THE
ANTANANARIVO ANNUAL
AND
MADAGASCAR MAGAZINE.
A RECORD OF INFORMATION ON THE TOPOGRAPHY AND NATURAL PRODUCTIONS
OF MADAGASCAR, AND THE CUSTOMS, TRADITIONS, LANGUAGE,
AND RELIGIOUS BELIEFS OF ITS PEOPLE.

EDITED BY THE
Rev. J. SIBREE, F.R.G.S.,
AND
Rev. R. BARON, F.G.S., F.L.S.
Missionaries of the L.M.S.

No. XIX.—Christmas, 1895.
(PART III. OF VOL. V.)

ANTANANARIVO:
PRINTED AT THE L.M.S. PRESS.
All rights reserved.
CONTENTS.

1. — THE "NATURAL BRIDGE" ON THE ROAD TO MAHANORO. BY REV. G. K. KESTELL-CORNISH, M.A., AND REV. R. BARON .......... 257
2. — A MALAGASY GHOST-STORY. BY REV. C. P. CORY, B.A. .......... 260
3. — THE MAMMALS OF MADAGASCAR: MALAGASY ANIMALS ARRANGED ACCORDING TO THE NATURAL ORDERS, WITH NOTES ON THEIR HABITS AND DISTRIBUTION; PART II. BY REV. J. SIBREE .......... 267
4. — OHABOLANA, OR WIT AND WISDOM OF THE HOVA OF MADAGASCAR; PART II. BY REV. J. A. HOULDER .......... 281
5. — GEOLOGICAL NOTES OF A JOURNEY IN MADAGASCAR. (WITH 2 MAPS.) BY REV. R. BARON .......... 291
6. — ON A COLLECTION OF FOSSILS FROM MADAGASCAR. BY R. BULLEN NEWTON, ESQ., F.G.S.* .......... 304
7. — L.M.S. CHURCHES AND CONGREGATIONS, AND CHRISTIAN LIFE IN MADAGASCAR. BY REV. J. PEARSE .......... 316
8. — THE DISEASES PREVALENT IN MADAGASCAR. BY DR. A. DAVIDSON, F.R.C.P.ED.; WITH ADDITIONAL NOTES BY DR. C. F. A. MOSS ......... 330
9. — MADAGASCAR IN THE YEAR 1840. BY REV. W. E. COUSINS, M.A. .......... 324
10. — THE RELATIONSHIP BETWEEN THE MALAGASY AND MALAYAN LANGUAGES; PART II. TRANSLATED FROM THE GERMAN OF DR. RENWARD BRANDSTETTER BY REV. R. BARON .......... 345
11. — AMBATOVORY, ONE OF OUR HOLIDAY RESORTS IN MADAGASCAR. BY REV. J. SIBREE .......... 355

* We much regret to see that Mr. Newton's name, as the author of this article, has been accidentally omitted in the text. — EDS.
12.—FROM FORT DAUPHIN TO FIANARANTSOA: NOTES OF A JOURNEY IN SOUTHERN MADAGASCAR; PART I. BY E. F. KNIGHT, ESQ. 363
13.—VARIETIES.—French Exploration in Madagascar.—M. Gautier’s Explorations in Madagascar.—Archæological Discoveries in the Lanihay District.—The Malagasy Custom of ‘Mirary’ ............................................. 371
14.—LITERARY NOTES:—A Fragment of Literary History—New Books on Madagascar—Pamphlets and Papers: English—Foreign—New Works in Malagasy—New Maps ................................................................. 374
15.—NATURAL HISTORY NOTES:—On Bones of a Sauropodous Dinosaur from Madagascar—Malagasy Cormorants—Notes on some of the Rollers of Madagascar—The Fosa (Cryptoprocta ferox)—New Species of Mammalia recently discovered in Madagascar .. 378
16.—BRIEF SUMMARY OF IMPORTANT EVENTS IN 1895:—Political—Obituary—Religious—Rev. W. E. Cousins, M.A. .............................................................. 382
17.—METEOROLOGICAL OBSERVATIONS FOR 1895:—At Antananarivo. By Rev. J. Sharmah, B.D. ....... 384

Frontispiece: Two Geological Maps:—
1. The Antsahanaka Province.
MAP NO. 2.
GEOLOGICAL SKETCH-MAP
OF NORTHERN END
OF MADAGASCAR.
BY
Rev. E. Barra

EXPLANATION OF MAP NO. 2.
1. Crystalline Schists, mostly Gneisses.
2. Granitites.
3. Aplite.
4. Aplite, with occasional epidote veins.
5. Basalt, mostly olivine basalts.
7. Dolerite mostly, with basalt, porphyry, and diabase.
8. Diabase, amphibolite, and diorite.
10. Feldspars, with quartz, and Periclase, and Biotite.
15. Dolerite.
16. Comarites, or an allied rock.
17. Jurassic, sometimes solfatina, sometimes
18. Scoriaceous, and some flows of volcanic rocks.
20. Unknown, but probably mostly basaltic rocks.

The western limits of the diorite, felsite, etc. of the east coast are not known, but these rocks are seen to be underlain by gneisses.
THE "NATURAL BRIDGE" ON THE ROAD TO MAHANORO.

The following account of a remarkable natural bridge between Antananarivo and Mahanoro, by the Rev. G. K. Kestell-Cornish, M.A., appeared in the Madagascar News of Dec. 24, 1892:

"On my way down country the other day I came across such a wonderful piece of scenery that I should like to make it known through your paper, for the benefit of anyone who may chance to be travelling over the same road.

"Imagine a natural bridge of solid rock about 50 yards long, across the River Manandra, supported near the centre by an enormous pillar, which appears to be part of the solid rock both above and below it; the height of the pillar is some 25 feet, and the thickness of the bridge above it about the same as the height of the pillar. Standing under the bridge, the breadth of which is colossal, you get a view second to none that I have ever seen—two lovely waterfalls, one above the other, with forest-capped cliffs on either side of the gorge. The effect of the whole defies description.

"Now for a few directions for the guidance of anyone who may find himself near this lovely spot. I am afraid it is rather an off-chance, for not many people come down to Mahanoro from the Capital.

"All mpilànya [bearers] know that there are two roads from Anosibe to Mahanoro, and to avoid the terrible hills on the southern route, which is distinctly shorter, they generally take the northern one, which leads to Béparásy. My advice is: take..."
the southern road in spite of the hills; sleep (the second night from Anosibe) at Sàhavàza; leave next morning and go on through a village called Andrànobé, but stop at the top of the hill above the next village, Ambòdimànga, and look out for a path going off to the left, or west. This path will bring you to the top of the bridge, from whence the best view of the waterfalls is to be obtained. When you have had enough of that, go on to Ambodimanga and ask the way to Antetèzan-tàny. It is very easily found, but you have to be a little bit nimble on your legs to get up to it, as the river bed is full of massive boulders. If possible, take a camera. Alas! after getting a view of the falls from the top of the bridge, I sent my camera on to the place where we had arranged to sleep—Antsàhan-òmby, never dreaming of what I was going to see below."

Having recently had an opportunity of seeing this bridge, I can fully corroborate all that Mr. Kestell-Cornish says about it, for it really is one of the most wonderful and picturesque sights imaginable. It is of course difficult to compare one natural phenomenon of this kind with another, but if the bridge and its surroundings were situated in the British Isles, it would not improbably rank in fame with Fingal’s Cave and the Giant’s Causeway. Having seen all three, it is difficult for me to say to which I should award the palm. The vegetation round about it, at any rate, gives it a charm which is totally absent from the two former.

A few notes and approximate measurements which I made on the spot may perhaps be of interest.

First of all then, there is a deep ravine which has been excavated by a small river (the Manandra). At the head of this ravine, and crossing it at right angles, there is a steep crag, down which the water falls in two beautiful cascades. The river then follows the ravine for some sixty or eighty yards, more or less, until it comes to the bridge, under the arch of which it passes, the whole bed of the river being filled with masses of rock, large and small. The top of the bridge is nearly level on the one side with the surface of the country out of which the ravine has been cut, but on the other side of it, the ground rises much higher, the whole country in the immediate neighbourhood being covered with forest.

The bridge itself, which spans the ravine, is a perpendicular mass of gneiss reaching probably to a height of 500 or 600 feet, possibly more. The actual length of the archway is about 200 feet, the width about 25 feet, and the height; in its highest part, about 20 or 25 feet. These measurements are of course only approximate, but they cannot be far from the truth, as, although made quite independently, they so nearly agree with those
Mr. Kestell-Cornish gives. At one end, the arch slopes away extremely gradually, the other end is more abrupt. This arch has been bored through a thick bed of coarsely crystalline rock, white in colour, but with a faint bluish tint, intercalated in the gneiss. This fact indeed accounts for the formation of the bridge. This rock is of such an anomalous character that it is difficult to give a satisfactory name to it. In outward appearance it is very like a crystalline limestone, but a more critical and microscopic examination shows it to be composed, for the most part, of white felspar (plagioclase, orthoclase, and microcline), and quartz, associated with which, but in lesser quantity, are found calcite, good-sized crystals of tremolite, apatite, and scattered grains of iron pyrites, sphene, and green epidote. It is impossible to give any satisfactory designation to such a combination of minerals, but for lack of a better name it may be called an extremely impure aplite. Near the middle of the bridge there is a pillar-like mass of very black compact rock. On examination, this is seen to be a basaltic dyke. It is three yards wide, and not only forms the pillar, but passes perpendicularly through the overlying masses of gneiss. It is a fine example of a basaltic dyke. Several other dykes of basalt, or rather veins, as they are very much narrower, may also be seen projecting slightly from the roof of the archway, especially at the end which slopes down gradually.

