S. "Challenger," set out from the port for the Royal Palace. King Kalakaua was holding a *levée*, at which our party had the honour of being presented. The nucleus of the future Hawaiian army was drawn up in the avenue, and, as we drove in at the gate, the band struck up the English national air. On entering the throne-room we found His Majesty, surrounded by his Ministers, the Crown Prince, and other members of the royal family. The King is very good-looking, his carriage dignified, and his conversation—he speaks very good English—most affable and engaging.

H.M. KING KALAKAUA.

The walls of the throne-room were adorned with a portrait of Her Majesty Queen Victoria, a full-length of King Louis Philippe, one of the Emperor Napoleon III., and with an old oil-painting representing King Kamehameha I., the founder of the kingdom of Hawaii. Spread over the throne was the *mamo*, the famous feather war-cloak worn by the last-named sovereign. Nine generations of kings are said to have passed away during its fabrication. Its length is four feet, with eleven and a-half feet spread at its lower margin. The feathers, which are exceedingly small and delicate, being less than an inch in length, are skilfully attached to a groundwork of fine netting. The whole is of a beautifully bright

yellow colour, having, indeed, the appearance of a golden mantle. The birds from which the feathers are obtained are found in the mountainous parts of the islands, and as each bird produces only two of these feathers, one under each wing, the number of birds required to furnish the material for the cloak may with difficulty be guessed. Five of these feathers are valued at about a dollar and a-half, so that this royal mantle is equal in value to some of the most costly gems in the regalia of a European monarch. A few days after the *levée*, the King, the Crown Prince, and the Ministers paid a state visit to the ship.

Queen Emma, the last of the royal race of Kamehameha, and whose claim had been

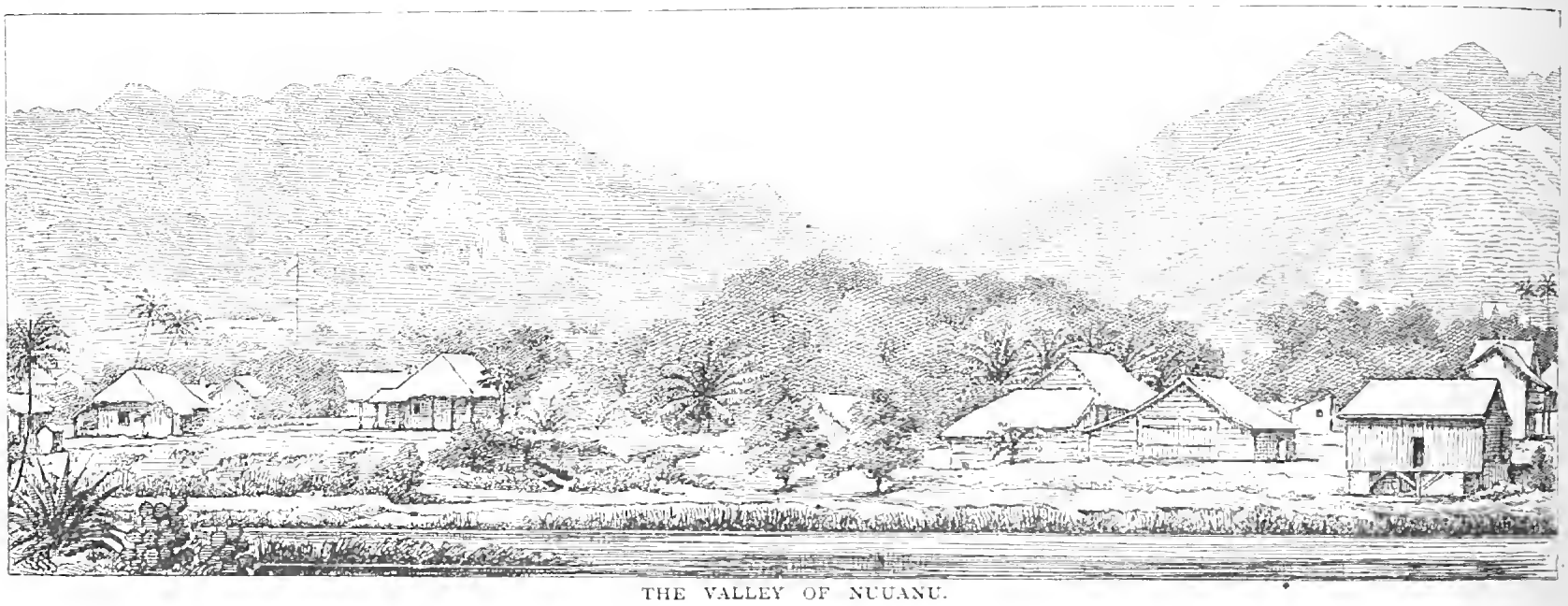


set aside in favour of the present occupant of the throne, resides in Honolulu. Her Majesty is often seen driving in a carriage and pair, with two footmen behind in liveries of green and gold. The national air of Hawaii bears some resemblance to that of England; the composer seems open to the imputation of unconscious imitation, at any rate.


NATIVE GIRL OF OAHU.

The natives of these islands—now all converted to Christianity—are apparently of the same race as the Tahitians. The men now all dress in garments of European or rather American pattern; the women wear the long gown, the favourite dress of the ladies of Polynesia. These are remarkable for their large lustrous eyes; but the full lips—a typical feature of their race—do not harmonise with our conceptions of beauty. The girls of Oahu seldom appear without a garland of leaves suspended from their neck, or a wreath of flowers encircling their abundant raven-black hair. They excel in the art of equitation, and may be seen galloping in the company of their friends and relatives on all the roads converging towards Honolulu. The people seemed always pleasant and cheerful, and, however "bent on speed," would find time to salute the pedestrian with a friendly "Aloha-nui!"

The road which connects Honolulu with the eastern side of the island ascends the picturesque valley of Nuuanu, and crosses the main range of Oahu through a gap hemmed in by stupendous rocks, which the natives call the "Pali." Travellers who visit the islands situated in the track of the trade-winds are struck with the extraordinary contrast, as regards climate and vegetation, which exists between the leeward and the windward sides, as well as between the coast districts and the more elevated regions of these islands. While the latter are covered with a rich carpet of vegetation, thanks to the abundant moisture distilled by the trade-wind, the former often present the aspect of absolute desert, nothing but sand and stones reflecting the fierce rays of the noonday sun. The valley of Nuuanu exhibits a similar contrast

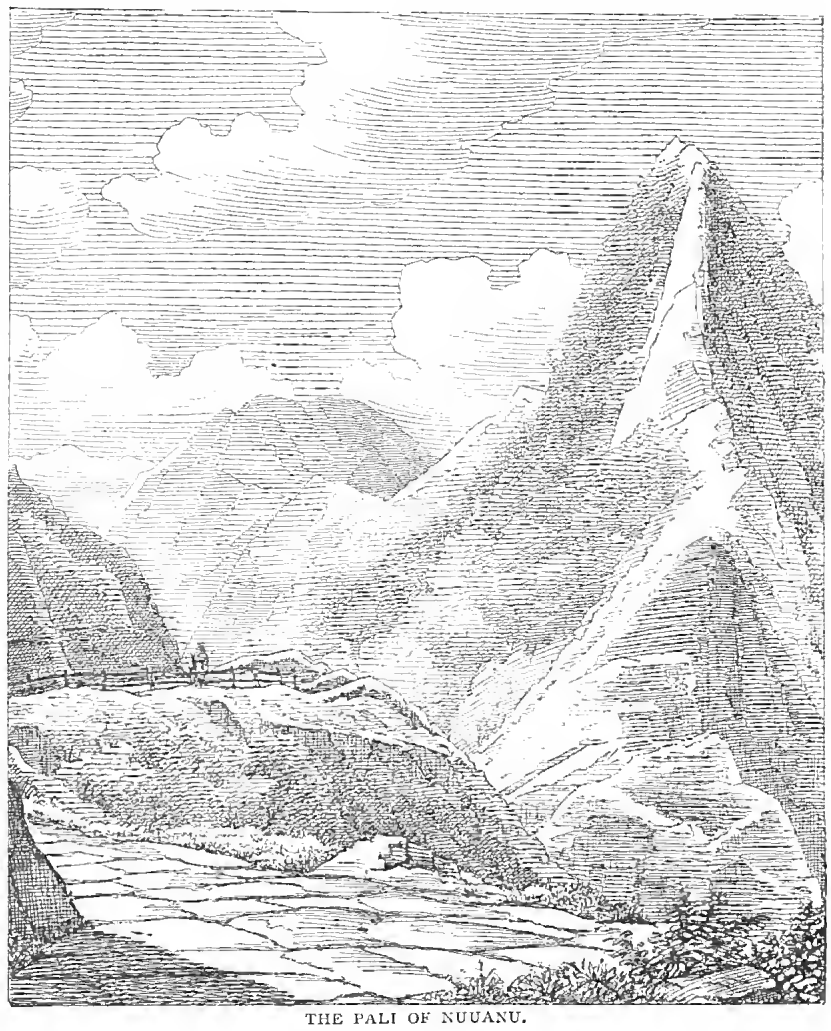


THE VALLEY OF NUUANU.

within the short distance of six miles, and its effect is further heightened by the abrupt change of scenery which accompanies the transition from one climate to another. Having left the dusty roads and tropical groves of Honolulu behind us, we found ourselves, after an hour's walk, as if by magic, in the midst of an Alpine valley—green meadows, cattle grazing, a mountain-stream turning a mill, a few scattered farm-houses, on both sides of the valley the steep slopes of the mountain covered with verdure, and above them tall vertical cliffs, over which the water trickled in silvery streams. Only a few hours ago exposed to the hot rays of an unclouded tropical sky, we were now surrounded by the mist which the trade-wind swept down upon us from the summit of the pass, occasional showers filling the air with delicious moisture. When we had arrived at the highest point of the valley, under the shadow of the Pali, the eastern side of the island suddenly burst into view. Here, from the brink of a precipice many hundred feet high, the eye surveys a magnificent panorama—a wide undulating plain, bounded in front by the blue sea, and towards the north by a chaotic mass of mountains—the ruins, as it were, of the great volcano which in the remote past rose from the bed of the sea and formed the island of Oahu. On each side of the pass extends a stupendous rocky wall over a thousand feet above the plain, and the pass of the Pali is for many miles the only practicable opening whereby the two sides of the island can communicate. The plain below is divided into patches of wood, green fields, and red sand hills, and in the distance the chimney of a sugar plantation may be discerned. The cultivation of sugar is one

of the rising industries of the island; but time alone can tell whether Oahu will be able to compete successfully with its formidable rivals the West Indian Islands.

The historic traditions of Hawaii, like those of many other countries, mainly deal with wars and intrigues between kings and chiefs, and, as such, possess little real interest. An event in local history at the end of the last century, however, deserves a brief record here. The valley of Nuuanu was the scene of the battle in which Kamehameha, King of Hawaii, defeated Kalanikupule, King of Oahu, and thus added the latter island to his dominions. Kamehameha—one of the most remarkable men whom the Polynesian race has produced—was amongst the visitors on board Captain Cook's vessel when the latter appeared off Maui towards the end of November, 1778. He was then a mere youth in attendance upon King Kalaniopun, whom he ultimately succeeded as ruler of Hawaii. In 1794, Kamehameha set out at the head, it is said, of an army of 16,000 men, including a few white men, to conquer the neighbouring islands. He rapidly overran Maui, Lanai, and Molokai; and in February, 1795, he landed on Oahu, and marched to the valley of Nuuanu, where Kalanikupule was encamped. The latter had taken up a position on the steep side of a hill about half-way up the valley. A stone wall which protected him in front was soon knocked down by a field-piece with which Kamehameha was provided. The Hawaiian forces then attacked the Oahuans, many of whom were slain on the spot, and the rest pursued with great slaughter to the end of the valley.



THE PALI OF NUUANU.

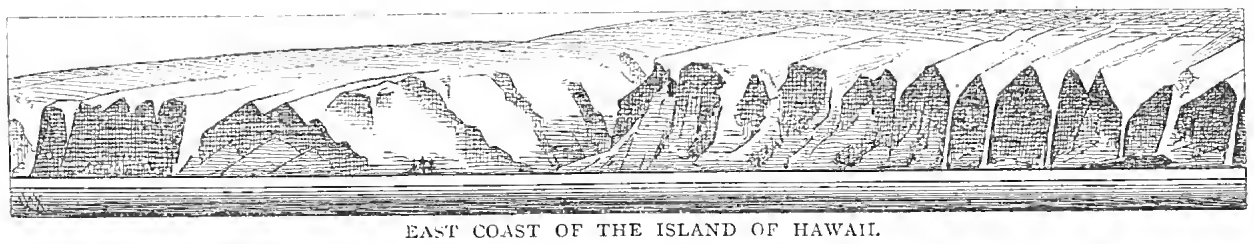
Some were driven headlong over the brink of the precipice at the foot of the Pali, and lay, mangled and lifeless corpses, on the rocks and trees beneath; others fought step by step with desperation, among them Kalanikupule, who, gallantly contesting his inheritance to the last, met a warrior's death. The bodies of the slain were sacrificed, and many heads were impaled upon the walls of the Temple at Waikiki. The scene of this catastrophe is now traversed by the road which winds up towards the Pali, and the rocks around repeat no harsher sounds than the gay laughter and the clatter of the hoofs of mounted parties going towards or returning from Honolulu.

H.M.S. "Challenger" left the harbour of Honolulu in the forenoon of the 11th August. During the day we remained in sight of Oahu, engaged in the operation of swinging ship in order to ascertain the errors of the compass and dipping-needle. In the evening we proceeded southwards with a strong north-easterly breeze, and on the following day entered the channel

between Maui and Hawaii, when we obtained the first glimpse of the great volcano Mauna Loa, the red light of the lava-streams flowing out of its crater just visible among the stars on the southern horizon. Steaming against adverse winds and waves, we made little progress during the night, and about noon on the 13th we found ourselves in the narrowest part of the channel. The summit of Mauna Haleakala, on Maui Island, was hidden behind the clouds; but, looking southwards, we had a fine panoramic view of the island of Hawaii, with its three giant volcanoes—Mauna Hualalai, 7822 feet high, on our right hand; Mauna Kea, 13,953 feet in height, on the left; and between them, Mauna Loa, at present in a state of eruption, rising to 13,760 feet above the level of the sea. A few specks of snow were visible near the summit of Mauna Kea. The two last-mentioned volcanoes, although of about the same height as the Matterhorn, and only 1000 feet lower than Mont Blanc, do not produce, as viewed from the sea, the impression of great height conveyed by the monarchs of the Alps. This may be due partly to the absence of lower mountain ranges, by which the eye is led up, as it were, by degrees to the contemplation of the highest summits, partly also to the low angle of inclination of their slopes. The usual conception of a volcano is that of a conical hill or mountain, the sides of which form with the horizon an angle of from 30° to 40°—such, for example, as Gunong Api in the Banda Islands, the volcanoes of Tidore and Ternate, and, nearer home, the Peak of Teneriffe, Mount Etna, and Vesuvius. The volcanoes of Hawaii have rather the appearance of flattened domes than that of steep conical mountains, as their slopes form with the horizon an angle of only from 10° to 20°. This remarkable variety of conformation, which strikes the observer at first sight, may be closely connected with their origin. Owing to the pressure of the superincumbent ocean, the matter ejected from the interior of the earth will form more level declivities if the eruption commences at the bottom of the sea, than if it had occurred on the surface of the dry land. Hence a marked difference between a volcanic cone of submarine and one of subaerial origin. Most, if not all the islands in the ocean which are the remains of volcanoes built up from the bottom of the sea—such, for example, as Ascension Island, Marion Island, Tahiti and its neighbouring island of Eimeo, and, in the present instance, Hawaii—rise from the sea at an angle of from 10° to 20°, and seem to have originally formed flattened domes, although their general outline has been more or less obliterated by subsequent eruptions and denudation; while the numerous cones found on the slopes of these ancient volcanoes, and which are the result of subaerial eruptions, have an inclination of from 30° to 40°.

