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SELECTIONS
FROM
THE RECORDS
OF THE
GOVERNMENT OF INDIA,
(HOME DEPARTMENT.)

Published by Authority.

No. XXV.

THE ANDAMAN ISLANDS;

WITH

NOTES ON BARREN ISLAND.

CALCUTTA :

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PREFACE.

IN the pages of this number of the Selections from the Records of the Government of India is contained nearly, if not quite, all that is known regarding the Andaman Islands.

This singular and interesting group, placed in the track of one of the greatest commercial highways of the world, is chiefly remarkable for its complete isolation from the civilization and progress by which it is surrounded, and for the ill-defined terror with which it still continues to be regarded by the uneducated Mariner.

The sum of our knowledge of the Andamans may be stated in a few words.

They are a collection of islands, surrounded by most dangerous coral reefs, which are gradually forming innumerable islets as each becomes lifted above the surface, and which are peculiarly perilous to vessels in their vicinity, in the violent hurricanes that occasionally sweep across the Bay of Bengal.

They are covered to the water's edge with the dense and luxuriant vegetation of the tropics, and enclose some of the grandest and most picturesque harbours in the world.

They are essentially volcanic in character, hilly on the Eastern Coast, and a collection of flat salt marshes on their Western aspect, where the vegetation is less luxuriant and the hills gradually subside into small hummocks.

They are extremely deficient in animal life, and the birds inhabiting them are comparatively few ; but the reefs and bays abound in shell and other fish.

The most singular feature connected with them is, however, the paradoxical race by which they are scantily peopled.

It is impossible to imagine any human beings to be lower in the scale of civilization than are the Andaman savages. Entirely destitute of clothing, utterly ignorant of agriculture, living in the most primitive and rudest possible form of habitations, their only care seems to be the supply of their daily food.

Their inhospitality and implacable hostility to strangers, with their reputed cannibalism, have caused them to be regarded with terror and aversion by all who have approached their shores.

The little that is known of their manners and customs proves them to be without religion or government, and that they live in perpetual dread of the contact of any other race.

Their origin is a mystery which will probably never be solved, as the traditions of so absolutely barbarous a race, if they have any, are not likely to throw light upon such a question.

The earliest authentic account of them is that of the two Muhammedan travellers, which has been so often quoted. It is subjoined, as extracted from Pemberton's General Collection of Voyages and Travels.

“Beyond these two islands lies the sea of Andaman: the people on this coast eat human flesh quite raw; their complexion is black, their hair frizzled, their countenance and eyes frightful, their feet are very large, and almost a cubit in length, and they go quite naked. They have no sorts of barks or other vessels; if they had, they would seize and devour all the passengers they could lay hands on. When ships have been kept back by contrary winds, they are often in these seas obliged to drop anchor on this barbarous coast for the sake of water, when they have expended their stock; and upon these occasions they commonly lose some of their men.”*

* “It is most certain that, upon a strict enquiry, most of the stories of man-eaters have been found to be fables void of all foundation; but it must be allowed, in regard to our author's account, that what he says has never been disproved; for the very latest accounts we have of the Indics, give these people the same character that he does.”

The travels of two Muhammedans through India and China. Pemberton's General Collection of Voyages and Travels, London, 1811, Vol. 7, p. 183.

It is abundantly evident that these travellers did not themselves visit the Andamans, and that their account is borrowed from the tales current in neighbouring countries at the time. The natives of these islands most probably possessed canoes long prior to the period referred to.

The following description of the Andamans and their inhabitants extracted from Hamilton's Account of the East Indies, contains a more specific and apparently trustworthy description of their habits, than that of the Muhammedan Travellers.

"The islands opposite to the Coast of Tenasserim, are the Andamans. They lie about eighty leagues off, and are surrounded by many dangerous banks and rocks; they are all inhabited with cannibals, who are so fearless, that they will swim off to a boat if she approach near the shore, and attack her with their wooden weapons, notwithstanding the superiority of numbers in the boat, and the advantage of missive arms of iron, steel, and fire.

"I knew one Fergusson, who commanded a ship from Fort St. George, bound from Malacca to Bengal in company with another ship, going too near one of the Andaman islands, was driven, by the force of a strong current, on some rocks, and the ship was lost. The other ship was driven through a channel between two of the same islands, and was not able to assist the shipwrecked men, but neither Fergusson nor any of his people were ever more heard of, which gave ground to conjecture that they were all devoured by those savage cannibals.

"I saw one of the natives of those islands at Atcheen, in anno 1694. He was then about forty years of age. The Andamaners had a yearly custom to come to the Nicobar islands, with a great number of small praws, and kill or take prisoners as many of the poor Nicobarians as they could overcome. The Nicobarians again joined their forces, and gave the cannibals battle, when they met with them, and one time defeated them, and gave no quarter to the Andamaners. This man, abovementioned, when a boy of ten or twelve years of age, accompanied his father in the wars, and was taken prisoner, and, his youth recommending him to mercy, they saved his life, and made him a slave. After he continued so three or four years, he was carried to Atcheen to be sold for cloth, knives, and tobacco, which are the commodities most wanting on the Nicobars. The Atcheeners being Muhammedans, this boy's patron bred him up in that religion, and some years after, his master dying gave him his freedom; he having a great desire to see his native country, took a praw, and the months of December, January, and February, being fair weather, and the sea smooth, he ventured to the sea, in order to go to his own country, from the islands of Gomas and Pulley-vey, which lie near Atcheen. Here the southern-most of the

Nicobars may be seen, and so one island may be seen from another from the southern-most of those to Chetty-Andaman, which is the southern-most of the Andamans, which are distant from Atcheen about an hundred leagues. Arriving among his relations, he was made welcome, with great demonstrations of joy to see him alive, whom they expected to have been long dead."

"Having retained his native language, he gave them an account of his adventures; and, as the Andamaners have no notions of a Deity, he acquainted them with the knowledge he had of a God, and would have persuaded his countrymen to learn of him the way to adore God, and to obey his laws, but he could make no converts. When he had staid a month or two, he took leave to be gone again, which they permitted, on condition that he would return. He brought along with him four or five hundred weight of quicksilver, and he said, that some of the Andaman islands abound in that commodity. He had made several trips thither before I saw him, and always brought some quicksilver along with him. Some Muhammedan fakirs would fain have accompanied him in his voyages, but he would never suffer them, because, he said, he could not engage for their safety among his countrymen. When I saw him he was in company with a Seid, whom I carried a passenger to Surat, and from him I had this account of his adventures."*

This account, however, will not bear strict analysis, and is evidently a mixture of fiction and fact, from which it is difficult to extract the truth.