Hanging from the roof directly above the river I noticed a number of lianas (vány) strung together. These, it seems, are fixed in a large cavity in the mass of the rock above the archway, the breeding-place of numerous bats, and form a rude ladder, by which the natives climb into it in order to secure the young bats, which are used as food. The cavity itself is not visible.

The first sight of the bridge, approaching it from below, is extremely imposing and charming, the lower of the two waterfalls above referred to being visible in the distance through the great span of the archway.

The top of the bridge is by no means so interesting, although both waterfalls at the head of the ravine are here distinctly visible, while the lower one only is seen from below. On the top of the bridge are some very ancient tombs, though all that is to be seen of them is some rude stones.

Of all the natural phenomena I have seen in Madagascar, this bridge is by far the most remarkable.

R. BARON (Ed.).
ONE evening I was sitting beneath the verandah of a house on the borders of the upper forest in Madagascar. It was one of those glorious evenings only to be found in the tropics, when the afterglow of sunset enriches and enhances the beauty of everything before darkness hides them for another night, when red flowers look like flame, and yellow like burnished gold. As the sun sank deeper below the horizon the colours slowly changed, one blending with another till all grew sombre. Over to the east, behind the forest, shot up the great white beams of the rising moon, distinct and regular. The trees stood out in bold relief; the very leaves seemed to separate and let the moonbeams through.

Grand as was the scene, my thoughts, I must confess; were hardly in keeping with it; I was thinking of pigs. I had been told by some natives that some wild-pigs had been devastating their crops, and I was wondering how I could get a shot at them that night.

As I sat puffing at my cigar, and wondering if it were possible to secure the services of an old native who was said to be exceptionally skilled in the matter of pigs, I saw a shadowy form coming towards me; and presently the dusky figure of a native stepped out of the shadow into the moonlight, his white lâmbo (a long cloth worn by natives) shining brightly as he threw it farther over his shoulder.

"Why!" I exclaimed, "it is Rainikôto himself—the very man I wanted. Hi! Rainikôto, will you go pig-hunting with me to-night?"

"How do you do, sir?" he said, with native politeness, before he answered the question. "What did you ask, sir?"

"Come with me to-night to look for that old boar that is eating up all your manioc, will you?"

"Where?"

"Oh, anywhere; I don't mind. At that little open glade in the forest about a rice-cooking* off, away to the east."

"At the clearing to the east?"

"Yes."

"I can't go; I have business to do."

"Nonsense, man! What business can you have to do?"

"I can't go, sir," he said again, squatting down on his hams beside me, and arranging his lâmbo so as to cover his mouth.

"But why?"

"I am an old man and don't care for sitting up all night, as I used to do. I like sleeping better than shooting. But what made you choose that place?"

"I thought it looked a likely spot, so many paths meet there."

"Go about midnight; you are certain to see a pig," he said, looking up with a curious expression.

I was surprised by the man's manner, it was so totally different from anything I had been accustomed to see in a native.

* A native way of measuring distance, equal to about a mile and a quarter.
"Funny you should pick that place," he added after a time.
"You seem to know it well and say it is good; then why 'funny,' my relation?"
"Oh, I know it very well."
"I'll give you a dollar to come with me!"

The old man laughed. "It is a big sum," he said, "a week's pay. But not for fifteen weeks' pay would I come to that place at night, my master."
"Oh, all right!" I said, pretending not to be curious, "I'll go myself."

I watched for some sign; but he sat looking out straight before him and evidently disinclined to talk. "Is there a ghost there, Rainikoto?"
"Yes, perhaps," he said, readjusting his lamba.
"Will you tell me about it?"

The old man sat perfectly still, as if in deep thought. No European could sit so long without moving. Not a limb moved, not the quiver of an eyelid. I waited for an answer, but none came. After a time, he took out his small polished bamboo tobacco-box. Shaking out a large pinch of the snuff-like preparation into the palm of his hand, he opened his mouth, and with a peculiar jerk, tipped it in below his tongue, a decided hint for me that he meant to keep his story to himself, whatever it might be. I knew it was no good pressing him then, so I lit another cigar and took no apparent notice. Presently, native fashion, he spat out his tobacco, and seemingly addressing himself as much as me, he began:

"White men don't believe in ghosts and witchcraft and Vazimba;* they laugh at them and at those who do."
"Witchcraft, perhaps, my friend, and Vazimba and sikidy [divination]; but we like to hear of ghosts. I do not feel at all like laughing, indeed, I very much wish to hear about it."

"It was a long time ago" (he began so suddenly it made me start), "it was a long time ago; two kings and queens have turned their backs upon us since then. I was but a little lad, but I remember it quite distinctly. I am old; but I remember it well, as well as if it were only yesterday. My father was going into the forest to get wood, only a short distance, so he took me with him. We had not gone far when we heard the long low whine of a lost dog. 'The boar-hunters are out early,' said my father, evidently surprised, 'they must have slept in the forest. Ho! è, è, è! he shouted; but there was no answer except from several dogs, which joined in one long howl. 'Ah! they are all lost,' he said, 'and no one shouting to let them hear. Ho! è, è, è! Ho! è, è, è, è!'"

"Again the loud chorus came ringing and echoing through the wood. We turned aside and made our way in the direction of the dogs. Cry upon cry now arose. I remember it well. Am I likely to forget it? It was early morning, and there had been a heavy dew; my feet were cold and wet, and the dogs frightened me. I felt chilled and scared. My father had girded himself, and his brown skin glistened in the morning.

---

* The Vazimba are the supposed aboriginal inhabitants, whose graves and spirits are held in great awe and respect. [See ANNUAL XVIII., p. 129.]
† The native idiom in speaking of the decease of a Sovereign. These do not die, they, 'turn their backs' on their subjects.
sun. How fast he went! pushing his way through the tangled growth. I could scarcely keep up with him, for the thorny creepers caught my legs, although my father helped to clear the way, striking with his axe at the great lianas that stopped our path. I think in the excitement he almost forgot me, for he guessed that something was wrong, and he held his spear ready shortened in his right hand. It seemed a long, long time before we reached the dogs. They were all together in the clearing to the east. It has not grown up as others do; it is just the same. There they sat, some howling, some licking the wounds received from a tussle with the boar. 'Look, father; what is that?' I cried. 'Adré! adré! it is a corpse. There are two: Rainimânga and Rainizâfy both killed by one pig,' he said, turning them over. Ah! I remember them well, sir, those gashed bodies. It was a horrible sight for any one, much more for a little lad. The shaft of a broken spear lay near; and still grasped in the hand of one lay the second spear. A look of surprise spread over my father's face as he gazed upon the man who held the spear. 'This wound would not have killed, and he never threw his spear. The other is nearly torn to bits! His spear has gone,' he said. 'I do not understand. And what is this? Money! fifteen dollars! How came that money here? Seven in one purse, and eight in the other?' He looked at me, and then, as if thinking aloud, he added: 'No! I will not take it. It has bad luck in it. I'll give it to their wives. Besides, if I kept it they would say I had killed these men. I wish I knew how they got it, though!'

'We soon raised the whole neighbourhood. The two men had come from the village over yonder, 'he said, pointing with his lips to a village about three miles away,' and their friends went and brought the bodies in. What wailing and mourning there was! what beating of tom-toms! But the money my father gave up was much more talked about than the deaths. Never had any one but the chief—nay not even he—had so much before. The funeral was very grand: several oxen were killed, and there was a lot of toaka [native rum] in siny [earthen water-pots]. The money was a great comfort to their wives. We heard soon afterwards that a trader from the coast had dropped his purse, and he offered a reward; but then the reward was less than the money in the purse, so of course he never got it.

'I soon ceased to think of that day, though the shock lasted long. As I grew up, I too became a hunter and forester. Malagasy, as you know, are not fond of hunting like you white men; the Bezanôzàno tribe are the most so; but even only a few of us care for it. I liked it and soon became proficient. One day a white man came to our village and stayed there. He was looking for birds, which he skinned; he never ate them, which surprised us. He taught me to skin and shoot; and when he went away he gave me the gun. I was very proud of it; and soon I found I could get wild-pig much easier by waiting for them at nights and shooting than by hunting them with dogs. So I used to go to the bush where you wish to go to to-night.'

He looked up at me with a sharp, keen, sidelong glance, as if to read my thoughts, and then proceeded: 'I nearly always got some, though you white men don't, for you have no patience; you sit and wait for one hour, perhaps, and then you get up and walk a little, or think
A MALAGASY GHOST-STORY.

another place better, or go home; but we Malagasy will sit without moving for hours. Whenever pigs came this way, I was sure to be waiting for them, and the glade you mentioned was a favourite place. You'll see some to-night, sir, when you go, for I know their habits well. The herd that were in the sweet-potatoes and manioc last night will come that way; they will be there about midnight and return about second cock-crow."

His wrinkled old face broke into a sort of satirical smile, as he paused. Without knowing quite why, I began to feel 'creepy;' but I answered with apparent unconcern: "Well, I hope so, Rainikoto. But you have not yet told me about the ghost. you know."

"Oh, I shall, I am coming to it. But you had better go, and it will save me the trouble of telling you. You will see it all then for yourself."