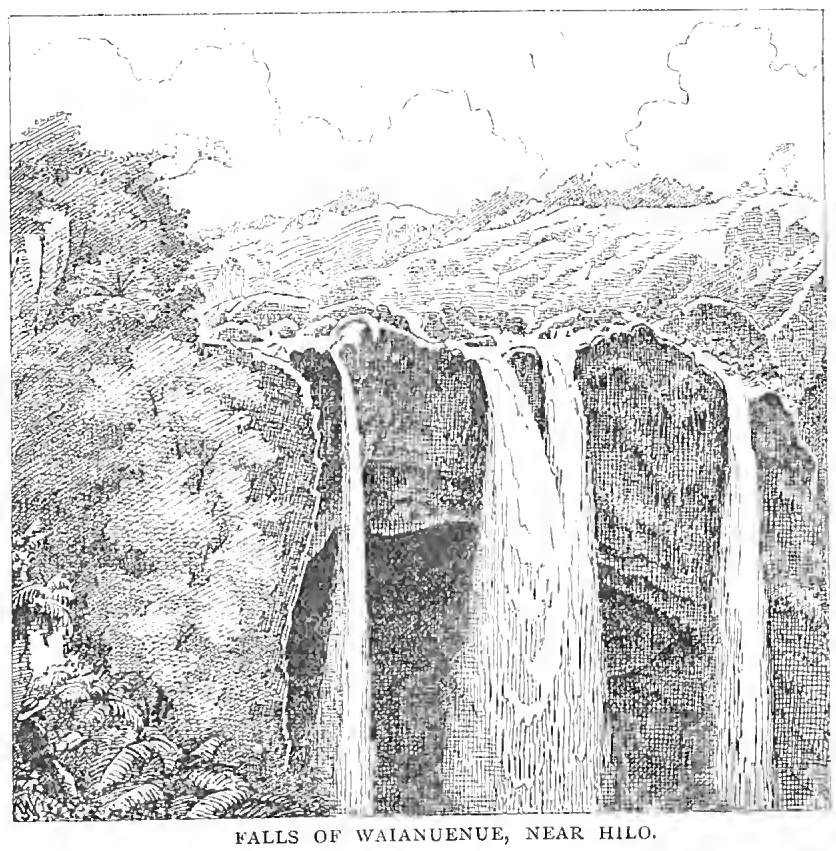
During the afternoon of the 13th we sailed along the east coast of Hawaii. The appearance of the land afforded a striking example of the erosive action of water—that great sculptor, so to speak, to whom we are indebted for the beautiful scenery which adorns this earth, and but for whom the surface of our planet would present, like that of the moon, a mere assemblage of volcanic blisters. Towards Upolou Point, the northern extremity of Hawaii, owing to a more recent flow of lava, sufficient time has not gone by for the formation of valleys and sea cliffs, and the land slopes down to the sea in the form of an inclined plane, scored by numerous shallow water-courses, which run in zigzag fashion towards the

beach. A few small craters lift their conical mounds above the nearly smooth surface of the immense incline, the summit of which is hidden in clouds. But further to the southward, time has deepened these water-courses, and the increased volume of water has straightened them, and thus have they been transformed into a series of glens and valleys, increasing in depth as they approach the shore. The undermining action of the sea has simultaneously created a range of stupendous cliffs, over which the streams which have carved out the valleys fall in magnificent cascades. As many as five or six of the latter, of an average height of several hundred feet, could be seen at one and the same time. Had our course been nearer to the shore, we might have enjoyed a better view of this wonderful spectacle, probably without a rival of its kind in the known world. The above sketch represents this portion of the coast as seen from the ship at a distance of about five miles. During the night, while we were cruising off the coast, the western sky was lighted up by the reflected glare of the burning crater of Mauna Loa. H.M.S. "Challenger" entered the Bay of Hilo on the morning of the 14th. We found here the U.S.S. "Pensacola," bearing the flag of Rear-Admiral Almy. H.M.S. "Repulse," with Admiral Cochrane on board, whom we had expected to meet here, had left for Honolulu shortly before our arrival.



EAST COAST OF THE ISLAND OF HAWAII.

The town of Hilo, or Waiakea, is situated at the southern end of the bay, its church and cottages hidden behind the trees. Above it rises Green Hill, a small extinct volcano; and on the right a wooden suspension bridge spans a creek, the favourite bathing-place of the natives. A short distance above the bridge is the waterfall of Waianuenue. The river descends into a deep chasm surrounded by inaccessible rocks, and in front of a wide cave, which seems to be the mouth of one of those tunnels frequently formed by the lava as it flows down towards the sea. The surface of the burning stream cools in contact with the air, and forms a natural roof, beneath which the lava continues to run. When the volcano ceases to pour forth its torrents of molten rock, the tunnels thus formed remain, and may serve as outlets to the lava-streams of a future eruption. The island of Hawaii is said to be undermined in all directions by these subterranean channels. In the present case the roof of the tunnel forms the bed of the river, while its



FALLS OF WAIANUENUE, NEAR HILO.

mouth, over which the latter precipitates itself, has been exposed, probably by the shock of an earthquake, which rent the ground asunder and created the chasm through which, "with ceaseless turmoil seething," the stream now hurries down to the sea. A few hundred yards below the falls, the natives, old and young, were disporting themselves in the swift-flowing current. Some miles further inland the river forms another waterfall, said to possess features even more imposing than Waianuenue. One day I made an attempt to reach it, but, after wading through the water which, often knee-deep, flowed through a forest, I had to relinquish the hope of adding the scene to my sketch-book; though at the moment, when forced to turn back, the roar of the cascade could be heard in the distance. One of my colleagues, accompanied by a guide, had gone to another part of the forest in quest of some rare birds. While awaiting his return in a hut on the hillside overlooking the bay, one of the fair inmates consented to sit for her portrait, to which she appended her signature. I preserved the sketch as a remembrance of the friendly and hospitable natives of Hawaii.

WOMAN OF HAWAII.

A large proportion of the generation at present living in these islands have received a fair education in schools established by the missionaries. A sum of from 20,000 to 30,000 dollars is granted annually by the Government for the support of these schools. Unfortunately this fine race seems to be doomed to extinction. The population, which in 1832, at the time of the first official census, amounted to about 130,000, had fallen in 1866 to 60,000, not including residents of foreign origin, whose number has steadily increased from a few score to over 4000.

From the shores of the Bay of Hilo the land ascends in one continuous slope to the summit of Mauna Kea. The region nearest to the sea is covered here and there with bright green spaces denoting sugar plantations. Next comes a belt of forest many miles deep; and above the latter rise the bare flanks of the volcano, coloured grey and red, with a few small patches of snow. The crest of this great mountain shows the profile of numerous cones, each of which represents a volcano of considerable size. About thirty miles to the south-westward of Hilo is the famous crater of Kilauea, one of the most active volcanoes of our epoch. It is situated upon the eastern flank of Mauna Loa, about half-way between the summit of the latter and the sea, and may be considered as an offshoot of Mauna Loa, the son being little if at all inferior to the father in his power of devastating the fair land beneath. The crater of Kilauea, as often stated in published descriptions, forms a large volcanic lake, or rather cauldron, oval-shaped, about five miles in circumference, surrounded by lava-cliffs in some places several hundred feet high, and in a more or less continuous state of ebullition.

About twenty months after the date of our visit, in the afternoon of the 4th May, 1877, a jet of lava was thrown up to the height of one hundred feet, and afterwards other jets, to the number of fifty, came into play. When, on the next day, an observing party ventured to descend into the vast crater, they found that, on the dark-coloured plain which forms its floor, a mound had been thrown up, 1400 feet in diameter and 700 feet in height.

The dimensions of the crater of Mauna Loa are not less extraordinary. It is 11,000 feet long, 8000 feet wide, about six miles in circumference, and has an average depth of 800 feet; the bottom is rent by awful chasms which no human being will ever fathom. The record of the eruptions of Mauna Loa shows that there have been eight since the year 1823, the last having occurred in April, 1868.

A "Volcano House," or hotel, has been built close to the crater of Kilauea for the accommodation of travellers, but the great want is a tolerably good road. The present road or track from Hilo passes over very rough ground, and is for long distances merely a succession of deep holes worn by the horses' feet. Several excursion parties from the "Challenger" started for Kilauea on horseback. I attempted to accomplish the distance on foot, but when about half-way I had to renounce the project, partly from fatigue caused by the heat of the weather and the bad state of the roads, partly on account of thirst, which exceeded anything I had experienced during former pedestrian tours. For the last ten miles there was not the smallest rill or pool of water whereat to refresh oneself, and I was glad to gather a few drops from the holes trodden by horses' hoofs. The track was at times scarcely visible among the tall grass, and I would have lost my way but for the help of an islander, who guided me to a place known as Hawelu's Halfway House. I had to content myself with a distant view of the fires of Mauna Loa; but the mishap procured me the unwonted experience of passing a night in a Hawaiian hut. The dwellings of the natives are well protected from the rain by a solid thatch; the walls, however, are a mere lattice-work of sticks. It was like sleeping in a large bird-cage. The stars twinkled through the chinks, and the deliciously fresh night-air entered in cooling streams. On my return to Hilo, I was accompanied during part of my way by a native, who conducted me to his hut, and introduced me to his smiling spouse.

> "With dispatchful looks in haste
> She turned, on hospitable thoughts intent
> What choice to choose for delicacy best."

Soon was produced that "abundance" with which they deemed it "fit to honour and receive" a stranger, and my kind hosts

> "Prepared
> For dinner savoury fruits, of taste to please
> True appetite,"

oranges, pine-apples, and bananas being included in the repast. The day was intensely hot, and never did fruit taste sweeter, deriving additional zest from the spirit in which it was offered. Leaving my generous friends, I resumed my journey over the fields of lava, wondering at the

strange convolutions into which this fiery substance settles as it gradually thickens and finally turns to stone. It was difficult to believe that the hard ground which I trod had been, but a few years ago, the surface of a moving mass of incandescent matter, glowing with the richest crimson hues. It was evident that the "solid foundations of the earth" are by no means so solid as they appear, and that the rocks which the poet calls "everlasting" have been many a time returned into the crucible before they assumed their present shape. I noticed that among the plants which first take possession of the newly-formed land ferns are conspicuous by their number—a fact which, perhaps, has some connection with the preponderance of these plants in former geological epochs, when, probably, the area of land covered with fresh lava-streams was greater than it is now.

A forest three miles deep still separated me from the port. It seemed to surpass in splendour all other displays of tropical vegetation that I had met with in my wanderings—the very paradise of the botanist, the despair of the artist who would attempt to depict its glories. Even he who has been called "the poet of Nature" halts far behind reality when describing

> "Majestic woods, of every vigorous green,
> Stage above stage, high-waving o'er the hills;
> Or to the far horizon wide-diffused,
> A boundless deep immensity of shade.
> Here lofty trees, to ancient song unknown,
> The noble sons of potent heat and floods
> Prone-rushing from the clouds, rear high to heaven
> Their thorny stems, and broad around them throw
> Meridian gloom."

We are accustomed to admire the beauty of our forests in Europe: the wide-branching lordly oak, the tall fir festooned with grey moss, the underwood, with its delicate branches and leaves, the ground carpeted with flowers and wild berries—the whole scene not less beautiful at night when a sheaf of moonbeams lights up the silent glade. But this beauty is quite different from that of a tropical forest. The one, quiet and modest, requires to be sought; the other, obtrusive, showy, and, as it were, unabashed, proclaims itself at once. Here both colour and form are more decided, and displayed on a larger scale: trees taller than our oak, with a dense foliage composed of broad leaves mixed with thick bunches of blossoms; climbing up their trunks, gigantic creepers, with leaves a foot long, and now and then bursting out into bright scarlet flowers. The underwood in the forest of Hilo mainly consists of graceful tree-ferns, rising to a height of from fifteen to twenty feet.

The forests of Hawaii are infested with wild cattle—the descendants of the animals which Vancouver presented to King Kamehameha. One of these, a wild bull with a fine pair of well-sharpened horns, met the narrator in the forest of Hilo, and as there was only room for one in the narrow path bounded on each side by an impenetrable thicket, the situation was rather awkward, for the animal seemed inclined to dispute the right of way. I was rescued by a party of horsemen. The bull charged the foremost horse, but the rider, a Hawaiian, familiar with these encounters, by a well-delivered blow sent the bull crashing through the

underwood. The incident was for me *un mauvais quart d'heure;* happily the other cattle I fell in with preferred the green meadow to the dusty highway. The danger was soon forgotten in admiration of the magic scene around. In this district of frequent rains, vegetation bears no trace of the scorching effect of tropical sunshine. Every leaf in this wide forest sparkled in the radiant light as fresh and as perfect in shape and hue as if it had just sprung into life. At Waiakea, are shown the remains of the artificial fish-ponds constructed in the reign of the former kings of Hawaii to keep up a supply for the royal table.

Hilo has suffered at various times from the destructive effects of earthquake-waves, caused by the shocks which so frequently visit the opposite coast of South America. On the 7th November, 1837, the sea retired at the rate of five miles an hour, leaving a great portion of the harbour dry. The village was crowded with people, who had collected to attend a religious meeting. They rushed to the beach to witness the novel sight; suddenly a gigantic wave came roaring towards them at a speed of from seven to eight miles an hour, and, rising twenty feet above high-water mark, dashed upon the beach with a noise like thunder. The people were buried in its flood; houses, canoes, living creatures, in short, property of all kinds, were mingled in one common ruin. A similar catastrophe, though not attended with the loss of so many lives, occurred in the spring of 1868, twelve hours after the towns of Arequipa and Arica, on the coast of Peru, had been destroyed by an earthquake-wave.

Since the visit of the "Challenger," Hilo has had another narrow escape from total destruction. Between four and five a.m. on the 10th of May, 1877, the day after the earthquake which laid Iquique in ruins, the sea suddenly receded, and returned with violence in the shape of an enormous wave, measuring about thirty-six feet from the trough to the crest. Entering the harbour of Hilo, the wave rolled in upon the shore and swept away the wharves and storehouses in the front part of the town. A small island in the harbour, named Cocoanut Island, was entirely submerged, and no trace left of the hospital which had stood on it. Our anchorage was close to this island, and had an earthquake-wave entered the harbour during our stay, our good ship would probably have been left high and dry among the trees and cottages of Hilo. On the opposite side of Hawaii, in Kealakekua Bay, the scene of Captain Cook's death, the wave on the occasion last referred to measured thirty feet.