The writings of Blair, and the chapter in Col. Symes's Embassy to Ava, with the extracts from Colebrooke's Journal, are the earliest reliable authorities to which we have access.

The latter published a vocabulary of the language of the Andamaners, which will be found in the Appendix, and which, if correct, would seem to prove the existence of different dialects in the Great Andaman, for not a single word of it was understood by the individual brought to Calcutta in January, 1858.

In the Calcutta Monthly Register for November, 1790, is a brief account of the Andamaners, evidently written by one of the surveying party. It is worthy of reproduction, as the work in which it appeared is scarce and somewhat inaccessible, and as

* Hamilton's Account of the East Indies. Pinkerton's Vol. VIII. pp. 430, 431.

it contains the remarks of an intelligent, trustworthy observer. It fully corroborates the statements of Blair and Colebrooke.

“The Andamans are on the eastern side of the Bay of Bengal, they bear about south half west of Point Negrais, about 130 miles distant. The Great Andaman extends in length nearly, north and south, about two degrees and a quarter of latitude; viz. from 14 to 11-45° north. The Little Andamans are a cluster of Islands, in the latitude of about 10-30° north. The longitude of the Andamans, is about six hours and eight minutes east of London.

“These islands, from their situation and appearance, had long been considered by navigators as possessing no importance; they were, therefore, little known or attended to, by our eastern rulers. Pulo-Penang had been given by the king of Queda to Mr. Light, and by him to the Honorable the East India Company; and a settlement had been recently established there, when the Hon’ble Commodore Cornwallis, with the squadron under his command, arrived in India.

“Shortly after the Commodore’s arrival, the harbour of this new settlement, and that of the Great Andaman were minutely and accurately surveyed, by order of the Supreme Government, and the proper officers ordered on that duty; but the particulars of their official reports, or the consequent intentions of Government, have not yet been made public.

“Port Cornwallis is situated on the eastern side of the Great Andaman, and is discovered to be a noble, capacious harbour, with most excellent anchorage, and capable of containing three hundred sail of ships, of the largest size, or greatest burden.

“The face of the country is covered with lofty trees, and thick underwood; the former affording most excellent timber, either for domestic uses, or ship-building. The soil, however, is excellent; and if we may judge from the experiment made by the gentlemen of the fleet, who cleared a spot of ground, and upon sowing various seeds, found them thrive beyond their expectation, it is capable of bringing all vegetables to as great perfection, as any other part of India can boast.

“From the temperature of the climate, we are led to imagine, that upon a further trial, we shall rather be induced to confirm, than to alter this opinion. During the south-west monsoon, a cool steady breeze, constantly predominates, and at the other part of the year, when the north-east monsoon sets in, the wind is sometimes intensely sharp during the night, but decreases into a gentle sea-breeze during the day. As a convincing proof, however, of the salubrious air, and healthy atmosphere, with which heaven has blessed this hitherto forlorn part of the globe, we need but instance, that out of two hundred men belonging to a ship upon this voyage, towards the close of last year, there was not a single invalid; but on the contrary, several who had left Bengal with troublesome complaints, were completely restored to health, very shortly after their arrival.

“The manner in which these islands were peopled, is a matter of

mere conjecture. We are told, that when the Portuguese had a settlement near Pegue, two of their ships with cargoes of slaves on board, amounting in number of men and women, to 300, were cast away there; and as the inhabitants are of the Coffree cast it must be allowed, that probability favours this opinion or conjecture. They are a strong, robust set of Coffrees, and in their appearance, and mode of living, resemble much what Cooke describes to us, of the inhabitants of the south-west part of New Zealand. Both men and women go entirely naked; the former armed with bows and arrows, which they employ in shooting fish for their subsistence. In this instance we perceive a want of instinct, which, neither fails the rude inhabitants of New Holland, the simplicity of those of the Sandwich Islands, nor the gloomy uncultivated mind of the Nootka-Sound men; who all employ some kind of a hook and line, for the purpose of catching fish. The women at low-water, wade the mud flats, and search the reefs for cockles, and other shell-fish; and as the tide rises, they retire to their huts, to roast this casual provender. When a supply of fish fails them, they roam into the woods in quest of wild hogs and rats, (the only animals that were perceived in that country) and which they are sometimes fortunate enough to procure, as the bones about their huts testify. These are, however, by no means plenty, and it is to be supposed, from the few that were seen by our people, that they are a *dernier* resort, when the calls of hunger are very pressing.

“So far, we have been able to give a brief account of the origin, and manner of living of these people; who are probably destined by the hand of Providence to come under our protection, and to participate in the blessings of civilization. The shyness they have hitherto shewn, and the want of confidence they have betrayed, may easily be accounted for; nor is it to be doubted, but that when once they experience the advantages of commerce, and the benefit of our friendship, our intercourse will be permanent; and that they may be taught to enjoy the fruits, of a well directed industry, and a civilized Government.”*

The inhabitants are dwarf Negrilloes, strong and robust, when their supply of food is abundant, as it was during the time of our visit; intensely black; and possessing most of the physical characters of the true Negro, with the exception of the projection of the heel.

The individual captured at Interview Island was singularly quiet and docile, imitated readily the acts and gestures of those by whom he was surrounded, and never from first to last exhibited the smallest indication of ferocity.

* Calcutta Monthly Register, or, India Repository, November, 1790, pp. 15—17.

The appearance of his countenance as given in the frontispiece was caused by the very strong light in which he was placed to photograph him. His restlessness was so great that it was necessary to take an instantaneous picture.

Subjoined are the measurements of his body, taken according to the English standard, on board the steamer *Pluto*.

Place of the Observation, Year. Month. Day.
 Steamer Pluto, 1858. Jan. 26th.