"I should like to hear it first, you know, to see if it agrees with what you saw."

"Well, master, you are my father and mother, and I should like to please you, but it is a long story."

"Go on, my relation," I said, answering his politeness in the orthodox way. He got up, readjusted his lamba, and squatting down a little more in front of me, began:

"It was on the 15th day of the moon Alahasâtý"—

"Why! that's to-day!" I said.

"Is it?" he said. "Let me think. Yes: so it is. That is funny.—Well, it was on this very day, about ten years ago, I went to watch for pigs at yonder glade. It was just such another night as this. The day had been very hot, and these little whirlwinds had been raising their dusty columns on the road—the spirits of our forefathers visiting the earth or returning to heaven, we Malagasy say. There had been a good many that day, I remember well. But they have not much to do with the story, nothing at least in your eyes. A herd of pigs had been among the village crops the night before. I had tracked them and found out the way they had come. I noticed the slot of a huge boar, and I meant to have him. They passed right through the clearing. That glade has never altered, as the others do; it is the same now as then; and it was the same then as when I was a little boy; but it never struck me till after that night, and then I noticed it. The grass grows just the same, and the trees do not seem to change."

The old man, I noticed, was dropping into the native style of rhetoric, a form not unseldom heard in British pulpits, a certain reckless way of wandering up and down the keys of thought, and then the persistent striking of a single chord, with an emphasis varying directly as the number of repetitions.

"Ay, it was just such another night as this, just the same; the same little fleecy clouds rushed across the full moon. The children were dancing in its rays, as they are now down yonder, and their song came rising and falling on the wind as now you hear it. The night was just the same; the crickets chirped and whistled in the grass; the great cicada rang his rattle as loudly as he now is doing—just the same. The dew was sparkling on the broad leaves, like tears on the cheeks of a young wife who has lost her child, her first-born. The frogs croaked in the
A MALAGASY GHOST-STORY.

marshes—a sign of rain, I've heard you say; we call it the women's parliament, for it is no sign of rain. Croak they will, as frogs and women always must. They could not live without it; aye master, the night was just—

"The same, my dear relation. Let us agree that the night was just the same," I said, breaking in rather rudely, perhaps. "The very birds, beasts, fishes, insects, you know, they always are the same except when it is raining."

"I said you would laugh at me. If you laugh already, what will you do before the end?"

"I laugh! My dearest father and mother, I am so anxious to hear the end that I have even been rude. Pray excuse my haste; my eagerness out-stepped my manners." Malagasy are not easily offended, and he soon went on again.

"It was a short time before midnight that I started. I took my gun and spear and the usual little hatchet we all carry. No one went with me—I was quite alone. I soon reached the place and sat down, hiding behind a large clump of sèvabe,* through the broad leaves of which I could watch the whole glade from end to end. It is about thirty réfy (fathoms) long. The moon shone brightly; not a cloud obscured its rays; not a breath of wind could be felt inside the forest; but the tops of the taller trees rustled gently, and the twisting leaves showed their white linings with every little puff. The tree-frogs alone seemed to break the silence, for they alone were near me.

"I had sat about two hours and had seen nothing. I began to think the pigs must have passed out, or gone another way; and I had made up my mind to alter my position, so as to see them better when they came back in the early morning; but still I sat on, not caring to own myself at fault. I was just opening my tobacco-box, and had put my gun down by my side; my spear was sticking upright in the ground before me, and my axe on my knees, when I became conscious that something was going to happen, but I knew not what. I felt my head, to see if I were faint or dreaming. I never felt any feeling like it before, or since—a sort of trembling, cold, indescribable feeling, as if one's spirit were fighting with one's body. I was afraid, and thought I was ill—perhaps dying, perhaps bewitched, and I rose to go home. So disturbed was I, that I forgot to pick up my gun. Just at that moment a huge boar rushed past, his bristles all up, and his little eyes flaming from under his grizzled brows. He was covered with mud from head to tail; his jaws were set as if for fighting; he looked distressed and evidently hunted, being hard put to it. He was the largest and oldest boar I had ever seen, for his horns† were very long and large, and his tusks gleamed long and sharp in the moonlight. I could easily have shot him, had I had my gun; but I was startled and surprised, and he was past before I regained my presence of mind. I held my axe, though, and without knowing what I did, I hurled it after him. Round and round it flew and lit a foot in front. I thought it must have grazed him, but he never stopped. I was

*A shrub, Solanum auriculatum, Ait.—Eds.
†The Malagasy wild-boar has a large horn-like growth above each tusk.
astonished, for nothing followed; and a thing that did not strike me at once, but which I vividly recalled afterwards, was that there was no sound, yet he had run right through some dry fern.”

The old man stopped and altered his position. It evidently made him nervous to recall that night’s adventures, even when sitting inside a verandah and near one of the all-powerful white men. Glancing timidly over his shoulder, he began again:

“I got up, master, and picked up the axe. For a time the funny feeling had left me, owing, I suppose, to the excitement; but as I touched the axe, my hand shook like a rush in the wind and became as cold as the dead. I looked at it to see if there was blood on it, and I ran my finger along the edge. It was the finger of the other hand, and it shivered like the hand that held the axe. I was horribly afraid now, and knew not what to think. I wished to go home; but I wished still more to know what had become of the boar, and what had chased it. I remembered his enormous size, and I thought my eyes, being ill, might have magnified it, or that I had even seen a vision. I stooped down to examine the slot in the wet clay, but there was not a mark. I could not believe it. I knelt down and peered into the clay; not a sign. I was on the point of rising—oh, sir, I shall never forget it, no! not to my dying day. There he was!—the boar right on me, not ten yards off, and coming hard down on me—looking death in every line. I gasped, I shuddered; but I was still a man, and all my trembling ceased as I jumped up for one last effort. There was no room to move, for I had followed him out of the glade to that narrow passage between the high clay banks; for there, if anywhere, I knew his marks would show. Five feet perpendicular banks on either hand, and an immense boar in full charge. He had come without noise, or I must have heard him yards away. I had just time to get on my feet and strike at his head with the axe with all my force; I meant, as soon as I felt the axe bite, to jump high and so miss the rush and tusks. It was no use to jump and not strike, for he would have turned on me again. I just saw his great red carcase as it loomed before me; there was time for much thought, but for little action. Down came my axe on his head; but there was no resistance! I lost my balance, for I had thrown all my weight on to the blow, and fell right on to the top of him!

“I shut my eyes and breathed a prayer to the Great Spirit to receive my soul. I knew I was a dead man, unless a miracle was wrought, for I should never be able to get up before he would be on me again, even if he missed me then. How long I lay I knew not; but at last I found I was lying unhurt in the path, and no sign of the boar. I looked cautiously round without rising, in case he was there, waiting for me. How I ever missed his head I could not then imagine, for I was an expert axeman, and saw the blade fairly on him. Some sudden twist had saved him, I thought. But what was he doing? I thought him mad. For there he stood at bay against a tree near the glade; but not a sound, not a grunt, rushing as if at dogs with all his bristles set. Look, master, I see him now!” The old man had got up; his eyes glared as his excitement increased, and I confess to having felt very uncomfortable myself.
"Look! there he stands! No, no! you can't see him, but I do! Yes! I see it all over again. I see him rushing madly at those phantom dogs, biting, gnawing, trampling. shaking them off; and then with one wild rush he broke his bay and ran right up to me—spirit of my forefathers!—right through me, and only a shudder, a dull, trembling, cold, clammy shudder, as on he went. My hair stood on end; my tongue clave to the roof of my mouth, a horrid taste filled it; my knees shook; my heart leaped and bounded against my ribs, and I could not move. On he rushed. I watched him—aye, how I watched him! the great boar's ghost, for now I knew. Back again he came. He kept about the place. In desperation and half crazy myself, I gained strength to strike another blow. My axe passed through him, leaving a large gap, that closed again. My dread increased, and I thought I should have died. Fifteen dollars, you say! Nay! not for all the money you have would I pass that night again. It would mean death now, for I am older, and my heart could not bear the strain, even if that were all.

"But there is worse, worse! I wonder I ever lived to tell the tale. The boar had broken by twice, and was standing for the third time, when I saw two men run into the glade. They were girded tight, and had on the little straw skull-caps we foresters wear. They each had his spear raised, and rushed together towards the boar. I saw their mouths work, but heard no sound. They were both fine tall men, almost of the same height, and very like each other—for were they not brothers! I was then almost in a stupor from long-continued fear. I could neither move nor speak, only look. I wished to cry out, but could not, for I knew they must be the two men, Rainimanga and Rainizafy, whose bodies we had found dead years ago, when I was but a little boy. I knew I should see how it all happened now. I was close to where they passed, but they took no notice of me. As they did so, the same chill ran through me once more, as it had done when the boar passed by. As they ran on, an evil look came over the face of the hindermost. I never saw so fiendish an expression; all the evil passions man is prone to seemed stamped upon that face. Handsome as he was, he looked like a kinily.*

"I could see all plainly, for an artificial light lit upon both the men and the boar. The hideousness of the man's expression increased till he got within a few yards of the boar; then he leaped upon his brother from behind and seized his throat. Ah! what a fearful struggle that was! I shrieked and shrieked; but my mouth was parched, and the scream ended only in an uncertain sound. I tried to shut my eyes, but I could not. Over and over the two rolled, but the vice-like grip never relaxed. The eyes seemed to start from the head of the one that was held; his face blackened, blood began to trickle from his mouth. It was horrible, horrible! A few moments more and all was over.