On the 19th of August we bade farewell to Hawaii. The following day, when about thirty miles distant from the south-eastern extremity of that island, the soundings had already increased to 2875 fathoms, or 17,250 feet. If to this we add the height of Mauna Kea, 13,950 feet, we obtain the enormous height of 31,200 feet, or very nearly six English miles, for the total elevation of the island of Hawaii above the bottom of the sea, which is more than double the height of Mont Blanc. The course of the "Challenger" was nearly due south. Before crossing the Equator, we passed Manuel Rodrigues Reef, laid down in the chart in lat. 11° N., on the 26th August, and, on the 3rd September, Walker Islands, in lat. 4° N., but not near enough to verify their existence. The chart of the Pacific Ocean is strewn with islands, reefs, and shoals, many of which have been inserted on doubtful authority, and which have, consequently, been omitted from the

latest chart published by the Admiralty. During the last day of August and the 1st of September, a strong current and a westerly gale drove the ship considerably more than a hundred miles to the eastward of her course. In the afternoon of the 5th September, we crossed the Equator for the fifth time since our departure from England. The next crossing of the line, we all hoped, would be in the direction of a homeward course; but our confidence in a safe return for each and all of our company received a rude shock in a sad event marking our last entrance into the southern hemisphere. On the 13th of September, after a short illness, died Dr. Rudolf von Willemöes-Suhm, one of my colleagues on the Civilian Scientific Staff. He was a native of Schleswig-Holstein, and showed very early a decided taste for natural science. Having completed his studies at the Universities of Göttingen and Bonn, he was appointed Privat-Docent in Zoology in the University of Munich, which appointment, indeed, he held at the time of his death, having obtained leave of absence to join the "Challenger" Expedition. Dr. von Willemöes-Suhm devoted much attention to the structure and physiology of the crustaceans and other invertebrate animals obtained during the progress of the voyage, and has left behind him many valuable papers, and a series of carefully-executed drawings. Natural science has lost in him one of her most earnest students. For many a day we sorrowfully missed his familiar form from its accustomed place in the zoological laboratorium, where, ever and anon peering into his microscope, he had daily jotted down with unwearied industry his observations upon newly-discovered organisms.

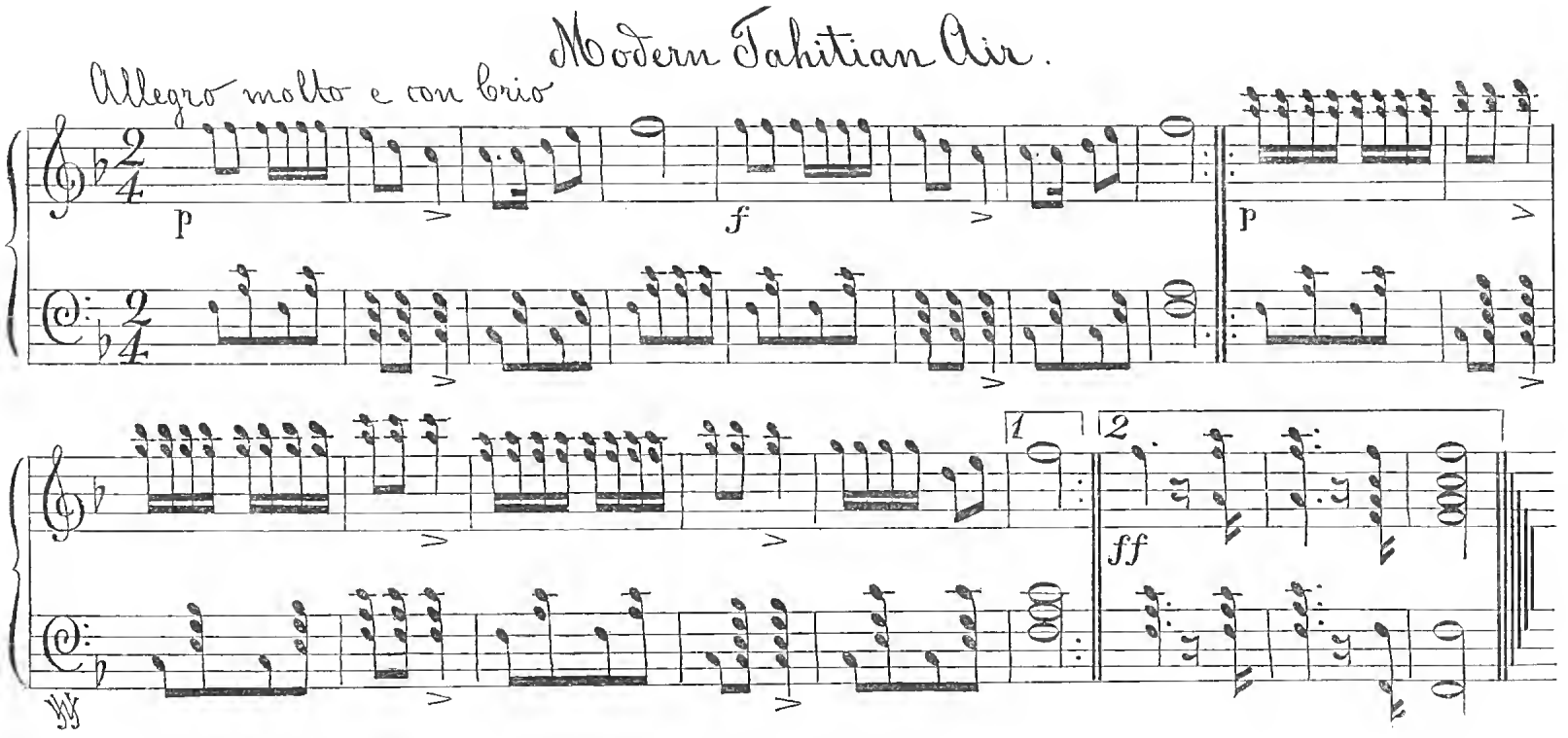
Our long and sad cruise of 2600 miles from Hawaii came to a termination on Saturday, September 18. As morning dawned, two large islands became visible upon the southern horizon. These were Tahiti and the neighbouring island of Eimeo. The former culminates in three pyramidal summits of nearly equal height, the highest, Orovena, being 7339 feet above the level of the sea; the latter, situated more to the westward, presented an even more extraordinary outline, composed of steep crags and lofty cones mingling with the clouds.

TAHITI.

In the afternoon, H.M.S. "Challenger" anchored in the harbour of Papeete. The view from deck, especially towards sunset, was magnificent; to landward the town of Papeete, its roofs and church steeple just overtopping the grove of trees in which the houses are enclosed, and above them a huge red and grey tinted mountain mass towering up into the sky; to seaward, a line of reefs breaking the smooth surface of the water, which reflected the crimson rays of the sun setting behind Eimeo. The first days succeeding our arrival were spent in a mutual interchange of the civilities customary at the visit of a man-of-war in a foreign port—in making official calls, receiving and returning the visits of the notabilities of the place. Accompanied by the British Consul and the aide-de-camp of His Excellency the Governor, we went to pay our respects to Queen Pomare. The reception took place in a building adjoining Government House. We were met at the door by one of the

Queen's sons—a tall, portly, fine-featured man, attired in black. On entering a large room we saw Queen Pomare seated in an arm-chair, and behind her four young ladies, members of the royal family, including the Crown Princess and the Queen of Raiatea. The conversation was carried on in French and Tahitian through an interpreter; Her Majesty, who seemed to be much gratified by our visit, replying in her native tongue. An oil-painting representing the Queen in her younger days, dressed in a white satin dress with short sleeves in the style of the First Empire, adorned the walls of the reception-room. Queen Pomare is, if I were rightly informed, sister of King Pomare II., who was son of Pomare I., better known perhaps as the chief Otoo, the friend of Captain Cook.

A few days after this visit, the Queen and her relatives were present at a ball in Government House. The elegant and brillantly-lighted rooms were crowded with Parisian and Tahitian toilettes, French and English uniforms. The Queen, accompanied by two female attendants carrying a box full of cigarettes, would at times step out on the verandah with her son, to enjoy a quiet whiff in the cool evening breeze. The lawn in front of Government House was crowded with natives, attracted by the strains of our amateur band. The latter had already appropriated a highly popular air, which, though not of local origin,



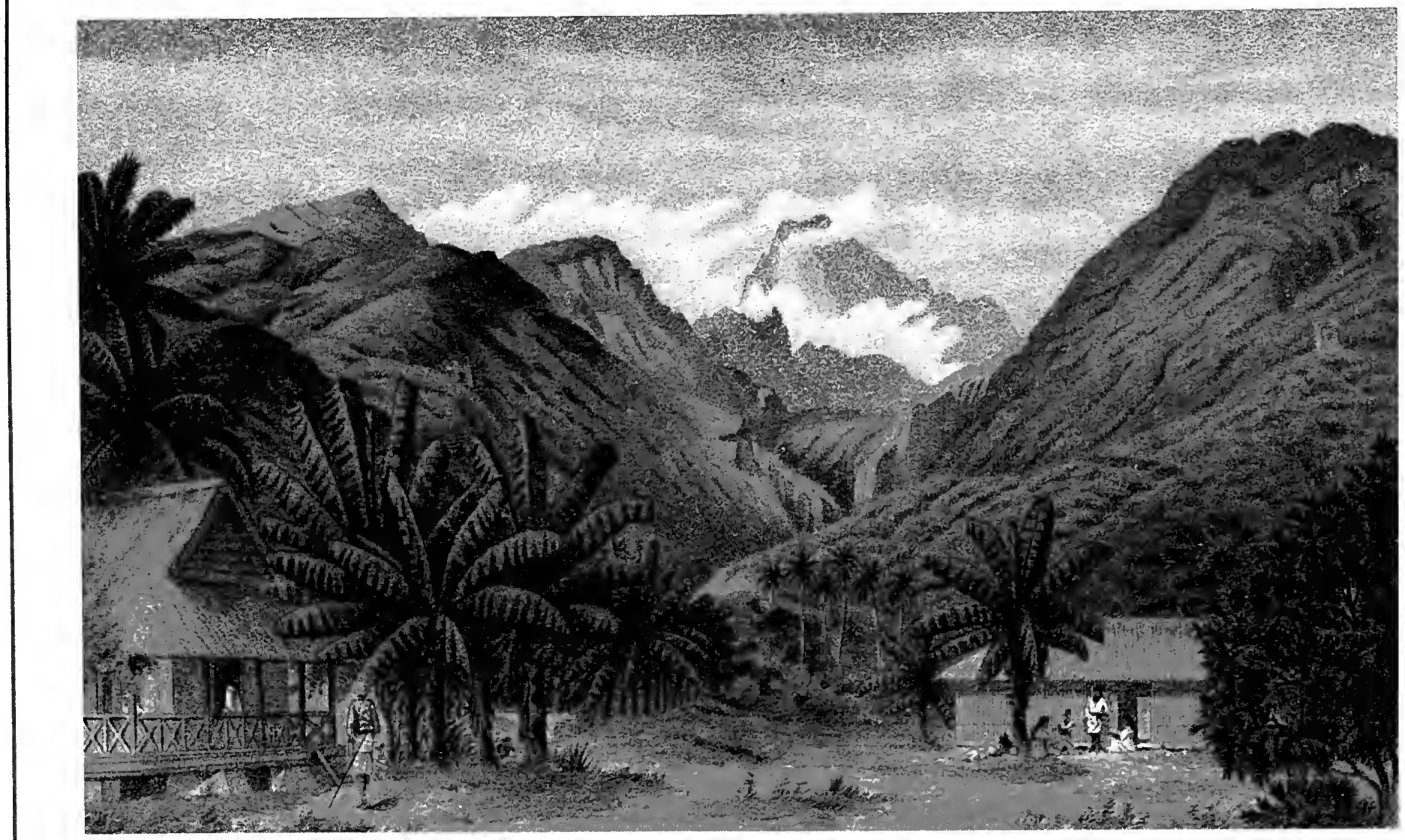
is very characteristic of the gay, pleasure-loving disposition of the Tahitians. Thanks to the exertions of our energetic bandmaster, aided by Jack's enthusiastic love of music, the band had attained a creditable amount of proficiency. Its performances on shore must have astonished the aborigines of the Pacific Islands; while the sounds of music on board greatly helped to relieve the tedium of a long cruise. Wind and weather permitting, one evening in the week the band played for the recreation of our tars. Sailors, it need hardly be said, are excessively fond of dancing; some, indeed, excel in this graceful art

to a degree not always witnessed in a ball-room. A rare combination of physical strength, agility, suppleness, and precision of motion, with perfect good-humour and thorough enjoyment of the fleeting hour, is to be seen among a number of tars "footing it"—stockingless—on the smooth deck of a man-of-war, holding the while their bearded partners in "gentle" embrace.


Woman of Tahiti

On a subsequent evening the band played in the pavilion occupying the centre of the large green in front of the Governor's residence. All Papeete was there, and the scene was very striking—groups of Tahitian women and girls, with flowers in their hair, walking arm in arm round the pavilion, or sitting on the ground smoking cigarettes, or joining in impromptu dances with their native or French beaux, all dimly seen by the light of a few lamps placed round the green. The reputation of the gentler sex for good looks seems well deserved. With great regularity of feature, reminding one sometimes of the faces of the Roman peasantry, they combine fine large eyes with dark flowing hair rolling down over their shoulders; their walk, too, has the natural grace which comes of a happy ignorance of the tight-fitting garments and boots of their sisters in Europe. The loose gown—generally of a decided colour, white, red, green, blue, yellow, or striped—has at first sight a somewhat *négligé* look; but when seen at the end of an avenue of palms, or among the trees of an orange grove, these garments just supply those bits of bright colour which the landscape painter requires to subdue the tints of his picture.