<i>Name.</i>	<i>Object of the Measurement.</i>	<i>ft.</i>	<i>in.</i>
John Andaman, ... <i>Sex. Age.</i> Male. 25 years. <i>Native Country.</i> Andaman Islands.	1. Total height,	4	9½
	2. Width of the arms horizontally extended,	4	1
	3. Vertex to the beginning of the hairs on the forehead,	0	4½
	4. Vertex to the orbit,	0	7½
	5. Vertex under the nose,	0	9½
	6. Vertex to the mouth,	0	10½
	7. Vertex under the chin (the head), ...	1	½
	8. Circumference round the frontal sinuses,	1	8½
	9. Vertex to the clavícula,	1	2½
	10. Diameter of the head by the temples,	0	6½
	11. Antero-posterior diameter of the head,	0	7½
	12. Interior distance of the eyes,	0	1½
	13. Exterior distance of the eyes,	0	4½
	14. Length of the mouth,	0	2½
	15. Length of the ear,	0	2½
	16. Length of the hand,	0	6½
	17. Length of the foot,	0	9
	18. Breadth of the hand,	0	3
	19. Breadth of the foot,	0	3½
	20. From the ground to the middle of the patalla,	1	4½
	21. Diameter by the acromion apophysis,	1	1½
	22. Length of the arm from the acromion process,	1	6½
	23. From the ground to the trochanter, ...	2	6½
	24. Circumference round the calf,	0	10½
	25. Circumference round the knee,	1	0½
	26. Distance of the malar bones,	0	5½
	27. Breadth of the nose,	0	1½

Two of the unfortunate savages killed in our encounter at South Reef Island, whose bodies were brought on board the

Steamer, exhibited the same characteristics as their captured comrade. They were more robust, but of about the same height, and in all respects corresponded with the Negrilloes of Ethnologists.

The photographs taken in Calcutta were sent to Baron Alexander von Humboldt, by whom the individual was declared to belong to the type above mentioned.

Of the vocabulary of the Andaman language published by Colebrooke, and reproduced in this brochure, not a single syllable was intelligible to the savage brought to Calcutta.

Of the Malayan, Burmese, Chinese, and other Eastern tongues he seemed to be equally ignorant, nor did he comprehend a word of the several African dialects spoken by the Seedies in the service of the Peninsular and Oriental Company with whom he was confronted. The most simple terms were employed, such as the expressions signifying fire, water, food, eyes, nose, mouth, head and hand, hunger and thirst: but in vain. He himself applied distinctive terms to all, from which he never varied. They did not correspond with any known written or spoken language, which could be brought to bear upon him.

He unfortunately sickened so rapidly and unexpectedly, as to afford no time to prepare a vocabulary of those terms which he was in the habit of using daily, to designate objects presented to him, and to make known his wants.

His imitative powers were great, he rapidly learnt to dress and wash, and always behaved with propriety and decorum.

He exhibited great tenderness towards, and affection for young infants, whom he caressed with as much gentleness as the most civilized being could have shewn.

When his own photograph was shewn to him, he laughed heartily at it, and called it *Jack*, the name by which he was himself known. He never turned a picture upside down; and always looked behind it to see the remainder of the figure.

His mode of salutation was to take the hand of the person whom he addressed, and to blow upon it, humming a sound like *ooh*, prolonged for some seconds, and uttered in a cooing tone.

With the use of tobacco he was evidently unacquainted, and the first quid given to him by a sailor he swallowed, without apparent nausea or distress of any kind. I would not permit the experiment to be repeated.

He mounted stairs with a good deal of dread, and an evident feeling of insecurity and wonder.

He had the short, quick, chuckling, joyous laugh of the Negro races, and, when not sick, was always good humoured.

He went to sleep at sunset, and arose at sunrise, with the utmost regularity, and, until he lost his health, never slept during the day.

In mending and making nets, in fastening on the iron barbs of arrows, and in the use of his native adze he was clever and handy. He learnt to holy-stone and wash decks, and always seemed anxious to do something.

As there is undoubtedly occasional communication with the Andamans by Malays and Burmese, it was surprizing that he did not understand a word of Malayan or Burmese, or appear as if he had ever seen such people before.

Of the existence of cannibalism we found not the remotest trace in any form, or in any of the many localities explored.

Since the re-occupation of Port Blair, several of the convicts have been killed by the Andamaners, but in no single instance do the bodies or any part of them appear to have been devoured.

The late Mr. Piddington mentioned to me that, some thirty years since, he was anchored off Landfall Islands, and seeing a large fire on a sandy beach, with a number of savages around, he landed with an armed party, after dusk. The savages fled on his approach, and he found a human body on the fire, too much charred for identification, and apparently undergoing.

cremation. It could not have been intended for food, as it was nearly reduced to a cinder, and quite unfitted for a cannibal banquet.

If they ever resort to human flesh, which I very much doubt, it can only be under the pressure of extreme hunger.

The only commercial purpose for which the islands would seem to have been frequented, heretofore, was for the *beche de mer*, or *Holothuria*, abundant on every reef, and for the edible nests, which we found in some of the caves visited.

In most of the canoes captured, we found a considerable quantity of dammer, in some cases made into torches.

With the exception of their bows and arrows, canoes, nets, paddles, a twisted cord which they wear round the waist, nails beaten into thin knife blades, and an adze, we found no manufactured article of any sort.

Their arrows were barbed with iron with much ingenuity, and were truly formidable weapons; carrying straight, and with considerable force to a distance of forty yards. Beyond this, they were innocuous, and in no single instance did we find them to be poisoned.

In the excavation of their canoes they now use an adze, and do not scoop them out with fire, as appears formerly to have been the case.

In their villages, which usually enclose an open central space, was invariably one hut, built and roofed in with much more care and attention than the remainder. It was generally richer in pigs' and turtle skulls, was square in form, and was most probably the abode of the head man of the party. In all the instances in which we came in contact with them, there was evidently a local chief whom the rest obeyed, and from whom they obtained their orders to fight or run away. At Craggy Island, the commander brandished a formidable looking spear, and was followed by a henchman, who carried his bows and arrows.

They are evidently a bold, hardy, crafty race, extremely active, possessing many of the qualities of the African type, and susceptible, under the influence of civilization, of becoming an intelligent and an industrious population.

It was my intention to have embodied in this preface a condensed account of such shipwrecks on the Andamans as have occurred of late years, and of which I believed that authentic particulars were procurable.