"The murderer arose, gave one look at the corpse, picked up his spear and rushed at the boar, which still stood at bay. High above his head he raised his spear, poised it, gave it the twisting motion, and then, quick as lightning, threw it. It struck well, just behind the shoulder.

* A kind of ghostly demon, the half-decomposed body of a man come to life again.
A MALAGASY GHOST-STORY.

With one savage bite, the boar severed the shaft and charged the man. In the murder of his brother he had forgotten his axe. The boar was upon him. One great shock, and his leg was ripped up as he turned to flee. Back again, another rush before he had recovered himself, and the tusks ran into the bone and severed the sinews. The man staggered and fell. He dragged himself slowly, but another rush of the huge animal, and his side was open. Then the boar, with bloodshot eyes and staggering gait, ran away to die. I fainted, and when I recovered, it was dawn. For a year I was ill, and I have never sat for pig in that glade since."

"That day was the 15th day of the moon Alahasaty?" I asked. He nodded. "I think, my dearest father and mother," I said, "you must have been asleep." Whereupon he shook his head, rose slowly and departed.

C. P. Cory.

(From Chambers's Journal, Sept. 9, 1893.)

---

THE MAMMALS OF MADAGASCAR:

MALAGASY ANIMALS ARRANGED ACCORDING TO THE NATURAL ORDERS, WITH NOTES ON THEIR HABITS AND DISTRIBUTION.

PART II.*

CHAPTER IV.—THE LEMUROIDA (continued); THE TRUE LEMURS.

II.—THE LEMURIDÆ. We have now to consider the Lemurs proper, of which, according to M. Grandidier's classification, there are no fewer than 15 species and varieties in the genus Lemur alone: and all of which, as already observed, are confined to Madagascar and the Comoro Islands.

As to this family, M. Pollen makes the following general remarks: "There is only one species in which the tail presents, instead of one uniform colour, alternate rings of white and black, viz., Lemur catta. The others may be divided into three groups: (1) those of one uniform tint, whose ears are almost hidden under the thick and long fur. To this group belong (a) Lemur varius, a species exceeding all others in size, with black throat and a very variable system of coloration, and of which (b) L. ruber is only a variety, and (c) the L. macaco of Linnaeus. (2) The second group has the muzzle of a light or whitish tint; this contains (a) L. coronatus, (b) L. mongos, and its variety (c), L. nigriprous. (3) And in the third group, all the species have the muzzle of a more or less deep black or, more rarely, passing into brown. These are (a) L.

* Continued from ANNUAL XVII., p. 84.
rubriventer, (b) *L. albifrons*, (c) *L. rufifrons*, and (d) *L. albimanus.* It may also be remarked that although some of the Lemurs are nocturnal, and others diurnal in their habits, they all differ from the Indris group in subsisting on a mixed diet; insects, small reptiles, birds' eggs, and the callow young of birds forming at least as important a part of their food as fruits. It is probably owing to this mixed diet that they are of a much hardier disposition than those of the Indris group, so that they flourish in confinement in Europe so well as not infrequently to breed, the number of young produced at a birth being either one or two.

"In consequence of their arms being longer in proportion to their legs than in the Indris group, the true Lemurs and their allies, when on the ground, are in the habit of going on all-fours, although capable of taking leaps of great length. The true Lemurs may be distinguished from the other members of the group to which they belong by the length of their snouts, and the large size of their tufted ears, as well as by their diurnal habits."

1. **The Variable or Ruffed Lemur** (*Lemur varius*, Geoff.). This species, says M. Pollen, has, so far, been observed only in the eastern central forests of Madagascar. It is found in large companies and is shy in character. Its voice is very powerful and can be heard at a considerable distance; and the howling which a number of them make when together resembles the roaring of a lion [sic] and is truly frightful. There are many varieties of this species; in some, black tints predominate, in others, white, while some are entirely white, and others are entirely black; the white tint is very general near the skin, and the black occurs in patches, the tail being completely black. The muzzle is long and prominent, and it has a ruff of long whitish hair round the throat and cheeks. M. Pollen is almost certain that the *Lemur ruber* of some naturalists is only a red variety of *L. varius,* having seen a specimen whose fur changed in colour so as to be identical with that of *L. varius.* M. Grandidier also classes the Red Lemur as a variety only of the Variable Lemur. It is called *Vârikândana* by the Betsimisaraka.

Mr. Ellis describes the habits of some of these Lemurs which he observed in captivity, and says that "though covered with thick, almost woolly, hair, they seemed to be ill at ease in wet or cold weather, but to luxuriate in the warm sunshine. I often noticed two or three of them together on a fine morning, after rain, raised up on their hind legs, on the outside of the house, leaning back against the wall with their fore legs spread out, evidently enjoying the warmth of the sun." "One we had on board ship conveyed its food—boiled rice and fruit—to its mouth by the hand; it was gentle and sociable, and seemingly grateful for any trifling notice or kindness. I frequently gave it water, which it lapped like a dog. It was scrupulously clean and seemed unable to endure any tar or other dirt on its shaggy coat." This species is said to be the largest of all the true Lemurs.

2. **The Red Lemur** (*Lemur varius*, var. *ruber*). This is a large and handsome animal, chiefly of a warm reddish brown, with black markings on the face. It is seen occasionally in the upper belt of the eastern forest. Native name, *Vârikândana.* As regards its classification, see the opinion of M. Pollen quoted above.
3. The Macaco or Black Lemur \((Lemur\; macaco,\; L.;\; L.\; niger,\; Geoff.;\; L.\; leucomystax,\; Bartl.)\). These animals appear to be confined to the north-western parts of Madagascar, and are found in the forests from Diego-Suarez, at the extreme north, to Bembatoka Bay and the island of Nosibé on the north-west coast. They live in companies, keeping to the tops of high trees in impenetrable woods. These Lemurs are mostly seen at evening, when there is often a truly frightful uproar produced by their united outcries. Sometimes these cries are varied by a kind of growling, which is specially employed on the approach of any danger. The agility which they display in leaping from tree to tree is incredible; one can hardly follow them with one's eyes, and it is more easy to shoot a bird in rapid flight than to shoot these animals when leaping. They have also the habit, when hunted, of letting themselves fall suddenly from high trees into the bushes; but the hunter, believing them to be dead, is soon undeceived by seeing them reappear at a considerable distance upon other trees, so that the pursuit of them becomes very difficult.

If brought up in the house while quite young, these animals soon become very tame and gentle. Perched on the shoulder of their owner, they will eat any food he may offer them. They are fond of fruit, especially of bananas, which are indeed their ordinary food in a wild state. They are also very partial to the brains of birds, which they suck out and eat after having broken the skull with their molar teeth; the rest of the bird is then thrown away.

In certain parts of Madagascar it is unlawful to kill these Lemurs, or even to keep them living or dead. M. Pollen says: “Each time that I visited the island of Nosifaly (N.W. coast), I had to take great care to assure the people that I would not bring any Lemurs, which, so the inhabitants say, would profane the island. Once it happened that the people of the island obliged me to take my booty to a village on the mainland of Madagascar, and to do this before landing on Nosifaly, so as not to bring misfortune on the inhabitants of the ‘sacred island,’ for that is the meaning of its name \((fâdy=fâdy,\) tabooed, sacred; \(nôsy,\) island).”

The native name of the Black Lemur is Akomba. The males are always black in colour from youth upwards, while the females are yellowish-red, sometimes pale and sometimes dark, with white whiskers and a white patch on the lower part of the back. The fleshy pads on the feet and hands of this Lemur are largely developed, as described in the introductory remarks upon the sub-order generally.

“A female of this species in the Gardens of the Zoological Society twice gave birth to a young one, and thus afforded an opportunity of seeing the curious manner in which the true Lemurs carry their offspring. The young one born on the 24th of March, 1884, proved to be a female, and was of the same brown colour as its mother. On the 3rd of April in the following year the second young one was born, which was a male, and at the time of birth it was of the black hue of its father. Each of these young ones was carried lying nearly across the abdomen of its mother, with its tail passed round her, and thus on to its neck, so as to afford a firm attachment; and it is believed that, at least in the wild state, the young are at a later period carried on their mother’s back.”

Of a female of this species in the Regent's Park Gardens, Mr. A. D. Bartlett says: "I imagine from her voice, which is a kind of hoarse croaking bark, rapidly and frequently repeated, that the male would probably produce a louder and more powerful note, since the voice of the male of an allied species is certainly astonishingly powerful and can be heard at a great distance; while the voice of the female, although loud and discordant, is comparatively weak. Nevertheless it is a very unpleasant series of loud, grunting, grating barks, sufficient to alarm a nervous traveller, should he be in the forest at dark and unacquainted with the size and nature of the animal producing these loud and dismal sounds."*

4. The Mongoose Lemur (*Lemur mongoz*, L.). This Lemur has a long head, flat forehead, and large canine teeth. It is of a general reddish-grey colour, but the crown of the head and the face and chin are black; and there is a streak of the same colour up the forehead. The cheeks and the side of the forehead are iron-grey, and this and its black nose distinguish it. It carries its long bushy tail well erect as it moves about, jumping on all-fours from place to place, and grunts with pleasure when fed and noticed.