On the 22nd, I joined one of my messmates in a drive round the west coast to the village of Papeuriri, situated about twenty-five miles from Papeete, and not far from the isthmus which connects Tahiti-nui, or great Tahiti, with Tahiti-iti, or Little Tahiti. This narrow, low isthmus gives to the whole island the appearance of the figure 8, placed in the direction from south-east to north-west, with Eimeo, Raiatea, and the other islands of the group fixed in the same axis further towards the north-west. One object of our excursion was to pay a visit to Chief Tere, who resides at Papeuriri, and to whom we had a letter of introduction written in his own tongue. On one of those bright sunny mornings which are here the rule, we set out in an open carriage and pair. The drive along a tolerably good road which skirts the shore was a series of surprises, one beautiful view being succeeded by another still more attractive. On our left, the purple-blue sea rolled its snow-white breakers over the coral reefs; on our right, the wooded hills rose, in majestic terraces, until they reached the foot of the rocky pinnacles which, half-veiled by the clouds, seem to keep watch and ward over the island. From the lofty summits which cluster round Orovena, deep ravines, glens, and valleys radiate in all directions, and, as we proceeded along the coast, these came into view one after the other, presenting vistas of surpassing loveliness. Here might Shelley have found



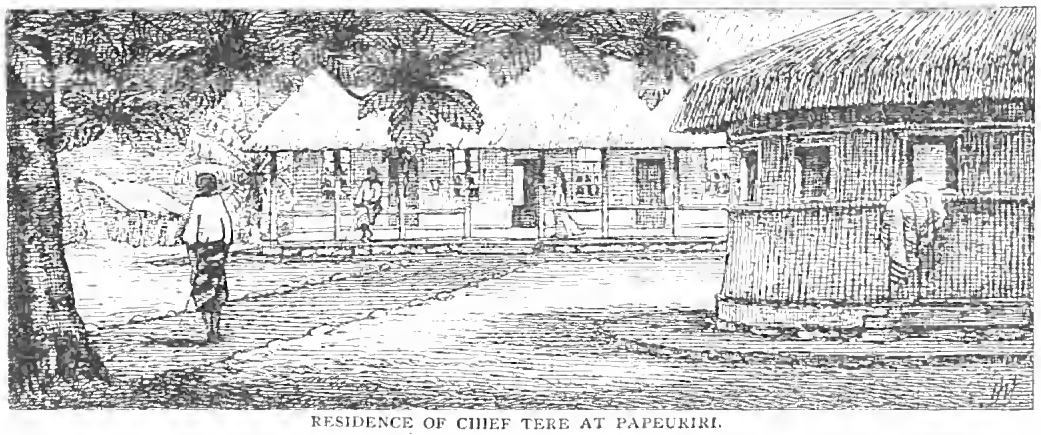
"A dell 'mid lawny hills,
Which the wild sea-murmur fills,
And soft sunshine, and the sound
Of old forests echoing round,
And the light and smell divine
Of all flowers that breathe and shine."

A few miles on this side of Papeuriri, the road passes through an old cotton plantation which, since the death of its enterprising founder, Captain Stewart, has been allowed to lie waste. The ground was still dotted here and there with cotton-plants displaying their white tufts. The attempt to introduce the cultivation of this plant into Tahiti seemingly failed, although both soil and climate were in its favour, partly owing to the difficulties of establishing such a branch of industry in a remote island of the Pacific, partly through local jealousies. The traders who first gain a footing in a newly-opened country enjoy for some time the exclusive privilege of barter with the natives, which to some extent is the legitimate reward of their enterprise; but they are liable to look upon every project of a new-comer, however beneficial it may prove in the end to the whole community, as an attempt to invade their rights, and to lessen the social and political influence they have acquired. Captain Stewart, to secure the number of labourers required for his plantation, had imported natives from the neighbouring Hervey Islands, and their deserted huts still stood on the roadside. The extensive stores, offices, and dwelling-houses, neatly and substantially built, covered a large space of ground, but all were closed up and in the first stage of decay.

After a five hours' drive through groves of bananas, oranges, citrons, cocoa palms, and bread-fruit trees, we arrived at Papeuriri, whose chief, Tere, and his amiable wife, gave us a very hospitable reception. Our host was a fine, portly, middle-aged man, of commanding yet genial countenance. He was dressed in modern Tahitian style—wide-awake hat, loose jacket, and kilt or short petticoat of a bright pattern. His spouse, evidently his junior by some years, was attired in a white gown, her black tresses flowing gracefully over her shoulders. Both were unremitting in their endeavours to secure the comfort of their guests; and the incidents of this short but interesting visit come back to the memory as amongst the most pleasant recollections of our wanderings.

On the lawn in front of Tere's house was a large structure built to accommodate an assembly of several hundred persons—a sort of town-hall or meeting-house, partly shown in the sketch on next page. In the course of the afternoon a public meeting was held; but as the day was fine, the men attending it, to the number of some fifteen or twenty, sat down in the shade of the broad leaves of the bread-fruit trees, which formed the avenue to Tere's house. Each speaker, as he rose, uncovered, and then proceeded to address the chief, who stood in the verandah, at one end of which sat his secretary, taking notes. Their manner of speaking was energetic, yet marked by a quiet natural dignity. Unlike the even flow of our European orators, who generally deliver speeches prepared beforehand in a more or less mechanical manner, their discourse consisted of short sentences separated

by long pauses, as if the speaker stopped to reflect on what he should say next. I noticed the same peculiarity in a sermon delivered by a native preacher at Papeete. One of the principal orators, dressed in a loose gown reaching to his knee, his head encircled with a wreath of leaves, appeared the living image of an "antique Roman." His face, too, of the true Roman type, had an intelligent, sober expression, modified by an occasional humorous twinkle in his eye. He always ended his speeches with some witty remark, received with great laughter and applause by his countrymen seated around. The perfect order and decorum which prevailed at this meeting might serve—so it struck me at the time—as an example to more illustrious assemblies. The whole scene was intensely interesting, although, ignorant as I was of the Tahitian tongue, the details of the debate were unintelligible. Here, under the auspices of the French Republic, the dark-skinned men of Tahiti—whose existence was little more than a century ago unknown to us—had met together in the open air for the discussion of public affairs, after the manner of the citizens of ancient Rome. A book containing an abstract of the speeches made at such gatherings is sent in periodically to the French authorities at Papeete, who are thus made acquainted with the wishes and opinions of the native population.



RESIDENCE OF CHIEF TERE AT PAPEURIRI.

Towards evening we sat down with our host and hostess to dinner served in European style—that is to say, with knives and forks, china ware, glass, and a bouquet of flowers in the centre of the table. During dinner a party of men and women, boys and girls, assembled on the lawn and treated us to a choral song, which they call "hymnéné." Their singing, by no means inharmonious, is frequently accompanied by clapping of hands, and the time, at first slow, becomes very quick towards the end. Occasionally a few bars are sung by the treble voices, after which the men join in with their deeper notes. Having been accustomed for many months to the falsetto voices and nasal tones of the Malays, the Chinese, and the Japanese, I was quite taken by surprise when, at Honolulu, I heard a native humming to himself a tune in accordance with home notions of harmony. This difference as regards musical utterance seems to draw a decided line of demarcation between the Polynesian and Asiatic races. After dinner we sat in the verandah smoking, listening to the singing, and enjoying the cool night air, so delicious after the heat of a tropical day, while the stars twinkled through the dark foliage of the bread-fruit trees. When this pleasant evening party broke up, we were shown into exquisitely neat bedrooms opening out upon the verandah, and provided with regular four-posters—one of the unattainable luxuries the sailor dreams of when, at sea, he sleeps in his narrow cot or hammock.

Next morning I strolled down to the beach to look at Little Tahiti, also known under the name of the Peninsula of Taiarapu, which rises from the sea opposite to Papeuriri.

Like its twin-sister, Great Tahiti, it was originally a huge volcano, shaped like a flattened cone or dome. It appears to have suffered less from the effects of subaerial denudation than Great Tahiti, and is therefore, probably, of more recent creation. The almost uniform direction of the axis of the volcanic groups of the Pacific Ocean, from north-west to south-east, has struck many observers; but there exists yet another point of resemblance, the cause of which may perhaps be accurately settled in the future—namely, that the successive eruptions to which these island-groups owe their existence seem to have begun at the north-western extremity of each group, the volcanoes at that end being of older date than those found at the south-eastern extremity. Thus, in the Hawaiian group, Kauai, at the north-western end of the group, is older than Oahu, the latter older than Maui, while Hawaii, at the south-eastern point, is the island most recently raised from the sea-bottom. In the Tahitian group, judging from the effects of denudation, Eimeo seems older than Tahiti-nui, and the latter older than Tahiti-iti or Taiarapu. The peninsula is only 3700 feet high, little more than half the elevation of its neighbour.

Returning in the direction of Tere's house, the way led through a large orange grove at the back of his dwelling. It was more a wood than a grove, the trees attaining a height of about thirty feet. The oranges and pine-apples of Tahiti surpass in size and flavour those of any other part of the world visited by us, and are very different from the half-ripened, acid, and tough fruits which are sold under these names at home.

The time had come to bid farewell to our kindly host and hostess, who, according to the custom of their race, filled our carriage with parting gifts of fruit and fowl. On our return trip we gazed again with admiration at the beautiful mountain and coast scenery visible from the road, and thought with a touch of sadness that at least the elder of our little party was not likely to look on it again. During our stay at Papeete, I once happened to express to the accomplished aide-de-camp of the Governor, himself a successful amateur landscape painter, my regret that none of our European artists—who must be weary of reproducing the same aspects of sea and land year after year—should have thought of spending some time among the genial Tahitians in order to depict the marvellous scenery of these islands. A series of truthful representations of tropical views would surely prove a welcome surprise to lovers of art, and a novel feature in our exhibitions. No doubt a journey to Tahiti is a serious undertaking, and the effects of a hot climate—though this drawback may be exaggerated—are not favourable to work requiring long-sustained effort. An obstacle less thought of, but perhaps not less real, is the presence of mosquitoes, which render sketching or painting in the open air an irksome task. Half-a-dozen of these tormentors will sometimes settle on the hand which wields the pencil or brush. However, a passionate lover of his craft would find means to overcome even this difficulty, against which may be set the advantage of almost perpetual sunshine. On the other hand, the painter must be ready to abandon many cherished traditions, and begin to study nature over again, for the effects of form and colour, of light and shade, in a tropical landscape, demand a treatment different from that employed in the reproduction of the more subdued features of English or

Continental scenery. The island of Eimeo especially deserves the attention of the landscape painter. Our arrangements did not permit of a visit to its shores, but, judging from its appearance as seen from the harbour of Papeete, its rugged peaks rising in chaotic confusion, and its deep ravines, must surpass in wild and romantic grandeur the conceptions of the most fantastic brain. When the setting sun sends his rays through these "mountain steeps and summits," it is most difficult to guess how gorgeous must be the shapes and hues, ever shifting and changing before the observer's eye—

> "Blazing terrace upon terrace high
> Uplifted; here, serene pavilions bright,
> In avenues disposed; there, towers begirt
> With battlements that on their restless fronts
> Bore stars."

On the 29th an excursion was made to Point Venus, the northern extremity of the island. This cape—called by the natives Tehuroa, and rendered conspicuous from a great distance at sea by its well-built lighthouse—was named by the illustrious Captain Cook, by whom the site was selected for the observation of the transit of Venus which occurred in the year 1769. The tamarind planted by Cook has been well cared for. It is protected by a fence, and the sapling planted more than a century ago has grown into a large tree, spreading far and wide its forked branches and dark-green feathery foliage. Point Venus is a spit of level land projecting into the sea, the delta of the river Matavai, which flows down from the towering heights of Orovena. Planted with trees and partly under cultivation, it has a park-like aspect. In Cook's time the valley of the Matavai or Apape was one of the most populous districts of Tahiti; it seems now to be wholly deserted. Nowhere does the gigantic mass of Orovena, surrounded by its cloud-topped satellites, offer a more imposing spectacle than here, upon the spot where stood the old navigator's observatory. Returning from Point Venus towards Papeete, the road crosses the Tahara Bluff, which commands a fine prospect over the north coast of Tahiti and the opposite island of Eimeo.

A few miles to the eastward of Papeete opens another beautiful valley, perhaps the most picturesque in Tahiti. The path leads for miles along a mountain torrent, and through exquisite woodland scenery, amidst tree-ferns and wild fruit-trees. Further up the valley, near Fort Fantana, is a waterfall several hundred feet high, and the eye finally rests upon the steep crags of Diadem Rock, which adorns the brow of the Queen of the Pacific Islands.

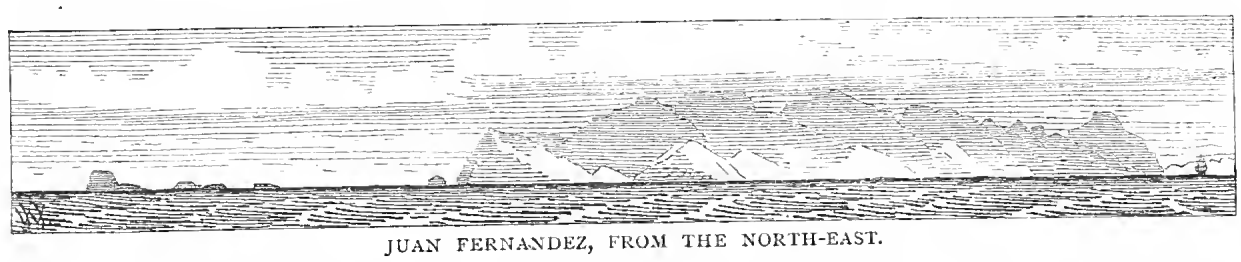
Two days before our departure, the captain and officers of H.M.S. "Challenger" gave a ball on board, which was attended by Queen Pomare and her court, His Excellency the Governor, the French officers and officials, the British Consul—to whose kindness and hospitality we were much indebted—and the principal residents of Papeete. The deck, adorned with flags and sheltered by an awning, looked extremely gay, while the numerous naval and military uniforms and the toilettes of the Tahitian princesses produced a brilliant effect. Queen Pomare, cosily ensconced in an arm-chair, watched the proceedings with evident gratification.

On the 3rd October our tars were heaving in the anchors, keeping time to the Tahitian air. It was a fine sunny morning, and we all stood on deck looking towards the beach, where our friends had gathered to bid us farewell. We remained during the day between Tahiti and Eimeo, swinging ship for the adjustment of the compasses. In the evening we made sail, and soon the realm of Queen Pomare had faded away in the twilight.

At sunrise on the 7th, the strongly-indented outline of Tubuai, the principal island of the Austral group, was visible about thirty miles to the eastward. Its surface is occupied by a cluster of high, steep mountains, evidently of volcanic origin. Baffled by alternate adverse winds and calms, we had to give up our intention of taking a more direct course towards Valparaiso, and of calling at Easter Island, with its curious stone images. The 21st found us on the 40th parallel. A few days later we fell in with the expected westerly breeze, and then our good ship began to plough her way through the foaming sea towards the distant shores of South America. The weather was cold, and as we were sailing parallel with and only a short distance from the latitudes where icebergs have been encountered, we would not have been surprised had one of these crossed our path. We had no sooner left the "forties," and shaped our course for Valparaiso, when we were again beset by calms, and but for the assistance of steam, another month might have been added to this section of our cruise—as it turned out—of over 5000 miles. Before sighting the snow-clad summits of the "Cordiller de los Andes," however, we had to pass a spot which, to the eyes of the youth of past and coming generations, was and always will be classic ground—the island of Juan Fernandez, once the abode of Alexander Selkirk, the prototpye of the immortal Robinson Crusoe.

JUAN FERNANDEZ.

The island appeared in sight on the morning of Saturday, November 13. Its rugged outline and precipitous cliffs became gradually more distinct, though the highest peaks remained covered with clouds. At 4 p.m. our vessel rounded the eastern end of the island, marked by a dark solitary rock called by the Spaniards "Morro Calchas," and at sunset we were anchored in Cumberland Bay, the largest indentation on the northern shore. The island—about twelve miles long, with an average breadth of three miles—extends from east to west, and presents the aspect of a mountainous ridge rising abruptly out of the sea. The highest summit—named, from its square shape, "El Yunque," the anvil—is 3000 feet high. The south side of Juan Fernandez forms an almost continuous wall of inaccessible cliffs; on the northern side the numerous spurs which branch off from the central ridge enclose several bays, capable of affording anchorage to ships. It was at English Bay, the one next to the westward of Cumberland Bay, that Selkirk spent four years and four months—between



JUAN FERNANDEZ, FROM THE NORTH-EAST.