In this I have been entirely disappointed. No information of any kind is procurable even of the singular wreck of the *Briton* and *Runnymede*, with portions of H. M.'s 50th and 80th Regiments on board. It occurred a few years since, and many of the survivors are probably now alive. It was doubtless officially reported to the Government at the time, yet not a trace of such record can be found. A diligent scrutiny of the newspapers of the time might possibly have exhumed some particulars; but for this I have not the necessary leisure. The place of the wreck on one of the islands of the Archipelago is indicated on the Chart prepared by Lieut. J. A. Heathcote, who accompanied the expedition.

* On the same Chart is contained the track pursued by the Committee in their examination of the Coast.

Since the re-occupation of Port Blair as a convict settlement, Ross Island, Chatham Island, and a portion of Viper Island have been cleared and occupied. Great sickness, as might have been expected, has occurred among the convicts and all who lived on the newly cleared grounds. The diseases are apparently identical in character, intensity and mortality, with those which followed the early occupation of Arracan. In the Terai of Bengal and Behar, newly cleared lands are not deemed habitable for a couple of years after they have been prepared for cultivation. The inhabitants of such places invariably sleep on *muchauns* raised high above the ground.

It is somewhat singular that in the year 1858, the sickness

and mortality among the Bengal and Behar convicts at Akyab, have been nearly as great, and of identically the same type as at Port Blair. Fevers, diarrhœas, and low forms of ulcer, degenerating into gangrenous sores, committed as great havoc in the old settlement, as they have done in the new.

In some of the sickly years in Arracan, the mortality among sepöys, well paid, well fed, and suffering from none of the depressing agencies which render rebels and mutineers an easy prey to malaria amounted to seventy-five per cent.

Natives of India bear transplantation badly in all circumstances, and, as prisoners, have lost heart and hope, and succumb without a struggle.

In our expedition, the means taken to prevent sickness were to dissolve a grain of quinine in every man's coffee before he started in the morning; to see that each individual had a fit covering for the head; and to prevent any one sleeping on the shore between sunset and sunrise.

The land at Port Blair has been found singularly fertile. Water is tolerably abundant, and I have little doubt that, in a few years, the settlement will be as healthy as Singapore and Penang, and more healthy than Arracan, or our own Sunderbunds.

The savages do not seem to have fraternized with the Sepöys, nor have they hitherto become more amicable than we found them.

The few runaways whom they have spared and treated with kindness, give a singular account of their manners and habits, but their descriptions do not appear to me to be sufficiently trustworthy, to be accepted without corroboration. In one instance, they burnt the clothes of the deserter, and shaved his head with a piece of bottle glass. While the men were absent fishing, he was carefully guarded by the women, to prevent his escape. On his return, he represented his captors to be a good humoured race, who had treated him kindly.

To guard against surprize, the exploring parties were always protected by an advanced and flank guard, and the charge of the rear guard to keep open our communication and to prevent our being cut off, was invariably entrusted to a careful officer. The movements of the savages were so stealthy and cautious, and the jungle so dense, that the earliest intimation of their presence was usually an arrow fired at an incautious or exposed member of the party. By never relaxing our precautions, we brought the whole of our party back in safety, and accomplished our perilous task with as little damage to our implacable opponents, as it was possible to inflict, to punish their aggressions upon us.

Of the courage and good conduct of our Naval Guard, and of the European Crew of the *Pluto*, it is impossible to speak in too high terms. They had not been thoroughly trained to act together, and were, therefore, occasionally wanting in discipline. But, we experienced no difficulty in preventing unnecessary bloodshed, and in stopping firing the moment aggression had ceased.

Our expedition was not marred by a single act of wanton cruelty.

The notes of Drs. Playfair and Von Liebig on Barren Island are extremely interesting as throwing light upon the actual state of one of the most singular volcanoes in existence.

This will be found to differ considerably from the pre-existing published accounts, as contained in the writings of the highest authorities on the subject.

The photograph of the cone was taken by Monsieur Mallitte who accompanied the expedition as photographer.

The drawings and plans of the island are by Dr. Playfair.

FRED. J. MOUAT,

Inspector General of Jails,

late President, Andaman Committee.

Fort William, May 1st, 1859.

At this time the north east
 showers, but giving place to
 the year. These winds vary but
 the land and sea breezes. The
 on the west, and rising eight feet at
 rent parts. On the north east coast
 of the moon at 8° 33'. The variation

ndaman Language.

	...	...	...	...	Mincopie,
	...	...	...	...	Ahoda,
	...	...	...	...	Doughay,
	...	...	...	...	Buttohie,
	...	...	...	...	Pilie.
	...	...	...	...	Vilvila,
	...	...	...	...	Otallie,
	...	...	...	...	Alai,
	...	...	...	...	Tetegay,
Black,	...	...	...	...	Cheegheooga,
Blood,	...	...	...	...	Cochengohee,
Bead,	...	...	...	...	Tahec,
To beat,	...	...	...	...	Ingo taheya,
Belly,	...	...	...	...	Napoy,
To bind,	...	...	...	...	Totoba oto goley toha,
Bird,	...	...	...	...	Lohay,
To bite,	...	...	...	...	Moepaka,
Boat,	...	...	...	...	Locgay,
Boar,	...	...	...	...	Stohee,
Bow,	...	...	...	...	Tongie,
Bow-string,	...	...	...	...	Geetain,
Breast,	...	...	...	...	Cah,
Bone	...	...	...	...	Geetongay,
Charcoal,	...	...	...	...	Wehee,
Chin,	...	...	...	...	Pitang,
Cold,	...	...	...	...	Choma,
Coco-nut,	...	...	...	...	Bollate,
Cotton cloth,	...	...	...	...	Pangapee,
To cough,	...	...	...	...	Ingotahay,
Crow,	...	...	...	...	Nohay,
To cut,	...	...	...	...	Hojeeha,