5—10. As will be seen by referring to the Tabular List, M. Grandidier distinguishes six distinct varieties of this species besides the type. These are named according to the colouring of the fur about the face and neck, as (5) the Collared Lemur (*Lemur mongoz*, var. *collaris*), (6) the Black-fronted Lemur (*L. mongoz*, var. *nigrifrons*, Geoff.), (7) the White-fronted Lemur (*L. mongoz*, var. *albifrons*), (8) the Red-fronted Lemur (*L. mongoz*, var. *rufifrons*, Benn.), (9) the Ashy-crowned Lemur (*L. mongoz*, var. *cinereiceps*), and (10) the Red-footed Lemur (*L. mongoz*, var. *rufipes*). Of these there is not much to remark upon, as in habits and disposition they appear to differ little, if in anything, from the type species. Several of the White-fronted Lemurs have been brought to England from time to time, and have been kept in the Regent's Park Zoological Gardens from as long ago as 1830. Their habits are simple enough. They often exhibit great vivacity, and are much given to leaping from one object to another, in which they are aided by the pad-like structure of the hands and feet. One of these Lemurs was sent to the great naturalist Buffon as a present and lived with him for several years. It was very good-natured and tame and full of fun while still young, but became cross and vicious, as well as very thievish, when old. It eventually died from the effects of cold, from which it always suffered much.†

11—14. Of the four following species of Lemur I have been unable to obtain any particulars and can only give their names, which are as follows: — (11) the Intensely Black Lemur (*Lemur nigerrimus*), (12) the White-handed Lemur (*L. albimanus*), (13) the Crowned Lemur (*L. coronatus*, Gray), and (14) the Red-bellied Lemur (*L. rubriventer*, I.G. St.-Hil.).

15. The Ring-tailed Lemur (*Lemur catta*, L.). This pretty species is perhaps the best-known of all the Lemuridae from its handsomely marked tail, which is ringed with black and white bands, thus clearly distinguishing it from all the other species of the family or of the sub-order.

† See Cassell's Natural History (new ed.); vol. 1, p. 228.
It appears to bear a sea-voyage and transportation to a distance more easily than many of the Lemurs, and is therefore frequently seen in Mauritius and Bourbon, as well as in still more distant places, where it is commonly known by the rather absurd name of the "Madagascar Cat"! M. Pollen says of it: "This species, so characteristic by its strongly marked colours, inhabits the south-western forests,* and I have never observed it in other parts of the island. The specimens I obtained came from Fiherênana and the Mâhafaly and Másikôro provinces; but, according to Sganzin, it is also found in Anôsy, on the south-east coast. These Lemurs, like their congeners, live together in considerable numbers and are hardly distinguishable from them in habits. They are extremely active and leap with great grace and agility from tree to tree. The little plaintive cry which they utter at intervals resembles that of our domestic cat. In captivity this Lemur soon becomes attached to its owner. One I saw on board the corvette Dupleix was quite one of the family and loved to play with the dog and the cabin-boys. This gentle animal protected in a special manner a little monkey, taking care of it like an infant, licking it and nursing it in its arms. It leaped with grace and astonishing agility for an adult animal; it had the habit of frequently stretching out its arms and fixing its eyes on the sun."

The Rev. G. A. Shaw says of the Ring-tailed Lemur;† "As far as my experience of seven years goes, these Lemurs are found only in the south and south-western borders of the Betsileo province of Madagascar. A forest extends along the whole eastern side of this region, fringing the table-land, and covering all the slopes down into the low land bordering the sea; but nowhere in these forests have the Ring-tailed Lemurs been found. Their habitat in the south and south-west is among the rocks, over which they can easily travel, where it is impossible for the people, although bare footed, to follow. An examination of their hands will show that they are pre-eminently adapted for this kind of locomotion. The palms are long, smooth, level, and leather-like, and enable the animal to find a firm footing on the slippery wet rocks, much on the same principle as that which enables the fly to walk up a pane of glass. The thumbs on the hinder hands are very much smaller in proportion than in the Lemurs inhabiting the forests, which depend upon their grasping power for their means of progression. These latter spring from tree to tree, and very rarely, if ever, touch the ground, except in search of water. Hence the Ring-tailed Lemurs are an exception to the general habits of the Lemuridæ, in that they are not arboreal. There are very few trees near their district, and those that do grow there are very stunted and bushy.

"These Lemurs are provided with two long canine teeth or fangs in the upper jaw, those of the male being considerably longer than those of the female. These they use to take away the outer coating of the fruit of the prickly-pear, which is full of fine spines and constitutes their chief article of winter food, and which grows abundantly in the crevices and around the foot of the rocks. Their summer food consists of different kinds of wild figs and bananas. Their fangs are doubtless used as

---

* See, however, Mr. Shaw's statement as to their habitat given in the following paragraph.
THE MAMMALS OF MADAGASCAR:

weapons of self-defence, although when fighting, I have noticed that they depend a great deal upon their hands, with which they scratch and strike. I have seen the male put a dog larger than itself to the rout in this way.

"They are very easily tamed, and in captivity will eat almost any kind of fruit, but do not like meat in any form. [They are, however, extremely fond of spiders.] By a little care they can be induced to feed upon cooked rice, upon which they thrive. In their natural state they do not drink, as is proved not only from the native accounts, but also by the fact that for the first month or two after being caught, and while living on bananas, they do not drink. It is curious that all the species of Lemur living on the west, including the two kinds of White Lemur, appear to subsist without water, while all those on the east invariably drink at their meals."

The mammae or teats of this species are two in number and are placed near the armpits. They have usually but one, or at most two, young ones at a birth, the period of gestation being about a hundred and ten days. The young animal is born almost naked and without fur. "They cling on to their mother's fur, and, holding on to that over her stomach and abdomen, they lie across her, so that when she draws up her legs, she either hides the little one effectually, or it may be seen hairless in the folds of the mother's groin. After a while, and as the young Lemur becomes better clothed and stronger, it leaves this snug and warm retreat and crawls up on to the mother's back and seizes her fur, holding on with such tenacity that she can jump and bound about without unseating her little burden."

There is one point of great interest in the throat of this Lemur, for it has a small laryngal pouch, resembling the great one in the throat of the American Monkeys called Howlers; while the hyoid bone resembles that of the Carnivora rather than that of the Monkeys. It appears therefore as a kind of link between the two orders.

Two of the smaller species of Lemuridae are classed in a distinct genus from the true Lemurs and are known as Hapalemur (H. sinus and H. griseus), or 'Gentle Lemurs' (Gr. hapalos, soft, tender).

16. The Broad-nosed Gentle Lemur (Hapalemur simus, Gray). A specimen of this animal was brought alive to England in 1878 by the Rev. G. A. Shaw, and of it he gives the following particulars:—

"This one was caught and chained up last January. It came from the higher-level forests on the eastern side of the Betsileo, among the bamboos, on which it appears in a great measure to subsist. Its teeth are different from those of any other kind of Lemur with which I am acquainted. It has the few, sharp, outwardly inclined teeth in the lower jaw in the front common to all Lemurs, and which they use as scrapers, and not to bite with. Besides these, nearly all its teeth are serrated cutting-teeth, and are arranged, not in opposition, but so as mutually to intersect. In this respect it is admirably accommodated to suit the country in which it lives, since with the greatest facility it can bite off the young shoots of the bamboo, and mince up a whole handful of grass blades and stalks at once, each bite cutting clean like a pair of scissors. Like very many grass-eating animals, it seems to feed nearly all day long. For several months I had this one chained on the lawn, and it scarcely
ceased gathering the grass within its reach and eating it from morning till evening. It is also unlike other Lemurs in its dislike of fruit. I have tempted it with very many different kinds of berries and fruits growing in the forest, but it would not touch any of them. It is very fond of cooked meat and also of sugar-cane; and it was owing to its desire for sugar that it has been coaxed to eat cooked rice, which is now its staple food. It is furnished with a remarkably broad pad on each of the hinder thumbs, by means of which it is enabled to grasp firmly even the smallest surfaces. Unlike most other Lemurs, its head is very round, although the female has a somewhat more pointed snout than the specimen now in the Society's Gardens. Its cry is very peculiar, at times resembling the quack of a duck, at other times loud and piercing. Its tail is long, but not very bushy.”

17. **The Grey Gentle Lemur** (*Hapalemur griseus*, Is. Geof. St.-Hil.; *Lemur griseus*, Geoff.; *Hapalemur griseifrons*, Is. Geof. St.-Hil.). Of this species M. Pollen gives an interesting account, which I shall translate and quote in full; it is as follows:—

“This little species, which the north-western Malagasy call *Bokombolo*, prefers the bamboo woods for its abode. I have found it at some distance from the coast, on the banks of the River Ambasana. The natives had so often spoken to me of these animals that I could not resist the desire to go and observe them myself. The Tankarana, who only could guide me to the place, however, made a thousand objections, saying that it would be very difficult for a European to hunt in the bamboo woods; that he would tear his clothes at every step; that he would be constantly wounded by the spines and sharp-pointed leaves of the bamboos; that it was very far to go, and that I should fall ill on the way; in short, that the road would be impracticable for a foreigner. But I at last succeeded, by giving them small presents, in persuading them to conduct me to the places frequented by these animals. I set out on Nov. 2, 1864, at early morning, accompanied by two Tankarana of Ambatorángana, for Tánimalándy, a region where one finds forests of bamboo inhabited by these little Lemurs.* After a difficult march of several hours we reached a dense bamboo wood, where I was able to kill several of these animals. I was obliged to crawl along on the ground, a style of travelling which gave me frightful pain in the loins, besides getting frequently wounded with the sharp points of the bamboo leaves.