1704 and 1709—in absolute solitude. He is said to have occasionally crossed the ridge which divides the two bays in order to reach a place commanding an extensive view of the sea, and still known as "Selkirk's Look-out." The spot is now marked by a tablet erected to his memory by Commodore Powell and the officers of H.M.S. "Topaze" in 1868. Selkirk, as the tablet informs us, died lieutenant of H.M.S. "Weymouth," in 1728, at the age of forty-seven.

Defoe, using the licence accorded to a writer of fiction, has adorned the abode of Robinson Crusoe with the rich tropical vegetation of the West Indies; but Juan Fernandez, situated in the comparatively low latitude of 34° S., is exposed to cold winds from the Antarctic, and its general appearance is barren and bleak, not unlike the west coast of Scotland. The canopy of clouds which almost constantly rests upon its summits, and the dark patches of myrtle forest, combine to produce an impression of profound melancholy. Yet are these forests enlivened with the tiny humming-bird, and the glens boast of a luxuriant vegetation, composed of the myrtle, the peach—just in blossom at the time of our visit—and a variety of ferns and flowering shrubs. Bright green patches of mint fill the air with a delicious perfume.

The accident of men being left behind, or being wrecked upon a deserted island, or their being abandoned by evil-intentioned shipmates, is of more frequent occurrence than the reader might be inclined to suppose. Unless speedily rescued, the castaway dies a miserable death, for man, at all times liable to disease and injuries, is unable to cope single-handed with the forces of Nature. Even Defoe found it necessary to the truth of his marvellous delineation—the day-dream of so many youthful brains—to supply Robinson Crusoe with such provisions, tools, weapons, and ammunition as could be saved from the wreck—in other words, with the aid of his fellow-men, as represented by these indispensable implements. Alexander Selkirk enjoyed similar advantages, else he would not have lived to tell the story of his adventures. Moreover, he had at his disposal the moral and intellectual resources of an educated mind. This privilege, which is lacking to many a poor shipwrecked mariner, probably saved him from madness—one of the greatest dangers of a solitary life.

The settlement of San Juan Bautista, in front of which we lay at anchor, consists of a ruined fort and a few huts inhabited by natives of Chili, engaged in looking after cattle, killing fur-seals, and occasionally supplying passing vessels with fresh provisions. On a level with the fort are a number of caves, hollowed out of the volcanic bluffs by human hands. They probably served at one time as a retreat to the buccaneers who made this island a centre of their predatory excursions against the Spanish settlements on the coasts of Chili and Peru. The largest of these caves communicates by a passage with an inner cave, also artificially constructed. The ceilings, walls, and floors are covered with a thick and exquisitely beautiful clothing of fern. Sheltered from the sun, wind, and rain, every delicate stem and leaf was absolutely perfect in shape, and of a pure fresh green colour—indeed, one instinctively shrank from treading upon this wondrous carpet of Nature's making. It was a strange mutation that these haunts of brutal pirates should be thus transformed to leafy retreats where Titania might hold her revels.

The scene represented in the sketch below is not without historic interest. Here Lord George Anson, having doubled Cape Horn with the loss of two ships in 1741, landed his men, suffering from the seaman's scourge, scurvy. Many of the poor fellows died while being conveyed on shore, where Lord Anson had established a sanitary camp. Of the fleet—comprising five men-of-war, a sloop, and two victualling vessels—with which he had

SAN JUAN BAUTISTA, IN CUMBERLAND BAY.

left Portsmouth, only two ships and two tenders remained when he arrived off Juan Fernandez. He was successful, however, in taking several rich prizes from the Spaniards, and in causing much damage to the enemy, and, on his return to England in 1744, was made Rear-Admiral of the Blue, and one of the Lords of the Admiralty.

Cumberland Bay abounds with food, including a large cray-fish, which is very good eating. Our sportsmen captured a few descendants of the dark-brown long-haired goats which supplied Selkirk with that characteristic dress and head-gear familiar to the readers of Defoe's romance. One of these animals, a fine young creature, was brought alive on board. By universal consent it was at once named "Robinson Crusoe," and remained to the end of the cruise a great favourite. His neck adorned with a shining brass collar, he often wandered about the ship, giving rise to many a laughable scene. Robinson Crusoe had apparently never seen a cat, for with an air of curiosity he followed one which we carried with us up and down the ladders, until puss, who was rather frightened by his attentions, succeeded in reaching a coign of vantage beyond his reach. When the watch was called on deck to make sail, Robinson Crusoe also made his appearance, placing himself at the head of the men. As soon as the operation was completed, he, with a hop and skip across the deck, disappeared below.

Were it not for want of space, and the strict regulations necessary in a man-of-war, the "Challenger" would by this time have been converted into a floating menagerie. Even as it was, on sunny days tame pigeons fluttered about the yards of the ship, and the forepart was alive with Jack's pets, in the shape of parrots and other birds. Perhaps the greatest favourite on board was "Sam," a Newfoundland dog which one of the officers had purchased from the captain of the "Emma Jane" at Kerguelen. His black shining coat caused him to suffer much from the heat of the tropics; but his sufferings are now doubtless quite forgotten in the cool atmosphere of his Highland home. The dog's intense excitement at the approach of land was truly a sight to witness; and I therefore occasionally took him ashore

for a ramble, though his pranks sometimes threatened to bring me into trouble. He would walk into every shop, his size and boisterous gambols causing consternation among the Chinamen behind the counter; or he would stop in rapt amazement before a butcher's shop, where the display of so many choice morsels—a sight wholly unknown at Kerguelen or Heard Island—must have been to him what a picture-gallery is to a lover of art, or a library of rare volumes to the bibliophile. One day, as I was sketching the group of islands south of Hong-kong, he, being tired of waiting, deliberately laid his paw on my sketch-book, an intimation of his opinion that it was fully time to return home. To the numerous zoological curiosities on board were added subsequently a pair of turtles from the Galapagos Islands, handed over to us at Valparaiso, and which, on the return of the Expedition to England, were sent to the Zoological Gardens in Regent's Park. While at sea, they were allowed to take an occasional airing on the main deck; at such times a slight shuffling noise more than once attracted attention, when, on looking down, the writer saw one of these lethargic creatures slowly making its way over the door-step into the cabin. An ostrich, shipped at Monte Video, showed a remarkable propensity for pecking at "Sam's" brilliant eyes—conduct which the latter, on one occasion, so far resented as nearly to sever the bird's head from its neck by an angry snap.

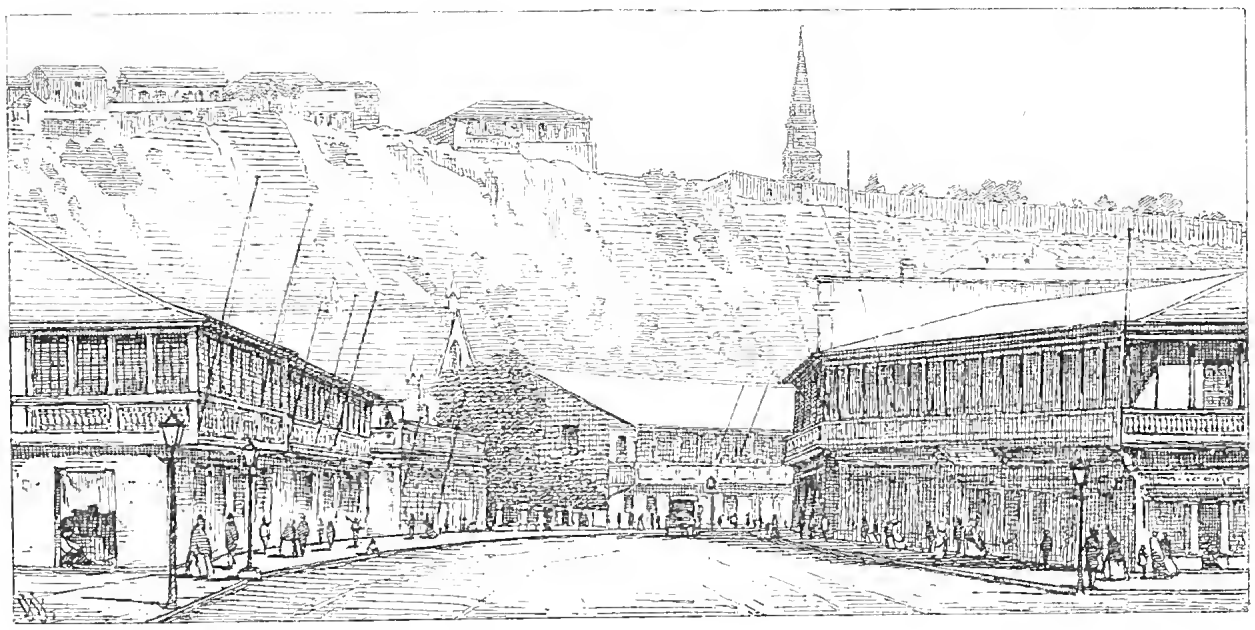
We left Cumberland Bay in the afternoon of the 15th. The wind was still against us, and although the distance between Juan Fernandez and the coast of Chili is only about 350 nautical miles, land was not sighted until late on the 18th, when off Topocalma Head, about 80 miles to the southward of Valparaiso. Getting up steam, we proceeded along the coast during the night, and with daybreak the entrance to the long-wished-for port could be discovered from the deck. Shortly after 10 a.m. on the 19th, we cast anchor in the fine Bay of Valparaiso, near "La Gasillonière," the flag-ship of the French Admiral on the Pacific station. As we came close to her, the French ship's band struck up the English national air, followed by the favourite Tahitian melody, it being known that we had last sailed from that island. Another French man-of-war, the "Dayot," and several Chilian war-vessels, also lay in the harbour.

The town of Valparaiso rises in amphitheatrical form round the steep shores of the bay, and has an imposing appearance—not less so at night, when numerous lamps produce the effect of a general illumination. The lower part of the town, containing several fine streets, public buildings, and open spaces adorned with trees and fountains, is built upon a narrow strip of land between the sea and the hills; while the upper part straggles in picturesque confusion through the steep ravines which converge in all directions towards the harbour.

Here, as in other regions subject to earthquakes and volcanic disturbances, I could not help being struck by the confidence with which the inhabitants build their houses and towns upon ground which they know may at any moment be covered with a torrent of lava or overwhelmed by the sea. An earthquake-wave, such as has frequently laid low the towns situated on this coast, would in a few minutes destroy the best part of the city of Valparaiso,

which has, indeed, been twice visited by disastrous earthquakes during this century, in 1822 and in 1851. The red barren hills—here and there clothed with patches of low shrub—which hem in the town on all sides, by no means suggest the idea of a "Vale of Paradise." This epithet, however, might be more justly applied to the district of San Jago, connected by a railway with Valparaiso. Abundant vegetation prevails there, and the snowy Andes form a majestic background to the scene; for the mountains roll inland in successive waves, rising higher and higher, until they finally culminate in the great cone of Aconcagua, 23,910 feet above the level of the sea.

The forest of shipping in the bay, the railway trains, the tramway cars traversing the busy streets, reminded us that we were once more within the limits of Western civilisation, and very far from the idyllic scenes through which we had been lately wandering. The rickety, dark, and unsavoury hovel of the poor Chilian contrasted unfavourably with the roomy, airy hut of the Tahitian, its floor covered with clean cocoa-nut matting, and its neatly-thatched roof; and the comparison in regard to manners and hospitality was no less unfavourable to the South American. Besides, the frank open smile with which the Polynesian welcomes you to his home is decidedly preferable to the indifferent stare of his "civilised" neighbours.



VIEW FROM PLAZA VICTORIA, VALPARAISO.

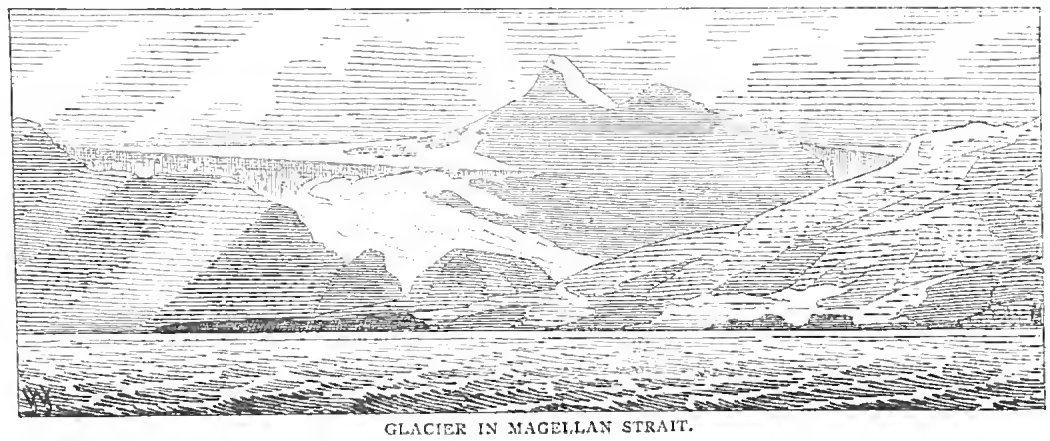
CHAPTER IX.—FROM VALPARAISO TO PORTSMOUTH.

SATURDAY the 11th December, H.M.S. "Challenger" left the port of Valparaiso, her next destination being the Gulf of Peñas, about 900 miles to the southward. We had hoped to accomplish this distance in the space of a week, but wind and weather decided otherwise. Driven to westward, we were on the 17th and 18th again within sight of Juan Fernandez. At last, on Christmas Day, when near the meridian of long. 90° W., we were able to shape our course towards land, and on the morning of the last day of the year Cape Tres Montes, which marks the northern entrance to the Gulf of Peñas, appeared in sight. It owes its name to three lofty promontories, of almost identical shape and height. Part of the day was spent off Cape Stokes sounding and trawling, and in the evening we anchored in Port Otway, a pretty harbour, which, sheltered by wooded hills, forms the western extension of the Gulf of Tres Montes, as the northern end of the Gulf of Peñas is termed. Here are several islands, and among the oddly-shaped hills by which the gulf is bounded are the Sugar-loaf and the Dome of St. Paul, 2284 feet.

THE STRAITS OF PATAGONIA.