Door,	...	...
To drink,	...	...
Earth,	...	...	..
Ear,	...	...	...
To eat,	...	...	...
Elbow,	...	...	...
Eye,	...	...	...
Finger,	...	...	..
Fire,	...	...	...
Fish,	...	...	...
Fish-hook,	...	...	...
Flesh,	...	...	...
Foot,	...	...	...
Friend,	...	...	...
Frog,	...	...	...
Goat,	...	...	...
To go,	...	...	...
Grass,	...	...	...
Hair,	...	...	...
Hand,	...	...	...
Head,	...	...	...
Honey,	...	...	...
Hot,	...	...	...
House,	...	...	...
Jack Fruit,	...	...	...
Jackall,	...	...	...
Iron, or any metal,	...	...	...
Kiss,	...	...	...
Knee,	...	...	...
To laugh,	...	...	...
Leaf of a trec,	...	...	...
Leg,	...	...	...
Man,	...	...	...
Moon,	...	...	...
Musequeto,	...	...	...
Mouth,	...	...	...
Nail,	...	...	...
Neck,	...	...	...
Net,	...	...	...
Nose,	...	...	...
Paddle or oar,	...	...	...
			... Etolay.
			... Kokee,
			... Ooffeema,
			... Tohobee.
			... Ottee,
			... Gonie or Monie,
			... Tabay,
			... Lorkay,
			... Hooloo,
			... Beaday.
			... Abay,
			... Omay,
			... Dobie,
			... Itolie,
			... Ingolay,
			... Onkeomai,
			... Tongolie,
			... Chigie,
			... Camolan,
			... Tabie,
			... Hohenanges,
			... Morna.
			... Moejedanga,
			... Tohie,
			... Lotolee,
			... Mellee,
			... Mecal,

				oda,
				olai,
				Pangpoy,
				Woobalay,
			...	Iugee genecha,
			...	Chollee,
			...	Bootchoohic,
			...	Totobati Gehoon.
			...	Oye,
			...	Gheallop,
			...	Echolle,
			...	Gohabela.
			...	Inkahey aha,
			...	Keetongay,
		..	...	Neena,
		..	...	Bolenee,
		...	...	Gokobay,
		...	...	Gongtohee,
		...	...	Tangtohee,
To sleep,	...	...	...	Comoha,
To sneeze,	...	...	...	Oh-cheka,
To spit,	...	...	...	Inkahoangy,
To swim,	...	...	...	Quah,
To swallow	...	...	...	Beebay,
Sky,	...	...	...	Madamo,
Star,	...	...	...	Chelobay,
Stone,	..	...	...	Woolay,
Sun,	..	...	...	Ahay.
To take up,	...	...	...	Catoha,
Thigh,	...	...	...	F ₂ 2,
Teeth,	...	...	...	Mahoy,
Tongue,	..	...	...	Talie,
Thunder and lightning,	...	...	...	Mausay-Macco.
To wash,	...	...	...	Inga doha,
Wasp,	...	...	...	Bohomakee,
To walk,	...	...	...	Boony-jaoa,
Water,	...	...	...	Migway,
To weep,	...	...	...	Oana-wannah,
Wind,	...	...	...	Tomjamay,
Wood,	...	...	...	Tanghee,

* It may appear surprising that they should have names for animals that are not found in the islands. This circumstance may tend to confirm the story of their origin.

APPENDIX No. 5.

BARREN ISLAND.

Having been for some days exposed to the noxious exhalations from the mangrove swamps fringing the eastern shores of the Great Andaman, it was determined by the Committee to visit Barren Island, a Volcanoe said to be still active, and in doing so, we were able to examine a place little known, and at the same time ensure, as far as possible, the health of our crew.

Barren Island, so called from the scanty vegetation which shews itself on its fire-formed rocks, is 50 miles East of the Great Andaman, lying in 12° 15' North Latitude, and 93° East Longitude.

It forms a link in the chain of volcanic action which, commencing in the Island of Java, extends North-west and North in a curved line, shewing itself in the Bay of Bengal in Barren Island,—in the Nacondam Rock, an extinct volcanic summit 45 miles directly East from Port Cornwallis, and in the mud volcanoes on the coast of Burmah.

Barren Island was visited by Lieut. Blair of the Indian navy in the year 1789—it was then in a state of violent eruption, large volumes of smoke and vapour issuing from its summit, and huge masses of rock being ejected to a considerable distance from the crater.

Another account of the Island appeared in the Asiatic Researches, upwards of 40 years later. The writer when passing in his vessel, was induced to land. The Volcanoe although smoking, was at that time quiescent.

I am not aware that the Island has been visited by any one else, but as Sir C. Lyell in the description and drawing given in his Principles of Geology, has apparently been misled as to the structure and elevation of the Island, it is probable some such account exists, for neither of the descriptions above mentioned makes any allusion to the existence of water between the external crater and the central cone of elevation.

We approached the Island from the South at daybreak on the 18th December, 1857, and, at the distance of eight or nine miles, it exhibited the outline

shown in the upper drawing No. 1, apparently inaccessible, until we steamed round to its North-west shore, where we found a break or ravine, along which we could see up to a cone which rose in the centre of a circular crater.

The Island is nearly circular, has a diameter of 2970 yards, and is formed of high ridges averaging 970 feet, which slope at an angle of 45° towards the sea, and inwards at a larger angle to the base of a central cone 975 feet in height, and having a diameter of 2100 feet at its base. The sketch taken from on board the steamer when opposite the ravine, and the Bird's-eye view, give a tolerable idea of the appearance of the Island.

Having approached in a boat to examine the break in the outer ridge which gave the only promise of a spot on which a landing could be effected, we found that an abrupt wall of lava about 20 feet in height filled the greater part of it, but that on its eastern extremity there was a sandy beach a few yards in extent.

Having pushed the boat in on this beach, the men jumped into the water in order to fasten her to a rock, but more quickly jumped on board again, the water being quite hot. The tide was then about half flood, and amongst the stones at the water's edge we discovered a spring bubbling up, the temperature of which was too high to be borne by the hand, the mercury in the only Thermometer in our possession rising immediately to 140°—its limit.

I have no doubt that had we been able to try the amount of heat before the spring was cooled by the rising tide, it would have been found at boiling point.

From the landing-place we walked towards the base of the cone over a mass of lava, which extends the whole distance, and fills the greater part of the ravine.

At its surface it is broken up into irregular shaped blocks of loose texture, containing a large amount of felspar, crystals, the lower strata of closer texture, probably from cooling more slowly.

The eastern side of the ravine exhibited alternate layers of lava, trap and scoria; the slope inclined towards the sea. This is represented on a small scale in the drawing which shows a section of the Island.