“The Hapalemurs rest during the whole of the daytime, sleeping on the highest stems of the bamboos, their backs curved, with their heads placed between the thighs, and their tails over the back. They are entirely nocturnal in their habits, which, however, does not prevent them perceiving any enemy and saving themselves at the approach of the hunter. Their food consists of the young leaves of the bamboo, at least I have always found their stomachs filled with this substance. These animals are very sluggish during the day, but during the night they display an agility and activity almost incredible. Their cry consists of a little grunt, like that of a pig, but much less distinct. It appears that this species bears its young in the months of December and January. * Part of their native name, *bolo=volo*, bamboo, apparently refers to their habitat; the first portion of it, *boko* or *bokony*, is obscure.
once kept one of these little animals for some months in captivity. I fed him on bananas, mangoes, and cooked rice, but he would not touch the rice unless forced to do so by hunger. He had the bad habit of gnawing his tail, as monkeys do when kept in confinement. When any one held up his finger at him, he was very angry, showing his teeth and setting up a sudden grunting."

The general tint of the upper portion of the body of *Hapalemur griseus* is brown, passing, in some examples, to yellowish, in others to red, and brighter below the head than elsewhere; the tinting of the under parts of the body is grey, as denoted by its specific name.

18. **The Weasel-Lemur** (*Lepilemur mustelinus*, Is. Geof. St.-Hil., 1854). The genus to which this animal belongs is characterized by a total want of incisors in the upper jaw. This species, to which the natives of the north-western parts of Madagascar give the name of *FitiHy*, presents much similarity, as regards both form and habitat, to the *Cheirogaleus furcifer*, yet to be described, since it inhabits the forests both of the western and eastern sides of the island, it is nocturnal and lives in hollow trees, and is about two feet in length, the tail being quite the longer half of its whole dimensions. It is often seen in company with the *Cheirogaleus*. These animals are said to be more stupid and sluggish than the Lemur just described, the *Bokombolo*, and the Malagasy assured M. Pollen that they sometimes kill them during the daytime by strokes of a stick, and that they eat their flesh. Their food consists of the flowers, buds, and leaves of trees, as well as certain fruits.

19—21. The second species of the genus *Lepilemur*, *L. ruficaudatus*, is described by M. Grandidier as including three varieties: (1) the **Red-tailed Weasel-Lemur** (type), (2) the **Pale-tailed Weasel-Lemur** (*L. ruficaudatus*, var. *pallidicauda*), and (3) the **Ridged Weasel-Lemur** (*L. ruficaudatus*, var. *dorsalis*). In habits they probably differ but little from the first species described.

The six remaining species of the Lemuridae include the smallest and prettiest of the Lemuroid animals. Until recently they were all included in one genus, *Cheirogaleus* (the *Microcebus* of some naturalists), but MM. Milne-Edwards and Grandidier have more recently seen reason to form two new genera for two of them, which they have named *Phaner* and *Mirza* respectively, as will be seen. These six species have long bushy tails, and are somewhat squirrel-like in appearance. But a very interesting fact about them is that they all hibernate, like our English Hedgehogs, Dormice, and Bats, as well as many reptiles and not a few insects. At the approach of the cooler season of the year, having previously stored up in their bodies, especially in their long tails, a supply of fat, they retire to their nests in hollow trees, and curling themselves singly up, sleep away several weeks until the hot weather returns again. The fat is slowly absorbed; and the blood sent out of the heart is not entirely the bright scarlet and oxygenated fluid of ordinary times, but is largely mixed with the impure darker blood from the veins; so that when the animal arouses from its sleep, it is thin and lean, and its tail is miserably attenuated. They all appear to be nocturnal in their habits, and the eyes are large and beauti-

*Xeir, hand; gale, weasel.*
fully adapted for seeing in the twilight, and they pounce upon their prey, insects and even small birds, with wonderful celerity.

22. The Fork-crowned Mouse-Lemur or Cheirogale (Phaner furcifer, Grand.; Cheirogaleus furcifer, Is. Geof. St.-Hil.; Lepilemur furcifer, G. R. Gray;* Microcebus furcifer, St.-G. Mivart.† This pretty species is found in abundance in the forests of the western parts of Madagascar, and it also appears to inhabit the eastern side of the island, whence specimens have been sent to Europe. Its total length is from 24 to 25 inches, of which the tail is from 14 to 15 inches. The lower parts of the body are white, passing into reddish yellow; while the general tint of the rest of the body is yellowish or reddish-grey, passing insensibly into black. There is a black or dark-brown line on the back, along the spine, and this, passing over the head, divides or forks in two bands, one over each eyebrow, from which peculiarity comes the name of the species, and the end of the tail is blackish; the ears are bare, and the eyes large and beautiful.

These little animals are accustomed to go out from their hiding-places only by night, for they sleep throughout the day; and for security they prefer hollow trees, having two openings, for their nests. It often happens that these hollows are occupied at the same time by bees, in which case, the Valovy, by which name this Lemur is known to the Malagasy, partition off the part occupied by these insects from their own nest by a little fence of straw and dry leaves. The natives say that this Lemur prefers the society of the bees, in order to steal their honey, of which it is very fond. Whatever may be its liking for honey, it has the means of biting hard fruit, for it has large middle front teeth, and also strong upper first molars. As a whole, the teeth are in number the same as in the first division of the American Monkeys. Besides its name of Valovy, by which this Lemur is known among the Tankarana at the extreme north of Madagascar, it is also called Tantaroalela by the Sakalava, on the western side of the island. It is said to hibernate in the hollow trees, in which it sleeps by day.

M. Pollen says: "I have observed these graceful little Lemurs at night, but it is extremely difficult to obtain one of them. They are much more nimble and agile than the ordinary Lemurs, and they make astonishing leaps. Their cries, which they utter continually during the night, are very abrupt and resemble the syllables ka-ka-ku-ku, having some resemblance to the piercing cries of the Guinea-fowl. As I have already said, the hunting of these Valovy is very difficult. One evening I determined to set out by moonlight in pursuit of them. To effect this, I set off with my Tankarana servant Zoje, before twilight, towards a clearing in the forest, near an encampment. My attendant made expeditions like this very unwillingly, because these places abound with mosquitoes, whose stings are followed by tormenting irritation. As for myself, I was somewhat fortified against their attacks by a thick overcoat, which I was accustomed to wear on such occasions, while the Malagasy, with their thin and scanty clothing, are quite unprotected against these plagues. On our way my trusty servant kept on saying: 'It is bad hunting Valovy, Sir, for there are plenty of mosquitoes.' There

are undoubtedly plenty of mosquitoes in such localities, but as I was very desirous to obtain one of these animals and to study their habits, what he said did not cause me to turn back.

"The moon was already shining brightly when we arrived at the place, where we remained, standing under a tree, for an hour or more before one of the Lemurs I wanted made its appearance. At first I could only hear their piercing cries above my head, without being able to distinguish the animals from which the noise proceeded. My native guide, who was standing, stamping his feet like a horse from the torture of the mosquito bites, suddenly said to me: 'I see them!' What he saw, however, was only the tail of the noisy crier, which I had also noticed for some minutes, taking it all the while for the stem of a liana swaying to and fro in the wind, and so had not paid much attention to it. But I had hardly prepared to seize it, when the animal, perceiving my movements, leaped to a neighboring tree. Following it as closely as I could with my eyes, I presently lost sight of it, and I all I could do was to fire into a clump of foliage, into which I saw it disappear. Hearing my native exclaim 'ambány!' ('on the ground!') I felt sure I had killed one, as was indeed the case. But as the tormenting stings of the mosquitoes prevented me from remaining quiet for more than an hour in this unpleasant style of hunting, I did not obtain another of these animals, although I frequently went to the same spot in hope of shooting a few more of them."

23. Coquerel's Mouse-Lemur or Cheirogale (Miura Coquerelii-Grand.; Cheirogale Coquerelii, Is. Geof. St.-Hil.; Microcebus Coquerelii, St.-G. Mivart). "This species," says M. Pollen, "new to science, was, discovered by us in the north-western parts of Madagascar. I have dedicated it to my excellent friend Dr. Charles Coquerel, since deceased, in remembrance of the kindness he showed to me during my stay in Réunion. This little animal inhabits the most impenetrable forests. It is accustomed to make its nest, of a foot and a half in diameter, of straw and twigs and dead leaves, in which it reposes during the day. It only goes out towards the evening, in order to search for food, which is the same as that of the Fork-crowned Lemur just described, and of Lepilemur mustelinus, that is to say, live insects and fruit. The unique specimen I was able to procure had been killed in the province of Kongony, in the neighbourhood of the Bay of Ampasindava, where it is known by the natives under the name of Sietui (?)."

24. The Brown Mouse-Lemur, or Larger (Milius's) Cheirogale (Cheirogaleus major=Miliii, Geof.). "M. Milius, who was Governor of the Island of Réunion in 1821, gave a pair of little Lemuroids, each being about nine inches in length, with a long tail, to the Jardin des Plantes, at Paris. They lived there for some time, and used to get out of their cages at night and wander about the rooms and places where the animals were confined. At dusk, after having been very quiet all day, they got up and stood well on their hind legs, and began to jump to and fro like mad creatures, and they kept it up when quite dark, for they could be heard rushing about amongst a crowd of cages inhabited by other animals; but if the least light were admitted, they darted through a small hole which led to their own cage, and were there again
in the twinkling of an eye. They had beautiful silky fawn-coloured fur, and rolled themselves in balls during the daytime, for the light seemed to be specially painful to them. In their captivity they were fed on bread, biscuits, and fruit.”