On New Year's Day, 1876, our ship crossed the Gulf of Peñas, and entered Messier Channel. This broad and deep waterway runs for a distance of about two hundred miles from north to south, between the large island named Wellington Island and the mainland of Patagonia, until it joins the Gulf of Trinidad. Its entrance is marked by high mountains standing on each side, and forming an appropriate gateway into the Alpine world which lay before us. If the reader will conceive the lakes and upper valleys of the Swiss Alps brought down to the sea, and distributed on both sides of a narrow strait extending over 500 miles, he will have some idea of the panorama—unsurpassed in variety, grandeur, and savage beauty—which was unfolded before our view. During the greater part of the distance

we seemed to float on the surface of a calm lake dotted with islands, its shores intersected by bays and deep sounds, divided from each other by steep rocky promontories; islands and shores covered with dark beech woods; the ground carpeted with green moss and sprinkled with wild flowers. Above the woods rose a chaotic mass of bare rocks, varying in hue from a dark brown tint below to a silvery grey at the summit, here and there marked with patches of snow; behind, the mountains and rough peaks loomed through the clouds, supporting on their shoulders immense glaciers, which stretched their icy arms far down into the glens. Nowhere a trace of man—not a hut or the smoke of a fire—no sign of life but a solitary steamer-duck, or a herd of seal retreating in haste at our approach. At one time sudden gusts and squalls would break out from the dark fiords and lash the waves into foam; at another we would pass pieces of ice gliding quickly along through the light-green water. On each side of the channel countless waterfalls leaped over precipices hundreds of feet in height, occasionally lighted up by flashes of bright sunshine. Such is a faint outline of the impressions gained in traversing the Straits of Patagonia. The belt of vegetation which, at the entrance to Messier Channel, reaches to a height of 1000 feet, gradually becomes narrower and narrower, and in Magellan Strait disappears altogether; there, in fact, nothing is to be seen but bare rocks, snow and ice, and glaciers sloping down to the water's edge.



GLACIER IN MAGELLAN STRAIT.

The commencement of the new year was celebrated in Hale Cove, near the entrance of Messier Channel, where the "Challenger" anchored on the evening of the 1st January, 1876. On the 2nd we took shelter in Gray Harbour, a picturesque inlet a few miles to the north of the narrowest part of the channel, known as the English Narrows. It was decided to remain here during the next day to snatch a brief space of rest after the fatigue of our tedious cruise. On the morning of the 3rd, accordingly, both officers and men—divided into numerous exploring, sporting, and fishing parties—started joyfully for the shore, and were soon scattered over the labyrinth of hill and dale which fills up the corner between the harbour and Messier Channel. On this occasion the narrator met with an adventure which had well-nigh proved fatal. Having landed on the beach just opposite the ship, I passed through the belt of forest which descends to the water, and proceeded westward along the bare crest of the hill in search of some vantage-point whence to obtain a characteristic sketch of the silent world around. The drawing was nearly finished when my ear caught the ominous rushing sound of a strong fire, and, looking round, I saw that the woods between me and the ship were actually burning. The several fires lighted by the parties on shore had ignited the dry and bleached moss which covered the ground and the lower branches of the trees, and, fanned by the fresh breeze from Messier Channel, the flames had spread with

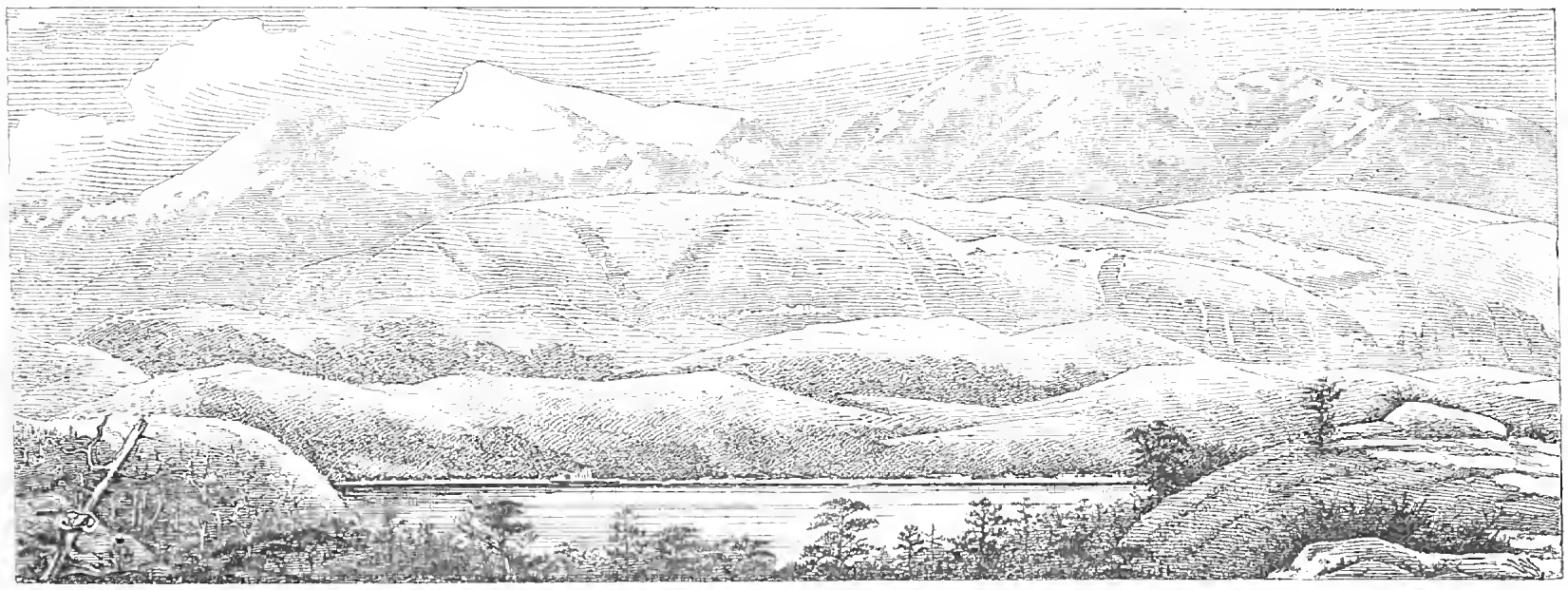
extraordinary rapidity. An opening was visible through which it seemed possible to reach the harbour before the conflagration had time to seize the woods all around; but before trying to reach it through the belt of trees which clothed the steep slopes, I got upon a prominent rock, and hailed a number of sailors who, unaware of the approaching danger, were gathering mussels on the beach below. They neither heard nor saw me, and I then commenced my descent through the forest, clambering over the trunks and branches of fallen trees which encumbered the ground, and at every step sinking up to the waist in the moss which filled up the insterstices. While thus progressing slowly down the steep slope, more by the help of hands than of feet, I heard the distant roar of the fire on each side. Then came a "happy thought," and it suddenly struck me that, if I should be disabled by spraining a foot or fracturing a limb, my plight would be a sorry one, unable to move, with the flames closing around me. Would it not be wise to regain the rocky heights above the wood? When at last I emerged from the trees, I was so exhausted that I lay down for a few minutes in a spot protected from the flames by a piece of swampy ground. Along the edge of the swamp the fire rose with a terrible roar, forming a burning wall from twenty to thirty feet high. The sight was one never to be forgotten—

> "Wide and aloft the smoking fires extend,
> And in the form of high embattled walls,
> Gird the green wood."

Ascending the bare rocks above me, so as to get completely clear of the vegetation, I made for the summit of a hill which commanded a good view of the country. By a fortunate accident I had glanced at a chart of Gray Harbour before leaving the ship, and was thus enabled to judge of the direction by which I was likely to reach a spot where one of our boats might be lying, or catch sight of the ship. On examining the land from my lofty perch, I saw that my object could be effected by following the bare ridges of the hills, thus avoiding the danger of being caught by the conflagration in the midst of the woods. Towards evening the sea-breeze had given way to a land-breeze, and the fire was spreading in my direction and towards Messier Channel, so that I had to keep as much to the westward as possible. The only obstacle in view was a small river flowing into the above channel from a lake near Gray Harbour.

Before commencing my journey over the rocks, I descended to a pool of water, and there partook of the few slight eatables I had carried, the pool serving to quench my thirst. On nearing the water I disturbed a pair of upland geese, with their young, on whose private domain I had evidently intruded. The upland goose is the great aim of the sportsmen of these regions, being considered a rare and delicate morsel. It is a large bird, well-proportioned, and of beautiful plumage—neck and breast of a light reddish-brown, and the wings, when expanded, display two broad snow-white bands, separated by a band of metallic-green feathers. At my approach the young birds disappeared as if by enchantment, being stowed away by their parents in some hidden creek; and the latter, not quite sure of the

intentions of the unfeathered biped—whose like they had probably never seen before—hovered about for a while and then also took their leave. I now returned to my look-out station, and, after once more reconnoitring the land, struck out in as straight a line as the nature of the ground would allow, now climbing the rocks, now sliding down the steep slopes, now skirting a marsh. On reaching the rivulet which I had feared might prove a difficulty, I happily found a spot where a tree had fallen across, thus forming a natural bridge. All this time the fire continued to spread, filling the atmosphere with a huge canopy of smoke. Night was coming on, and I had made up my mind to spend it in the open air on the top of a promontory not far distant, whence I could overlook the communication between Messier Channel and Gray Harbour. I had no sooner ascended the nearest ridge than, to my great joy, I saw one of our boats rounding the promontory and entering the inlet seen in the



VIEW NEAR GRAY HARBOUR, LOOKING TOWARDS MESSIER CHANNEL.

sketch. It was a search-party, commanded by Lieutenant George R. Bethell. Waving a flag of distress in the shape of a pocket handkerchief, I succeeded in attracting attention, and, the boat touching at the nearest point, Lieutenant Bethell plunged into the forest, I advancing to meet him from the opposite side. We met among the trees, and, with the assistance of my rescuer, who piloted the exhausted wanderer, we got down to the boat. Then I learned that at nightfall, my presence being missed, a number of search-parties, provided with bugles and fire-arms, had started in different directions. As soon as the successful boat was sighted, it was received with three cheers by all hands, and a gun was fired to recall the volunteers. The scene as viewed from the ship's deck was now striking in the extreme. All round the harbour, and for several miles up the country, the forest was in a blaze, each tree standing out like a flaming torch and reflecting its image in the water, while the sky was hidden behind an immense cloud of smoke dyed red by the glare from below. It was truly no small or fancied peril from which the writer was happily delivered, and he might well say, in the words of Es-Sindibád, looking back upon his rescue, "My heart was revived, my soul became at ease, and I experienced great comfort. . . . My courage was strengthened after I had made sure of destruction, so that it seemed that all which I then

experienced was a dream." The circumstances are here set forth with some minuteness of detail in order that future travellers in the same locality may learn to avoid, when possible, one of the most serious dangers that can befall the lonely wanderer on shore.

At the hour of our departure next morning, we found that the conflagration had spread inland, and far up the mountain slopes. In the vicinity of the harbour a legion of charred tree-stumps alone marked the site of the green woods of the day before. Such fires, however, are of frequent occurrence, and after a few years a new vegetation, even more luxuriant than heretofore, effaces the last trace of the destruction which a single spark of fire may bring about. Forests never touched by the hand of man are especially liable to suffer in this manner. The trees die on the spot on which they grew up, and for long years afterwards their trunks and branches, bleached by the storms, extend their white arms in fanciful contortions above the young growths around them. The great number of these dead trees scattered through the Patagonian woods, either still standing or stretched on the ground, together with an accumulation of branches, leaves, and dry moss, form ample materials for feeding a fire. In the present case the flames seemed to rush over the ground, swallowing up many yards of forest in the twinkling of an eye.

At noon, on the 4th, H.M.S. "Challenger" passed the English Narrows. There was just room enough for the ship to turn, as the channel here makes a bend, and a favourable moment of the tide had to be selected to effect the passage. But for this obstacle, the large mail steamers which traverse Magellan Strait might escape the dangers of the stormy west coast of Patagonia, by taking the inner channels as far as the Gulf of Peñas. The scenery of the English Narrows, adorned with small tree-covered islands, and overlooked by steep bluffs, is very attractive. The same evening we anchored in Port Grappler, a sombre, dismal-looking inlet, shut in by bare rocks. In the gloom we descried near a little island in the harbour the form of a sunken vessel. It proved to be a German steamer, the "Karnac," belonging to Hamburg, with a cargo of silver ore, leather, saltpetre, sugar, &c. The captain, passengers, and crew had been taken off the wreck by a French surveying vessel, and forwarded to Punta Arenas. This information was given us by an Englishman, one of four belonging to a Chilian company who had taken charge of the wreck. They hoped to float the ship and save part of the cargo, with the assistance of a steamer expected from Valparaiso.

Next day we passed through Ice Reach and Wide Channel, and anchored in Tom Bay, near the entrance of the Trinidad Channel, which opens out into the Pacific. A contemplated survey of this channel had to be given up, the weather being stormy and wet, with no promise of improvement. The mountains which overlook the Trinidad Channel, more especially the group of elevated peaks marking the southern extremity of Wellington Island, form an imposing panorama. One of these peaks, from its shape, is called the "Cathedral Mountain." The "roof" of this cathedral, over 3000 feet high, is covered with snow, and, like the famous minster of Strasbourg, it has but one steeple. Another mountain in the same group, the "Double Peak," rises to 3300 feet. On the 7th it was thought advisable to shift to a safer anchorage in the same bay. Tom Bay in Madre Island boasts

of several charming islets, and commands an extensive view of the opposite shore of Concepcion Channel, occupied by immense piles of bare rock, thousands of feet in height, and without a trace of vegetation. On the 8th another attempt was made to enter Trinidad Channel for surveying purposes. The weather was, however, still too boisterous, so, reversing our course, we ran down Concepcion Channel before the gale, passed the Guia Narrows about noon, and at sunset anchored in Puerto Bueno, at the commencement of Sarmiento Channel. The next day being Sunday, it was made a day of well-earned rest. Anchoring as we did every evening and starting afresh in the early morning, frequently sounding and dredging, manning boats for exploring parties, and so on, the "Challenger" men had had a busy time of it, and we were not as yet half-way through the Straits. The latter are of great depth—in fact, we obtained soundings in 345, 400, and 565 fathoms. The whole west coast of Patagonia, from Chiloe Island to Cape Horn, presents the aspect of a submerged continent, of which only the more elevated mountain-ridges have remained above water.