The cone which rises at an angle of 40° is covered with fine ashes, the inner slopes of the external crater are also covered with the same fine ash to their summits, but on the northern and eastern sides, the slopes are almost as smooth and regular as the cone itself, while the South-west aspect is so much less covered that the ridges of which it is formed are visible running inwards towards the base of the cone. The evident cause of this difference is that the South-west monsoon blows with great force during seven or eight months of the year, the North-east monsoon only lasting four months.

The upper part of the cone is truncated and hollowed, of an oval shape, the length from N. W. to S. E.—the hollow being filled with rough masses of lava, and on the Northern edge are numerous fissures filled with loose ashes, through which the smoke issues. At this spot the scoria and masses of lava are encrusted with sulphur.

On the edge of the hollow towards the beach there is a huge upright mass of rock which, as seen from below against the sky, looks like a pillar.

Some smoke was seen occasionally to issue from the slope of the cone a little way below this rock.

On the slope of the cone 200 feet from the summit towards the N. W. was a projection formed by a large mass of rock from which at some period, I believe, eruptions have taken place.

From this point to the summit, the heat was felt through the soles of the shoes in ascending.

The whole bed of the Island between the cone and external crater, is at least 50 feet above high-water mark. I could not, after very careful examination, satisfy myself that there had been any recent upheaval of the island, none of the rocks exhibiting signs of having been water-worn.

There is a great similarity, although on a smaller scale, to the island of Palma which, however, has long been extinct. The island of St Paul's has also a similar formation as regards the external crater, but its fires having become extinct and no cone of elevation raised, the centre exhibits a basin 150 feet in depth.

The origin of the ravine or break in each of these islands may, I believe, be learned from the formation of the central cone in Barren Island. The only points of exit for the smoke are at the summit; and on the slope below the pillar-like rock in that direction, the crust of the cone is evidently thinner than elsewhere.

Were an explosion to take place, its effect on the greatest part of the cone where there is solidity and resistance would be to throw or bend the rocks outwards, while in the direction where the crust was weak, the explosion would blow out the side altogether, leaving a gully or ravine.

G. R. PLAYFAIR, M. D.

BARREN ISLAND.

Barren Island is a Volcanic Island, situated in Lat. $12^{\circ} 17'$ N. and in Long. $93^{\circ} 54'$ E. Its smallest distance from the Andaman Archipelago is in a straight line only 36 miles East. The distance from the nearest point of the main land, near Tavoy, is about 270 miles W. S. W. It lies not far out of the straight course between Port Blair and Amherst, about 63 miles from the former, and 330 from the latter place. The *Semiramis* approached the Island on the morning of the 19th March, 1858, coming from the N. E., and steamed round it by S., keeping close to the shore, until the ship was opposite the entrance of the crater bearing about W. and by N. from the centre of the Island where she hove to, and we landed.

It is stated in former accounts, that all round the Island the lead finds no bottom at 150 fathoms, only $\frac{1}{4}$ mile distant from the shore. Captain Campbell found, however, ground at that distance on one side of the Island, its centre bearing N. E. at a depth varying from $4\frac{1}{2}$ to 14 fathoms.

Nearing the Island from the North and passing round to the South East of it, it looks from a distance like an oval-topped hill; but coming closer, the sides of the mountain are discovered to belong to a steep circular elevation, sending out spurs towards the sea and enclosing a central valley. The sides of the enclosing circle being lower in the direction of the spectator, the upper circumference of this valley is seen in the shape of an oval ring, formed by the crest of the surrounding ridge. In the middle of this ring, the upper part of a regular cone is visible, from the apex of which small white vapour-like clouds emanate. It is also distinguished from the surrounding darker masses by its grey colour, and some large white marks on it, like fields of snow. An entrance is not discernible.

The slopes towards the sea are generally covered with shrubby vegetation, presenting, however, some bare patches towards the upper edge. Small trees grow about the base, where large rounded stones are washed by the sea.

Turning now to the S. and S. W. the enclosing wall is higher than the cone and the crest of the opposite ridge, and both therefore disappear from the view. On this side the vegetation down the spurs to the sea may be called rich, and consists of different forest trees of moderate height, interspersed with graceful palms; and where the descent is rocky, the rocks are frequently covered with ferns.

Passing to the westward of the centre of the Island, and continuing the survey towards the northern end, one of the first turns discovers a large gap in the circular wall, extending quite down to the base of the Island, through which the interior of the valley, with the cone in the middle, opens at once into full view.

The sides of this gap or fissure in the circular wall form a regular cut or short transverse valley through it, opening towards the sea into a small bay, and on the other side into the circular valley, to which it is the only way of access. Opposite this entrance, in the centre of the valley, rises the cone of grey ashes, and surrounding its base, the bottom of the valley is filled with black masses of cold lava, which are continued like a congealed stream through the gap, breaking off abruptly when they arrive near the water's edge. At its termination the stream is about 10 or 15 feet high, and its breadth seems less than farther up. It looks like a black perpendicular wall, drawn across the entrance and facing the sea.

This lava consists of a black basalt mass (matrix) throughout which are disseminated innumerable semi-transparent little crystals of a variety of common felspar (orthoclase), and also many bright green granules of olivine. The lower part of its thickness is homogeneous, with a smooth fracture, but from the upper surface to a depth of several feet it is cleft in all directions, whereby the upper part is divided into rough blocks, possessing a spongy texture as well as countless sharp edges and corners.

The older lava, composing the rocks on the side of the valley and also the strata of the surrounding ridge, is slightly different from this. The colour of its principal mass is a reddish grey, felspar and olivine crystals are embedded in it in the same proportions as before, and in addition small pieces of black angite of the granular kind, with conchoidal fracture. From underneath the black lava, where it terminates near the sea, issues a broad but thin sheet of hot water, mixing with the sea water between the pebbles of the beach. The Thermometer I had with me was not graduated high enough to measure its temperature, its highest mark being 104° F. (40° C.) The water where escaping from the rock must have been nearly at the boiling point, judging from the heat felt when the hands were dipped into it, or when the hot stones were touched. When bathing, we found the sea-water warm for many yards from the entrance of the hot spring and to a depth of more than 8 feet. It is not impossible that a jet of hot steam or water may emerge from the rocks below the level of the sea. The hot water tasted quite fresh, and not saline as might have been expected, showing that it could not have been long in contact with the rocks.