The Lemur above described appears to be the same species as that which was brought (with others) alive to England in 1878 by the Rev. G. A. Shaw,† and of which he gives the following particulars:—

“This small and highly interesting animal was caught in November, 1877, since which time it has lived in a small box, and has been allowed a little exercise about the room each night. It is nocturnal in its habits, and its food consists of fruits and possibly honey; of this there is abundance in the forests on the eastern side of Betsileo, from the lower parts of which the animal was brought. The specimen is full-grown, about seven or eight inches in length, has a pointed snout and very prominent eyes, large ears, and round rat-like tail, which is not prehensile. It is of a brownish-grey colour, approaching to white on the under parts. Its four legs are almost equal in length, thus rendering it difficult for this Lemur to leap any considerable distance, as the majority of species can. It runs on all-fours, but sits up to eat, holding its food in the fore hands. I fancy that in the winter months in its natural state it hibernates, because in the beginning of last winter (that is, in June), after several nights’ good exercise, during which time it had the opportunity of eating as much banana as it chose to take, I was astonished in the evening, on opening its box, to find it still asleep and quite cold to the touch. At first I thought it was dead, but by holding it near a fire and rubbing it, it gradually awoke, and when thoroughly warmed, appeared none the worse in health. This happened two or three times, and without any apparent cause, as there was no ill-health, nor was the weather particularly cold. From this fact, and from the sudden and unnatural enlargement of the tail, which unfortunately still continues, I presume, had it been in its native forests, it would, under the same circumstances, have slept through the winter. It makes a nest of leaves or dry grass by carefully scooping a hollow big enough to contain itself, and then, after getting in, covering itself with the loose leaves or grass. The native accounts also confirm my opinion with regard to its hibernation; they say that it hides in the hollow trees in the winter.

“It appears to be a very uncommon animal, even in Madagascar, as this is the only specimen I have been able to obtain, although I kept a man in the forest for two months seeking for one, after I had obtained this one. Of course the fact of their sleeping all day and only feeding at night adds to the difficulty of catching them. It was easily tamed, and proved very affectionate; it comes when called by name, and enjoys being fondled and rubbed.”†

25—28.—Four other species of these small and pretty Mouse-Lemurs or Cheirogales are given by M. Grandidier in his list of Madagascar Mammals, namely, the Medium Cheirogale (Cheirogale medius, Is. Geof. * Cassell's Nat. Hist. (new ed.), vol. i., p. 235.
† Unless indeed the species described by M. Milius is identical with Coquerel's Lemur (23), or is one of the other Cheirogales.
THE MAMMALS OF MADAGASCAR:

St.-Hil.—Samati), the Dwarf Cheirogale (C. minor=murinus et pusillus:=nain), the Myoxine Cheirogale (C. myoxinus), and the Hairy Cheirogale (C. trichotis). Of these little appears to be known very definitely as regards each species, and I am a little doubtful whether the following description by Mr. G. A. Shaw is that of the Medium or of the Dwarf Cheirogale. On the whole, it seems most likely to refer to the latter. Mr. Shaw says:—

"This is another species of nocturnal animal, and is the most diminutive Lemur with which I have become acquainted. They inhabit a belt of forest-land stretching from the eastern forest into the heart of Betsileo, a few miles north of Fianarants'oa, where they are tolerably abundant. They live on the tops of the highest trees, choosing invariably the smallest branches, where they collect a quantity of dried leaves, and make what, from below, looks like a bird's nest." So close is the resemblance that it requires good eyes to distinguish one from the other.

"Their food consists of fruit and insects and most probably honey. I have frequently seen them catching the flies that have entered their cage for the honey; and I have supplied them with moths and butterflies, which they have devoured with avidity. They are extremely shy and wild. Although I have had between thirty and forty caged at different times, I have never succeeded in taming one. They are also very quarrelsome and fight very fiercely, uttering a most piercing penetrating sound, somewhat resembling a very shrill whistle.

"Their teeth are very minute, but exceedingly sharp; and when they bite, they hold so tenaciously that it requires a good shake and knock to make them let go. These Lemurs can leap better than the Brown Mouse-Lemurs, but still their usual mode of progression is on all-fours; and when running up any branches which they can grasp with their hands, they are very nimble indeed, very much more so than when on the ground. They are very strong on their hind legs and hands. I have often seen them swing themselves down from their perch holding by the hinder hands, grasp their food in the two fore hands, and then gradually draw themselves back again into their former position on the perch. In this they are assisted by the tail, but only as a balance, and not as an additional grasping member. And although the tail is of considerable assistance when stretching out from one branch to another, by being partly twisted round the branch, it is certainly not prehensile in the same way as some monkeys' tails are. Their eyes are large and brilliant, their ears large, and their hands beautifully perfect, with ordinary-sized nails on each finger, except the second finger of the hind hands, which is furnished with the long scratching claw.

"They bring forth two, and sometimes three, at a birth; but I have had none breed in captivity."†

This dwarf species is sometimes called the Madagascar Rat, for it is only four inches long, with a tail of six inches. Not only is it interesting from its minute size, but it is remarkable for its very resplendent eyes. "The tapetum, or coloured tinsel-looking glaring structure situated deeply in the eyes, is so large, and the eye admits so much light at dusk, that quite an unnatural brilliancy is produced."

* One account says that these nests are like that of the Crow, and consist of interlaced twigs, in the midst of which there is a depression, with a bed of hair for the young.

THE TRUE LEMURS.

"One of the Cheirogales has a black circle round the eyes, and is hence called the Spectacled Cheirogale; and it is interesting as being one of the species whose summer sleep has been noticed, and because it has an extremely important tail. This tail thickens at the root, and tapers towards the end, not being cylindrical throughout, and it is the tail which gets grossly fat and finally excessively thin."

It may be noticed, in conclusion, that the Cheirogales are the only Madagascar Lemuroids which are closely allied, as regards structure and form, to the African kinds. They have indeed much in common with the Galagos of Africa, and can be easily distinguished from the Propitheque, Indris, and Avahy Lemuroids. In both groups there is the long heel- or ankle-bone, they have the same number of teeth, and in both genera there are four teats or mamme, two on the breast, and two on the groin. They have no furry ruff or ear-tufts, and their brain is more triangular in shape than that of any other of the Lemuroidea.

Before leaving this family of living Lemurs, it may be mentioned here that recent research in Madagascar has brought to light the remains of an extinct species of Lemuroid animal of much larger size than any living species. At present this creature, which appears to have been about three times the size of the largest living Lemur, is only known to us by an imperfect skull and lower jaw. These remains were obtained by Mr. J. T. Last in a marsh at Ambólisàtra, near the south-coast, beneath a stratum of white shelly marl about two feet in thickness; they have been determined by Dr. C. J. Forsyth Major to belong to a gigantic form of fossil Lemuroid, related to the extinct genus Adapis, as well as to existing Lemuroids. Dr. Major names this new form Megaladapis madagascariensis; see Annual XVIII., p. 136.

(To be continued.)

JAMES SIBREE (Ed.).

APPENDIX TO CHAPTER IV.—TABULAR ARRANGEMENT OF MALAGASY MAMMALS.

ORDER I.—PRIMATES.

SUB-ORDER LEMUROIDA: LEMUR-LIKE ANIMALS (concluded)

FAMILY LEMUROIDÆ: TRUE LEMURS.