Undismayed by my recent misadventure, a desire to vary the monotony of life afloat induced me to take another walk on shore,

> "Over hill, over dale,
> Thorough bush, thorough brier,"

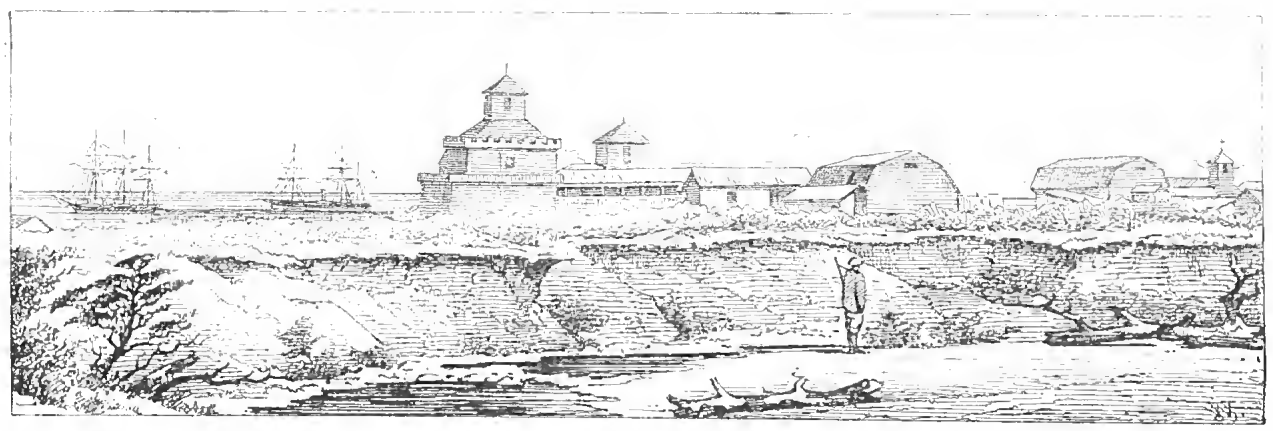
although the forest was dripping from the recent rains. The land around Puerto Bueno has been cleared, probably by the ships' crews who have from time to time taken refuge in this pleasant harbour; and a stream flowing out of a small lake forms a cascade at the head of the inlet. On my way back I followed the course of a brook, according to the practice of bush travellers, for there is generally a practicable opening in the line of running water; but my guide suddenly disappeared in a deep chasm, and I had just time to retrace my steps over the slippery rocks. Near this spot I witnessed a pretty sight—a small tree apparently alive with humming-birds. About a dozen of these tiny creatures fluttered around its branches, like bees about a hive. Next day, the 10th, we passed through Sarmiento Channel, and obtained a good view of an immense glacier which flows down the western slopes of the Cordillera of Sarmiento. In the course of the evening our vessel entered Smyth Channel, and anchored for the night in Isthmus Harbour, which is of very uninviting and desolate appearance. Steaming down through Smyth Channel, we entered, about noon on the 11th, the Strait of Magellan, of classic memory in the annals of geographical discovery. Port Churraca, in Desolation Island, sheltered us for that night. Overshadowed by high mountains, this port seems to rest in perpetual twilight; and from the deck we could see a large snowfield or glacier at an elevation of about 2500 feet. The streams of melted snow found their way down to the harbour through gloomy ravines, fully justifying the name bestowed upon this island. The following day one of the anchors was broken, and the ship might have drifted upon the rocks had not the accident been discovered in time. We next shifted our position to Oldfield anchorage, a sort of outer harbour, and of a less gloomy aspect than Port Churraca. When we re-entered Magellan Strait on the morning of the 14th, a

furious gale was blowing from the west, before which we ran at the rate of fourteen miles an hour. On both sides of the Strait nothing was to be seen but the hard rock, against which the waves spent their fury in vain, whilst above them the clouds reflected a bluish light from enormous glaciers. Except at Heard Island, we had never had such a scene before our eyes. What terror its aspect must have inspired to the countless shipwrecked and starving crews who have perished in these Straits! The old navigator who gave a name to the spot, as is well known, lost half his fleet in these dismal latitudes. From information received long afterwards, and unhappily much too late, it appears that, at the very time of our passage, the captain of a ship abandoned on fire off Cape Horn, his wife, and the crew, were dying of starvation on a small island within two days' sail of our track. Motives of humanity, apart from the immense commercial advantages certain to arise from the construction of a canal across the Isthmus of Panama, should hasten the execution of the project, in order to put an end to the great loss of life and property which annually occurs in the vicinity of Cape Horn and the Straits of Patagonia.

The "Challenger" made such progress on the last-named day, that at 4 p.m. we rounded Cape Froward, the southern extremity of the American continent. We now turned our faces for the first time towards England, and our minds began to fill with expectant thoughts of home. That evening we put into Port Famine, once the site of a settlement which now has disappeared. The clearings alone, and some slight traces of dwellings, indicated the former presence of man. Since we had rounded Cape Froward the weather seemed to have grown much milder, and the barren rocks had given way to large forests growing up to the mountain-tops.

Early on the 14th, our good ship anchored off Punta Arenas—in plain English, "Sandy Point"—the new Chilian settlement in the Straits of Magellan.

It is interesting to watch the early stages of what may at some future time develop into a thriving seaport town, a large commercial city, or, it may be, the capital of an independent state. A sandy plain divided by rough palings into skeleton streets and squares; here and there a furze-bush, or the stump of an old denizen of the forest, in the centre of what may become the Regent Street of the future city; a few avenues formed by wooden huts, and beyond these a belt of land encumbered with trunks of trees, the first slain in the combat between man and the wilderness; and finally, upon the nearest horizon the "forest primeval" rolling inland over hill and dale, a veritable ocean of verdure. Punta Arenas seems to have made a good beginning. It already boasts a fort, a church, a school, a consulate, a garrison,

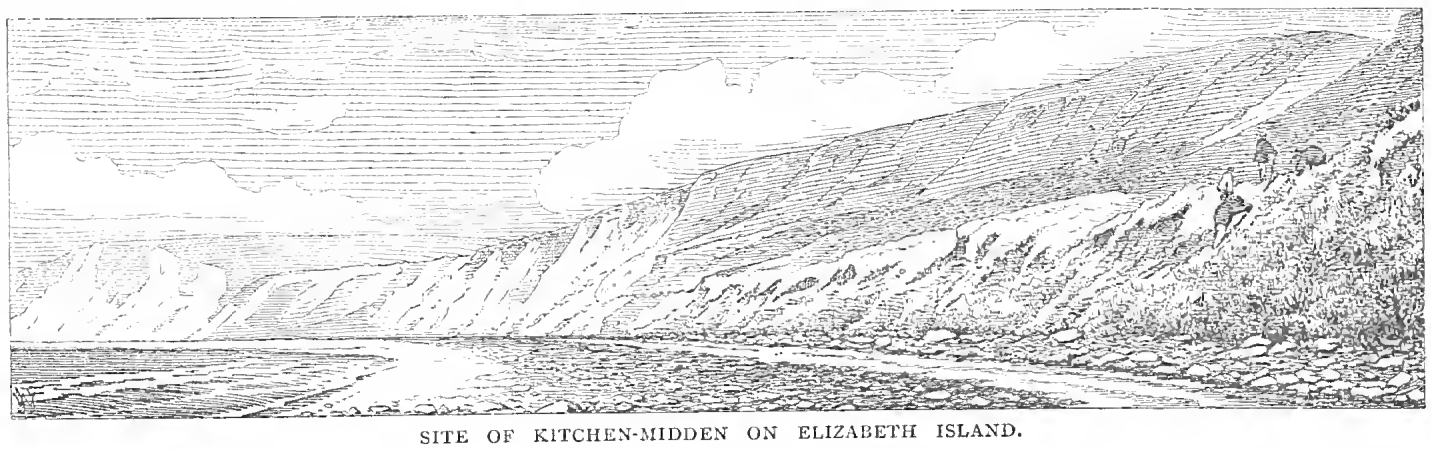


PUNTA ARENAS.

a post-office, a pier, and even a railway leading to some recently-discovered coal-mines. Gold has also been found in the neighbourhood, and should it be met with in greater quantity, a second San Francisco might spring up upon the shores of Patagonia. Two Chilian men-of-war—a corvette and an ironclad—lay in the roads; and it seemed evident, from what we saw at Valparaiso as well as in this new colony, that the Chilians, since they have shaken off the Spanish yoke, are stirred up to new life by the invigorating spirit of liberty and independence.

Our arrival, unfortunately, did not coincide with the time when the native Patagonians visit the settlement for purposes of trade; we therefore missed the opportunity of seeing specimens of this race of giants. A few natives of Tierra del Fuego were hanging about the town—beings, perhaps, next to the aborigines of Australia, the most forsaken by nature and man. At present, Punta Arenas is, excepting the Falkland Islands, the only civilised place in this part of the world, and forms a convenient port of call for steamers plying between Monte Video and Valparaiso.

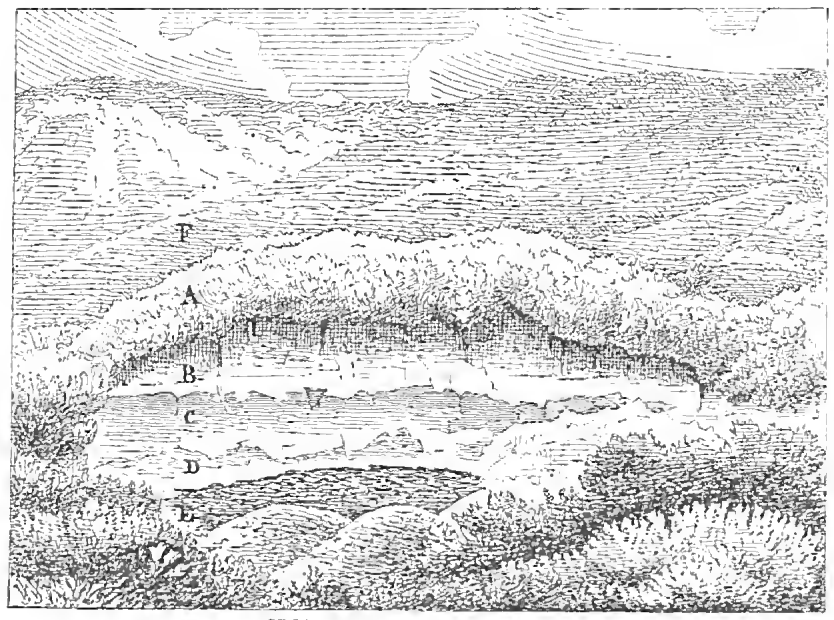
We left on the 18th, with the intention of visiting, on our way, Elizabeth Island, a small, long-shaped island of slight elevation, situated in the Strait to the northward of Punta Arenas, and noted for its flocks of wild-fowl. An exploring party having been landed, reported on its return the existence of a deposit of bones; accordingly, in the hope that a further examination might result in some discovery valuable from a scientific point of view, it was decided to devote another day to this work. On landing next morning, we found the north-east end of the island occupied by countless birds, whose nests thickly



SITE OF KITCHEN-MIDDEN ON ELIZABETH ISLAND.

covered the ground. Disturbed at our approach, they rose, "soaring the air sublime," and the sky was "fanned with unnumbered plumes." At a short distance beyond, the sea had laid bare the side of a bank of earth rising about fifteen feet above the highest fringe of seaweed. For a distance of about 400 feet, and near the top of the bank, a dark layer was

visible, containing numerous shells, and bones belonging to different animals. It was evident, almost at the first glance, that we had before us an object not unfamiliar to the man of science—an accumulation of the remains of animals which had served as food to human beings who at one time inhabited this spot, or resorted to it in search of nourishment. The following will best illustrate the arrangement and relative depths of the strata composing this bank:—A, Present surface-layer, about one foot deep; B, alluvial soil and gravel, about two and a-half feet deep; C, former grassy surface, carbonised, about six inches deep; D, old layer of alluvial sand and gravel, about two feet deep; E, kitchen-midden, a conglomerate of shells, bones of birds, seals, sea-lions, &c., with arrow-heads, cores of flint, &c., varying in depth from a few inches to five feet; F, hill from which the alluvial stuff has been washed down.



SECTION OF KITCHEN-MIDDEN.

The different layers of sand and gravel and of vegetable soil which had been formed above the kitchen-midden showed that the latter could not be of recent date. Also, the manner in which it had been exposed by the erosive action of the waves proved that this deposit must have extended at one time further to seaward. Perhaps, at a period when Elizabeth Island was still joined to the mainland, this spot may have been inhabited by generations of Patagonians or Fuegians, attracted hither by the abundant supplies offered by the sea. The shallow soundings found in the eastern entrance of Magellan Strait, moreover, point to a former connection between Tierra del Fuego and Patagonia, so that the site upon which this accumulation of refuse was found was probably situated at the head of an inlet now constituting the western portion of the Strait.

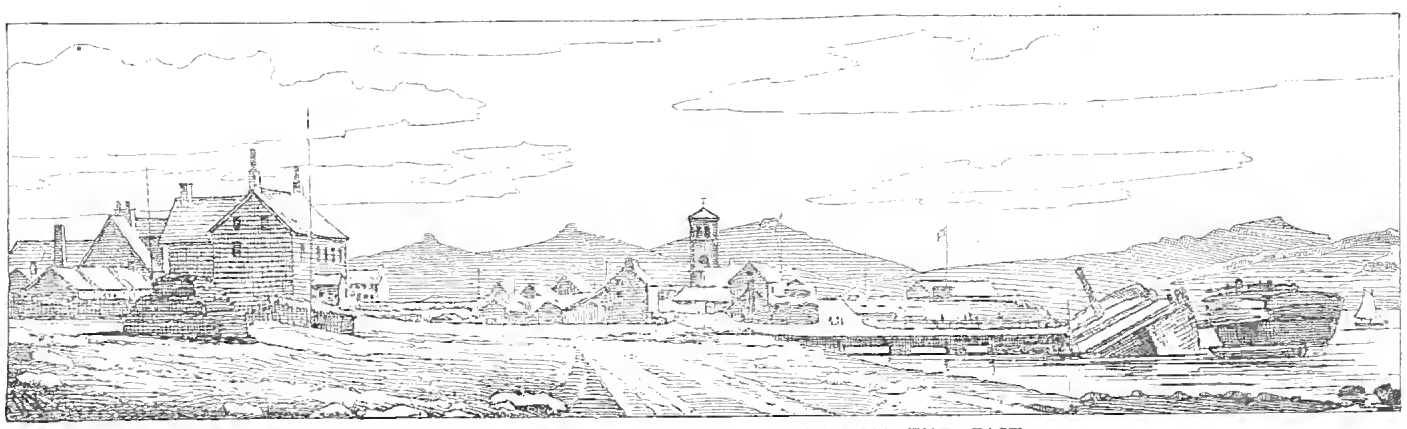
While *savants* and sailors were busily searching about for bones and other scientific treasures, a mail-steamer passed close to the island. The passengers who crowded the deck seemed at a loss to discover with what intent a number of men were engaged in scraping the earth of a lonely and deserted island which did not produce a single tree or shrub—possibly they took us for a party of diggers "prospecting."

Having collected a large number of bones, flints, a human implement in the shape of a bone sharpened to a point so as to form a kind of dagger, a small piece of obsidian, &c., we proceeded on our way towards the Falkland Islands. We had now left the mountains—which a traveller coming from the east sees for the first time on approaching Punta Arenas—far behind us. The Strait was bounded on the one side by the plains of eastern Patagonia, on the other by those of Tierra del Fuego, here and there relieved by low hills. Shortly after noon on the 20th, the "Challenger" passed Cape Virgins, and re-entered the Atlantic after an absence of two years. The weather on the following days was stormy, with mist and showers of rain. About

3 p.m. on the 22nd the clouds lifted for a moment, and we found ourselves in dangerous proximity to Jason East Cay, one of the small islands at the north-western end of the Falkland group. At sunset the sky cleared up, and we had a fine view of the summits of Steeple Jason, Grand Jason, and Elephant Jason, so named from their shapes. Passing down during the night along the northern shores of the Falklands, H.M.S. "Challenger" entered Stanley Harbour in the course of the 23rd, and anchored off the capital of this remote and little-known dependency of Great Britain.

THE FALKLAND ISLANDS.

It is needless to state that a hospitable reception awaited us. The harbour, crowded with wrecks towed in from the surrounding stormy seas, had an air of sadness. It is overlooked on all sides by bare hills strewn with white and grey boulders and dark patches of peat, and the whole suggests the idea of a Scotch or Irish moor brought down to the



STANLEY, FALKLAND ISLANDS, SEEN FROM THE EAST.