We ascended to the base of the cone, passing along the sloping sides of the transverse valley through dry grass and brushwood or over sandy ridges, so long as the solidified stream of lava in the middle left us room to do so. At last we had to ascend the rugged surface of the black lava itself, and cross the circular valley, which has about the same breadth as the transverse valley (not quite one-eighth of a mile), until we arrived at the base, about half a mile from the sea. The cone rises from the lava accumulated in the circular valley,

and its base is about 50 feet higher than the level of the sea, at a rough estimate. It is quite round and smooth, and the inclination of its sides is 40 degrees. No vegetation of any kind was visible along its surface. We turned to the left and went up from the North side where the appearance of a ravine, some way up, only two or three feet deep and very narrow with some tufts of grass growing along it, promised an easier ascent for a part of the way, and where a rocky shoulder at about two-thirds of the height would offer a place to rest. Our ascent commenced at about 2½ P. M., and was certainly the most fatiguing expedition many of us remember ever to have undertaken. The sky was almost cloudless, and the heat consequently was great. The lower third and more of the slope consisted of a powder of ashes, into which we sunk ankle-deep, and we often fell a step back for two gained. A little higher, stones loosening when the foot stepped on them and rolling down in long lumps, were dangerous to any one following.

Arrived at the rocks mentioned, their nature and the manner in which the side of the cone bulged out in their neighbourhood, showed that they marked the point from whence an effusion of lava of the same kind as we had seen below, had taken place from the side of the cone, not reaching the mouth of the tube at the apex. The last third of the way from the rocks upwards offered a firmer footing, the ashes being cemented by sulphate of lime (gypsum) which, where it was present, formed the white patches we had already observed from a great distance when approaching the Island. The ground now became very hot, not, however, intolerably so, until about 30 feet from the apex a few rocks again offered a convenient seat, not affected by the heat of the ground. There the Aneroid Barometer and the temperature of the air were observed in the shade of an umbrella.

About half way between these rocks and the highest point, cracks and fissures commenced to intersect the ground, widening higher up to the breadth of several inches, where clouds of hot watery vapour issued from them. They were filled with sulphur, often accompanied with beautifully crystallised white needles of gypsum, and a sulphurous smell also accompanied the vapour (sulphurous acid). This smell was, however, not very strong and did not prevent us from penetrating the clouds, when we discovered that, what had appeared from below as the summit was in fact the edge of a small crater, about 90 or 100 feet wide, and 50 or 60 deep. At that depth it had a solid floor of decomposed lava or tufa and volcanic sand. Its walls were made up of rocks, in appearance like those of the older lava, and they were highest on the north and south sides. Towards the west the crater opened with a similar cleft, to that which had permitted us to enter the Island. The vapours rose principally from the northern and southern quarters of the edge, where the fissures were largest and longest, running both parallel and across the edge. The rocks where the

sulphurous vapours issued from between them, were covered with reddish and white crusts, indicating the beginning of decomposition of their substance. From the top, the horizon and more or less of the sea were visible in all directions, with the exception of the quarter between South and West. The inner slope of the circular elevations enclosing the valley, had no spurs, but was like a plain wall, falling off with a steep descent all round towards the centre. It had a uniform brownish colour, appertaining either to the surface of larger masses of the rock itself, or being derived from the dry grass and smaller shrubs covering the slope. There were no trees or brushwood visible to correspond to the richer vegetation on the external circumference. Horizontal parallel lines, traceable throughout the circle and rising somewhat like the borders of receding steps, indicated the thickness and strike of the different sheets of lava and tufa which, super-imposed upon one another, formed the substance of the circular elevation. A very good transverse section of it had already attracted my attention, where the left side of the transverse valley debouches into the sea. Several strata of tufaceous formation, alternating with older rock like lava, could be seen there rising from the rocky beach. One of the most remarkable amongst these was a stratum of rounded stones, like large pebbles, cemented by tufa, exactly like those of the present beach, but at a considerable elevation (about 20 feet) above the high water mark, showing that the sub-marine base of the Island must have been raised since those pebbles had been washed by the sea. All these strata dipped outwards from the centre of the Island, parallel with the external slope of the encircling wall. It is interesting to observe that this slope continues under the sea level on three sides of the Island at least, at the same inclination as above water, which averages about 35°. This is shown by the soundings, which exceed 150 fathoms at a distance of a quarter of a mile from the shore.

Judging from what we saw, as I have here attempted to describe it, I should conclude that the circular valley and its walls constitute the crater of a huge volcanic cone of sub-marine basis, which had been the vent for fluid masses of rock, when such eruptions took place on a larger scale than in more recent times. The smaller cone in the centre of the old crater, corresponding in its size to the diminished forces of volcanic action, is of recent origin, and represents those smaller cones of still active volcanoes which are usually distinguished as cones of eruption, from the original cones, also called the cones of elevation.

We have it on record that about 60 years ago, the crater of the little cone was throwing out showers of red-hot stones of several tons weight and enormous volumes of smoke (Captain Blair's account, Asiatic Researches, 1795), and but for the isolated position of the volcano preventing its more frequent observation, we should doubtless be able to fix the date of the erup-

tion that left the stream of lava behind, which is now filling the valley and its outlet into the sea. Since that time it has entered the period of decline of volcanic activity, without, however, leaving us the assurance that it will not some day revive again.

From barometrical observations, I deduced the height of the cone by Gauss's formula, allowing for the time of the day and the influence of the hot ground near the summit, to be about 980 feet, from the level of the sea to the northern edge of the crater. This height is confirmed by a trigonometrical measurement of Lieutenant Heathcote, I. N., to whom I am indebted for the communication of his results. He visited the Island about four months earlier than we did, when he found the height of the cone 975 feet about the level of the sea, and the diameter of the Island 2970 yards, 1.68 miles North and South.

The few notes I could glean respecting the recent history of the Island, are derived from the Island itself, from the records of the Asiatic Society, and from Horsburgh. We found on a rock in the transverse valley the inscription, "Galathea 1846," showing that since then no alteration has taken place. The same conclusion can be extended farther back to the year 1831 or 1832, judging from an account communicated to the Asiatic Society (*Asiatic Society's Journal*, April 1832) by Dr. J. Adam, whose informant landed in the month of March and reached the base of the cone. By this explicit account, the descriptions of the Island in "Lyell,"* dated 1843, and in Humboldt's *Cosmos*, both apparently derived from the same source, must be rectified. The narrator states (in "Lyell") that the sea filled the circular valley round the cone.

Horsburgh states that in 1803, the volcano was observed to explode regularly every 10 minutes, projecting each time a column of black smoke, perpendicularly, to a great height, "and in the night a fire of considerable size continued to burn on the east side of the crater, which was then in view."

The oldest account on record is that of Captain Blair, already quoted, taken from his report of the survey of the Andaman Islands. He must have visited the Island about 1790, as far as I am able to conclude from the publication in the researches and the date of his chart of the Andamans, which is 1790. He approached nearly to the base of the cone, which he describes as the lowest part of the Island, very little higher than the level of the sea, but he does not mention the black stream of lava. The acclivity of the cone he states to be $32^{\circ} 17'$ and its height 1,800 feet nearly, which, says he, is also the elevation of the other parts of the Island. On the other hand, he remarks that the cone is visible in clear weather at a distance of twelve leagues, which would require a height of not more than from 900 to 1,000 feet. I think there-

* Lyell's Principles of Geology.

fore that Captain Blair could have taken no accurate measurements, contenting himself with a rough estimate. If it could be proved otherwise, the Island would have subsided 820 feet since he visited it.

From the description in some of these accounts it would appear that the high vegetation which we found on the external slope of the Island, is of quite recent origin.

Mr. Adam's authority (1831) states as follows :

"The summits to the N. E. were completely smooth and covered with ashes ; those to the S. W. although partly covered with ashes, also have a good many small shrubs over them, with dry and parched grass growing on the surface."

He conjectures from this that the eruptions would take place only in the S. W. Monsoon or rainy season, at which time the S. W. wind would blow the dust and ashes on the hills in the opposite direction, or N. E. ; such a conjecture is hardly admissible on the ground given, it being easier to account for the vegetation on the south-western slope by its angle of descent being much smaller than that of the north-eastern slope.

The sulphur on the top of the cone occurs in such quantity in the cracks and fissures, often lining them to the thickness of more than half an inch, that the question naturally arises, whether the sulphur could not be worked with advantage.

Although in the immediate neighbourhood of the crater, where the fissures are numerous, the ground seems to be completely penetrated with sulphur, this is not so evident in other parts, only a few feet lower, where the surface is unbroken. There are, however, some reasons which seem to promise that a search might be successful. In eruptive cones, like that of Barren Island, there is always a central tube, or passage, connecting the vent in the crater with the heart of volcanic action in the interior. In this tube the sulphur, generally in combination with hydrogen, rises in company with the watery vapour, and is partly deposited in the fissures and interstices of the earth near the vent, the remainder escaping through the apertures.

If in the present case we admit the sensible heat of the ground of the upper third of the cone to be principally due to the condensation of steam, a process of which we have abundant evidence in the stream of hot water rushing out from underneath the cold lava, it is not improbable that the whole of the upper part of the interior of the cone is intersected with spaces and fissures filled with steam and sulphurous vapour, these being sufficiently near the surface to permit the heat to penetrate. It is therefore not unlikely that at a moderate depth we should find sulphur saturating the volcanic sand that covers the outside of the cone.

I only speak of the outside, as we may conclude from the evidence we have

in the rocks of lava in the crater and those bulging out on the side, that the structure of the cone is supported by solid rock nearly to its summit, the ashes covering it only superficially.

From what has been said above, the probability of sulphur being found near the surface disposed in such a way as to allow of its being profitably exhausted, will depend on the following conditions :

First.—That the communication of the central canal, through which the vapours rise, with its outlets, be effected not through a few large, but through many and smaller passages distributed throughout the thickness of the upper part of the cone.

Second.—That some of these passages communicate with the loose cover of ashes and stones which envelopes the rocky support of the cone.

Although I have mentioned some facts which seem to indicate the existence of such favorable conditions, and which are moreover strengthened by an observation by Captain Campbell, who saw vapour issuing, and sulphur being deposited near a rocky shoulder about two-thirds of the height, on the eastern descent of the cone, still their presence can only be ascertained satisfactorily by experimental digging.

The Solfatara at Puzuoli, near Naples, is a similar instance of the production of sulphur. It is a crater in which exhalations of watery vapour, sulphurous acid and hydrochloric acid take place, and where sulphur is also deposited. The sulphur is gained there by distilling it out of the sand of the crater, to a depth of 10 metres or 32 feet—it becomes too hot lower down—and returning the sand, which after 25 or 30 years is again charged with sulphur. The permanency of the volcano of Barren Island as a source of sulphur would depend on the rapidity with which the sulphur would be replaced after the sand had been once exhausted. The time required for this is not necessarily fixed to periods of 25 or 30 years. In Iceland, at a similar spot, the sulphur is renewed every two or three years.

If a preliminary experiment should make it appear advantageous to work the cone regularly, the material about the apex, after being exhausted of the sulphur that is present, could by blasting and other operations be disposed in such a way as to direct the jets of vapour in the most convenient manner through uncharged portions of ground. If the sulphur should aggregate in periods of not too long duration, it would be possible to carry on the work of filling up new ground on one side, and taking away saturated earth on the other at the same time, so that after working round the whole circumference, the earth that had been first put on, would be ready to be taken away.

If the periods should prove too long to allow the work permanently to be carried on, an interval of time might be allowed to pass, before resuming operations.

Water for the labourers could always be obtained from the warm spring at the entrance of the Island.

The distilling or melting of sulphur to separate it from adherent earth is a matter of comparatively little expense or trouble. If the sulphur be abundant, it might be effected as in Sicily by using a part of it as fuel. It is not necessary to do it on the spot ; it might be done at any place where bricks and fuel are cheap.

It is impossible to predict certain and lasting success to an undertaking of this kind, all depending on the quantity of sulphur present and the rapidity with which it will be replaced.

The situation of Barren Island offers every facility for a preliminary trial. The near proximity of the Andamans insures a supply of convict labour, timber, bricks, and lime. All the wood and iron work required for facilitating the transport of loads, up and down the hill, could be made on the Andamans.

G. VON LEIBIG, M. D.