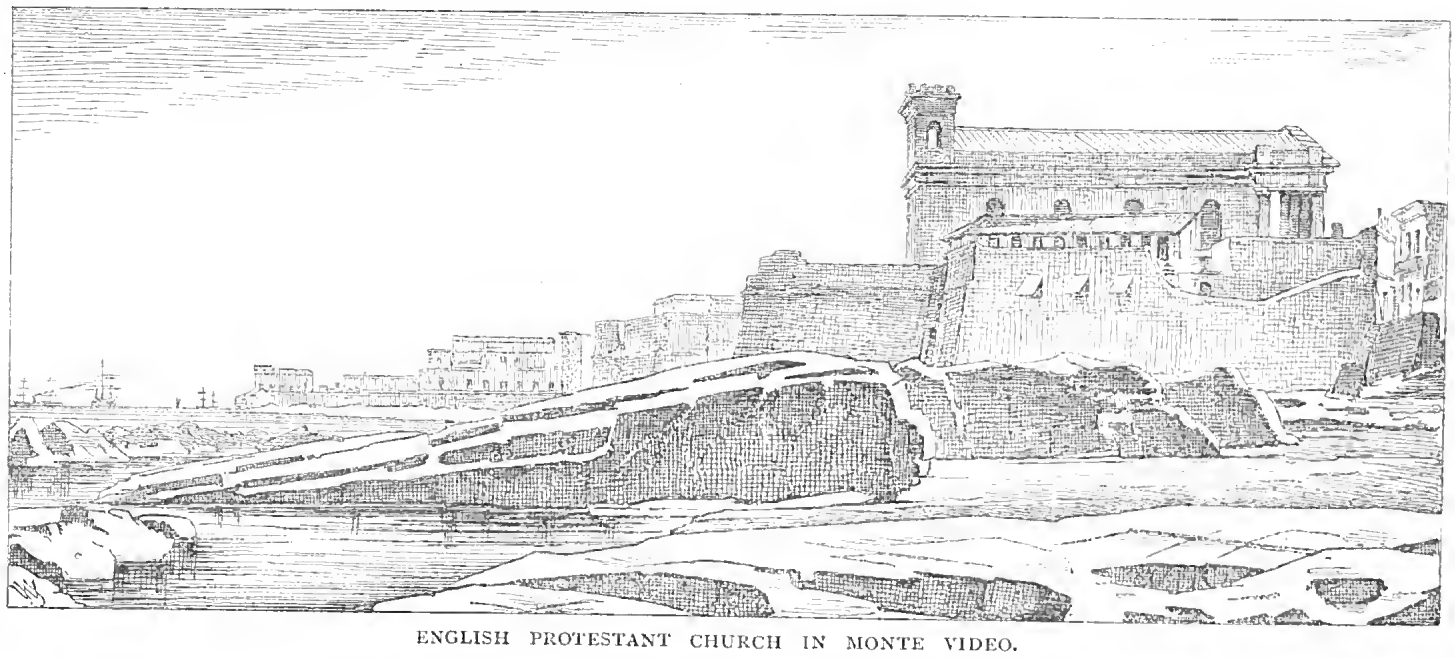
level of the sea—an illusion strengthened by the unmistakable British type of the inhabitants. The town straggles over the hill-side with that absence of symmetry and superfluous ornament so characteristic of the son of Albion. Many of the houses in Stanley, however, boast of charming conservatories gay with flowers and ferns.

Stanley is the residence of the Bishop of the Falkland Islands, which see also includes the missionary stations situated in Tierra del Fuego. His Lordship, who is an accomplished sailor, was often to be seen on the pier superintending the repairs of the schooner in which he visits his scattered flock. One must have visited these storm-beaten islands, placed on the edge of the icy currents of the Antarctic, to appreciate the devotion of the men who look after the spiritual interests of such remote populations. Judging from the number of ruddy-faced children, the climate of the Falklands seems to be healthy. One day we invited the juveniles to come on board, and they thoroughly enjoyed the sights of the ship and the cakes provided for their refreshment.

On the last day of January, during a dark and stormy night, a sailor belonging to the crew of our steam-pinnace fell into the water. One of the officers, Lieutenant A. Carpenter, threw himself overboard and succeeded in bringing the man to the surface, but, unfortunately, all endeavours to restore him to life were unavailing. On the following day we steamed into Berkeley Sound, situated north of Stanley Harbour, and stopped off Port Louis, a

settlement founded by the French in the last century, the ruins of which are still visible. Here, in the ancient churchyard, we buried the drowned sailor; and the funeral procession, composed of five boats in tow of the pinnace, winding its way through storm and rain, was a sight full of matter for sad contemplation. We returned to our old anchorage in Stanley Harbour on the 4th February, and two days afterwards shaped our course towards the north. The Falklands are situated in about the same latitude in the southern hemisphere as that of England in the northern, so that a distance of one hundred degrees, or 6000 nautical miles, still separated us from our homes. The soundings proved the existence of an immense body of cold water of a temperature below zero, which, issuing from the Antarctic, flows as an under-current along the east coast of South America. On the 12th the ship encountered the warm water of the equatorial surface-current which runs in the opposite direction, and we experienced one of those sudden changes of climate to which we had by this time become well accustomed.

On the 15th we entered the wide estuary known as the Rio de la Plata, and in the afternoon arrived in sight of Monte Video. On account of the shallowness of the water, large vessels are obliged to anchor at a distance of about two miles from the shore. Beyond the yellow waters of the harbour we could see a pile of flat-roofed houses, surmounted by the dome of a cathedral. The town occupies the gentle slopes of a promontory, while on



ENGLISH PROTESTANT CHURCH IN MONTE VIDEO.

each side extends the almost level shore of the estuary. The only mountain which gladdens the sight of the Monte Videans is called El Cerro, 500 feet high, situated to the eastward. The main street, which leads to the Cathedral and traverses several fine squares, follows the crest of the promontory. The presence of shovel-hatted priests, of ladies with black veil and fan, and of farmers in spurred boots, bright-coloured sashes, and broad-brimmed sombreros, reminded us that we were again amongst a race of Spanish descent.

The fleet of vessels anchored in the roadstead included the German frigate "Gazelle," commanded by Captain Z. S. Freiherr von Schleinitz. Simultaneously with our own Expedition, this vessel had made a sounding and dredging cruise round the world. Having

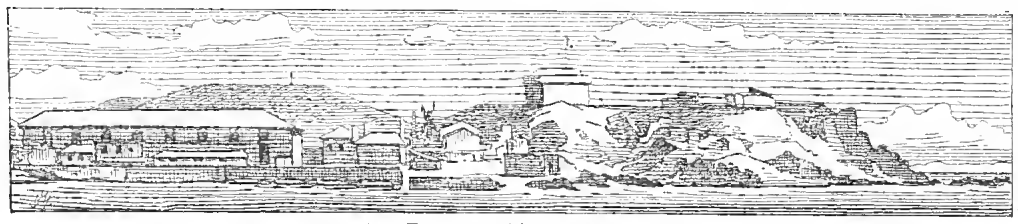
landed the German commission sent out for the observation of the transit of Venus in Betsy Cove, Kerguelen, the "Gazelle" visited the shores of the Papuan Archipelago, where, unhappily, about a dozen of her men were carried off by fever.

H.M.S. "Challenger" left Monte Video on the 25th February. On the 13th of March she crossed her former track, in the vicinity of Tristan d'Acunha, thus completing the circumnavigation of the world. On the 27th of the same month we arrived off Georgetown, Ascension Island.

ASCENSION ISLAND.

This island has the appearance of a huge heap of volcanic cones, ashes, and cinders. Its surface is covered with numerous extinct craters, which, seen from the height of Green Mountain, its loftiest summit, 2820 feet above the level of the sea, present a truly interesting spectacle. Its windward slopes and most elevated peaks are covered with vegetation, while to leeward there is an absolute desert of sand and stones. Black rivers of ancient lava wind down on all sides towards the sea. Countless birds resort to the island, and their nests cover the ground far and wide. The pedestrian is also surprised by numerous land-crabs scampering away at his approach. The island, as is well known, is frequented by large turtles, their favourite resort being a sandy bay near Georgetown, where they are caught and kept alive in a pond specially constructed for the purpose.

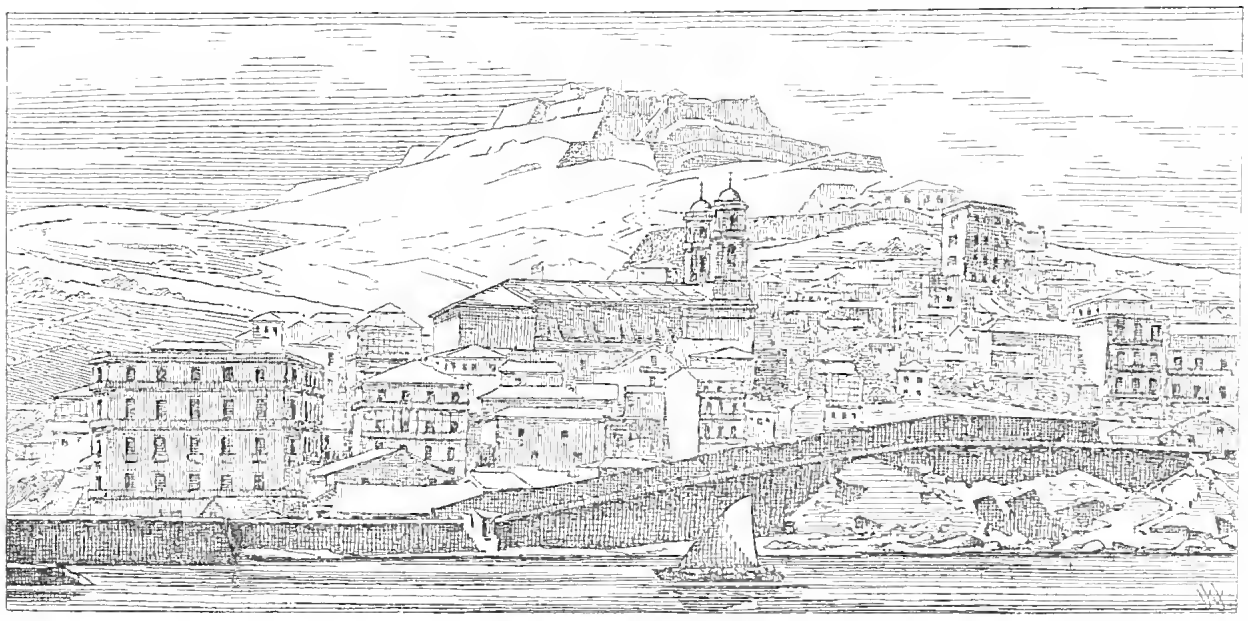
Georgetown mainly consists of barracks and coaling-sheds, built upon heaps of loose soil, which every heavy shower of rain threatens to wash into the sea. Its ugliness is compensated for by the charming scenery of Green Mountain—a little paradise of verdure, cool shades and villas adorned with flowers, an oasis in the midst of a sunburnt desert. It is used as a sanatorium, and is a welcome retreat during the hot season, which here, in truth, lasts nearly throughout the year. During the Ashantee war many fever-stricken patients were sent to this spot.



GEORGETOWN, ASCENSION ISLAND.

We left Ascension on the 3rd of April, and, after a long and tedious transit across the Equator, arrived at our former anchorage in Porta Praya on the 16th, and in Porto Grande, St. Vincent, in the evening of the 18th. Thence proceeding northward, we hoped to reach England early in May; but when off the Azores, having sighted the island of Flores, we encountered the great atmospheric current which in the spring-time sets in from the shores of Northern Europe. Unable to keep a north-easterly course in the teeth of the wind, we were driven towards the coast of Spain, and, being short of provisions, made for the port of Vigo, where we dropped anchor on the 20th May. Here we met the Channel Squadron, commanded by Captain Beauchamp Seymour. From one of the ships came floating the melody of "Home, sweet home," which, after our long wanderings in strange lands, seemed singularly appropriate.

What a contrast the sunny bay of Vigo, enclosed by scenery famed far and wide for its loveliness, presented to the stormy seas outside! High above the town rose the fortress, conspicuous in the pages of history for the several sieges which it has sustained.



TOWN AND FORTRESS OF VIGO.

H.M.S. "Challenger" took her departure on the 21st, and after a quick run across the Bay of Biscay—this time in less angry mood—sighted the light on Ushant in the evening of the 23rd, and on the following morning arrived in the English Channel. It was near sunset when we passed the Needles, and proceeded up the Solent towards Spithead. A cold north-easter blew down the Channel, and, wrapped in our greatcoats, we crowded the bridge amidships, straining our eyes through the mists of the evening to see the shores of Old England, so often the theme of our songs and conversation throughout our voyage of three and a-half years.

"Ye! who have traced the Pilgrim to the scene
Which is his last, if in your memories dwell
A thought which once was his, if on ye swell
A single recollection, not in vain
He wore his sandal-shoon and scallop-shell;
Farewell!"

CHART,

SHOWING THE TRACK OF

H. M. S. "CHALLENGER,"

1872-1876.

ARCTIC CIRCLE

TROPIC OF CANCER

EQUATOR

TROPIC OF CAPRICORN

ANTARCTIC CIRCLE

Limit of Drift Ice and Icebergs

Limit of Drift Ice and Icebergs

Depth 5 1/8 miles

Depth 4 3/8 miles

PLACES VISITED BY H.M.S. "CHALLENGER."

1 Portsmouth.
2 Lisbon.
3 Gibraltar.
4 Madeira I.
5 Teneriffe I.
6 St. Thomas I.
7 Bermudas Is.
8 Halifax.
9 Fayal I.
10 San Miguel I.
11 St. Vincent I.
12 St. Jago I.
13 St. Paul Rocks.
14 Fernando Noronha I.
15 Bahia.
16 Tristan d'Acunha Is.
17 Simons Bay.
18 Capetown.
19 Pr. Edward Is.
20 Crozet Is.
21 Kerguelen Is.
22 Heard Is.
23 Melbourne.
24 Sydney.
25 Wellington.
26 Kermadec Is.
27 Tonga Is.
28 Fiji Is.
29 New Hebrides.
30 Torres Strait.
31 Arrou Is.
32 Ki Is.
33 Banda Is.
34 Amboyna I.
35 Ternate I.
36 Zamboanga.
37 Ilo-Ilo.
38 Manilla.
39 Hong-kong.
40 Zebu.
41 Camiguin I.
42 Basilan I.
43 Humboldt Bay.
44 Admiralty Is.
45 Yokohama.
46 Kobe.
47 Miwara.
48 Honolulu.
49 Hilo.
50 Tahiti I.
51 Juan Fernandez I.
52 Valparaiso.
53 Messier Channel.
54 Port Churraca.
55 Punta Arenas.
56 Elizabeth I.
57 Falkland Is.
58 Monte Video.
59 Ascension I.
60 Vigo.

J. J. WILD

GEOGRAPHICAL INDEX.

Marcus Ward & Co., Royal Ulster Works, Belfast.