<table>
<thead>
<tr>
<th>English Name</th>
<th>Scientific Name</th>
<th>Malagasy Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable (or Ruffed) Lemur</td>
<td><em>Lemur varius</em> (typicus, Geoff.)</td>
<td>Vārikândana, Betšim.</td>
</tr>
<tr>
<td>(type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Lemur</td>
<td><em>Lemur varius</em>, var. ruber</td>
<td>Varikândana, Betšim.</td>
</tr>
<tr>
<td>Macaco or Black Lemur</td>
<td><em>Lemur macaco</em> (L.); <em>L. niger</em> (Geoff.); <em>L. leucomystax</em> (Bartl.)</td>
<td>Akomba, N. Tunk.</td>
</tr>
<tr>
<td>Mongoose-Lemur (type)</td>
<td><em>Lemur mongoz</em> (typicus, L.)</td>
<td>Gidro, Akomba, N.W.</td>
</tr>
<tr>
<td>English Name</td>
<td>Scientific Name</td>
<td>Malagasy Names</td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------------------------------------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>Collared Mongoose-Lemur</td>
<td>Lemur mongoz, var. collari's (Gray)</td>
<td></td>
</tr>
<tr>
<td>Black-fronted Mongoose-Lemur</td>
<td>Lemur mongoz, var. nigrifrons (Geoff.)</td>
<td></td>
</tr>
<tr>
<td>White-fronted Mongoose-Lemur</td>
<td>Lemur mongoz, var. albifrons (Benn.)</td>
<td></td>
</tr>
<tr>
<td>Red-fronted Mongoose-Lemur</td>
<td>Lemur mongoz, var. rufifrons (Benn.)</td>
<td></td>
</tr>
<tr>
<td>Ashy-crowned Mongoose-Lemur</td>
<td>Lemur mongoz, var. cinericeps</td>
<td>Probably all are known by the names Gidro or Akomba</td>
</tr>
<tr>
<td>Red-footed Mongoose-Lemur</td>
<td>Lemur mongoz, var. rufipes</td>
<td></td>
</tr>
<tr>
<td>Intensely Black Lemur</td>
<td>Lemur nigerimus</td>
<td></td>
</tr>
<tr>
<td>White-handed Lemur</td>
<td>Lemur albimanus</td>
<td></td>
</tr>
<tr>
<td>Crowned Lemur</td>
<td>Lemur coronatus (Gray)</td>
<td></td>
</tr>
<tr>
<td>Red-bellied Lemur</td>
<td>Lemur rubriventer (Is. G. St.-Hil.)</td>
<td></td>
</tr>
<tr>
<td>Ring-tailed Lemur</td>
<td>Lemur catta (L.)</td>
<td>Gidro, Ambonââla</td>
</tr>
<tr>
<td>Broad-nosed Gentle Lemur</td>
<td>Hapalemur sinus (Gray)</td>
<td>Varikâs, Sak.</td>
</tr>
<tr>
<td>Grey Gentle Lemur</td>
<td>Hapalemur griseus (Is. G. St.-Hil.); Lemur griseus (Geoff.)</td>
<td>Varikosy, Sak., Bôkombólo, N.W.</td>
</tr>
<tr>
<td>Ridged Weasel-Lemur</td>
<td>Lepilemur mustelinus (Is. G. St.-Hil.)</td>
<td>Gidro, Fitiliky, N.W.</td>
</tr>
<tr>
<td>Red-tailed Weasel-Lemur</td>
<td>Lepilemur ruficaudatus (typicus)</td>
<td>Boëngé, Sak.</td>
</tr>
<tr>
<td>Pale-tailed Weasel-Lemur</td>
<td>Lepilemur ruficaudatus, var. pallidicauda</td>
<td></td>
</tr>
<tr>
<td>Ridged Weasel-Lemur</td>
<td>Lepilemur ruficaudatus, var. dorsalis</td>
<td></td>
</tr>
<tr>
<td>Fork-crowned Mouse-Lemur or</td>
<td>Phaner furcifer (Grand.); Cheirogaleus furcifer</td>
<td>Valôvy, Tanâ, Tantaraoléla.</td>
</tr>
<tr>
<td>Cheirogale (or Cheirogale)</td>
<td>(Is. G. St.-Hil.)</td>
<td>Sak., Tantana, Honândro</td>
</tr>
<tr>
<td>Coquerel’s Mouse-Lemur or</td>
<td>Mirea Coquerelli (Grand.); Cheirogaleus Coquerelli (Is. G. St.-Hil.)</td>
<td>Vârika, Sisiba, Tsitsihy, N.W.</td>
</tr>
<tr>
<td>Cheirogale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Larger (Milius’s) Cheirogale</td>
<td>Cheirogaleus major (=Milius), Cheirogaleus media (Is. G. St.-Hil.)</td>
<td>Tsidy, Tsidika, Valôvy</td>
</tr>
<tr>
<td>(Brown Mouse-Lemur) Medium</td>
<td>Cheirogaleus media (Is. G. St.-Hil.)</td>
<td></td>
</tr>
<tr>
<td>Cheirogale Lemur</td>
<td>Cheirogaleus minor (=murus et pusillus)</td>
<td>Sisiba, Tsitsihy</td>
</tr>
<tr>
<td>Dwarf Cheirogale Lemur</td>
<td>Cheirogaleus myoxinus</td>
<td>Tsitsily, Sak.</td>
</tr>
<tr>
<td>Myoxine Cheirogale Lemur</td>
<td>Cheirogaleus tricholis</td>
<td></td>
</tr>
<tr>
<td>Hairy Cheirogale Lemur</td>
<td>Cheirogaleus myoxinus</td>
<td></td>
</tr>
</tbody>
</table>

**Family Cheiromyidae: Ayeayes.**

Aye-aye | Cheiromys madagascariensis | Haîhay, Aiay, Ahay (Betsim.)

*Note.—The following names are also given to certain species of Lemur (or Lemuroids): Bandro, Hâlobè, Hâlokôhôhina, Šamira, and Tsidikinijospéro, but I cannot identify them by their scientific names. Can any one give me this information?—J.S. (Ed.)*
OHABOLANA,

OR

WIT AND WISDOM OF THE HOVA OF MADAGASCAR, PART II.

(Continued from ANNUAL XVIII)*

III. Righteousness and Wickedness (concluded).

FAULTS AND IMPERFECTIONS.†

136.—Tsy misy mahita kilema momba tena.

None sees his own blemishes.

137.—Aza manafin-kilema momba tena.

Don't hide your own faults.

138.—Ny vilany nandraloana no efa nipoaka.

It's the pot that boiled (the meat) that's burst.

139.—Ny lalambe no miolika, ny tanim-bomanga.

The road winds about because of the sweet-potato fields.

An excuse or explanation. Paths are turned about in all directions according to the caprice of the husbandman.

140.—Tsoha no lavo niherika anao.

I stumbled because of looking back at you.

141.—Akondro no.jinjana hariva aho: ka raha tsy malazon' ny alina aza, mantasaky ny alina.

I'm a banana-tree cut down in the evening: if I'm not withered by night, I shall be by midnight.

142.—Toy ny saon.fo z'ray lolzasaha, ka tsy ilaozan' izay mamarara.

Like a field of arum; there's sure to be some speckled.

There's sure to be some black sheep amongst many others.

143.—Lambo soso-nify ka rentim-paharazana.

A hog with a double tooth: it came from his ancestors.

Lit., carried by, or brought from. Not my fault, but my ancestors'.

144.—Manasa lamba be tseroka; na madzo aza, mangarahara.

Washing a very dirty dress; though it's clean, it becomes full of holes.

There are faults anyhow.

145.—Ny akoho novonoina no mody latsa, ary ny alao no tonga adidy.

The fowl killed becomes a reproach, and the thing done blameworthy.

146.—'Veloma' tsy mba adidy, sakafo lany tsy mba andraikitra.

'May you live' isn't blame, a meal eaten isn't guilt.

147.—Tsorakazo noladz'nz'm-bitsz'ka: lofoso.foana, fa ny tenany be efa marazoka.

A twig climbed upon by ants: they bend it little, but its stem is pretty.

Lit., its bulk, or the body of it, is well formed. A little evil, but much good.

148.—Sotroben-dRatsiavanga: sady fikapohana akoho no fangaroana anana.

Ratsiavanga's big spoon: it beats the fowls and stirs the greens.

149.—Miandrty ondry zato, miambina omby arivo; ka tsy ilaozan' izay mania.

Watching a hundred sheep, minding a thousand oxen; some are sure to go astray.

Compare Nos. 1206-1208.

* For Introduction and first part of these articles, see last ANNUAL, pp. 188-204.
† See also Nos. 219, 227, 447, 448, 1626-1668.
282

OHABOLANA, OR WIT AND WISDOM

150. — Ny tsiny toy ny rivotra : mikasika ny tena, fa tsy hita tarehy.
Blame is like the wind : felt but not seen.
Lit. touches the body, but not seen as to its face.

151. — Tandra vadin-koditra.
A mole is wife to the skin.
Said of natural defects or of seemingly inseparable moral ones.

152. — Raha tsy manao be fondro, manao be tsiny.
Not much blame, yet many faults.

153. — Toko tapaka, vilany mitongilana; ka izay tsy mety arenina.
A broken trivet, a pot on one side; what's wrong can be put right.

Suet covered with soot : although it smells sweet, it's bitter.
Applied to a person who may have changed for the better. Though he does good now,
his bad deeds are remembered and he is more or less mangidy koditra, 'of a bitter
tasting skin,' i.e., distasteful, offensive.

155. — Tongolo maty taho, ka be fofona amin' ny tany.
Onions with dead stalks cause a great smell in the ground.
Bad deeds emit an offensive odour.

156. — Aza atao fanaky manan-tsiny amin' izay kiakiak' akoho.
Don't blame the axe when the fowls cry out.
The instrument of death is not to blame, but the one who uses it.

157. — Sobiky rindra notampenan-kerana, ka ny azy fanaky inany.
A thin rush basket with a thick rush top: it was what he intended.
So he can't complain of its grotesque appearance.

158. — Ny halavoana tsy mahalehibe.
Falling hinders growth.

IV. — Love and Friendship.*
UNION AND COMPANIONSHIP.

160. — Ny fihavanana tsy azo vidina.
Friendship cannot be bought.

161. — Ny fihavanana tahaka ny volon-kotona : hatonina, manalavitra; halavirina, manatona.
Friendship is like the pond-weed: if you come near, it goes away; it you
go away, it comes near.

162. — Ny fihavanana toy ny fasam-bazimba, ka izay mandrava aloha
no kely iha.
Friendship is like a Vazimba's tomb, and the first who destroys it gets
small on one side.
Also said to be "like the nest of the Tufted Umbre, and the first who destroys it be­
comes a leper." Compare No. 73.

163. — Ny fihavanana hoatra ny famoriana tain' omby : ka izay maha-
vezivezy no mahafeno harona aloha.
Getting friends is like gathering cow-dung: the more you go about, the
more you get.
Lit. whose can go hither and thither fills his basket first. Cow-dung is used for fuel,
particularly to heat and split the rocks, when large slabs are wanted for tombs.

* See also Nos. 587, 695, 8034, 2206.
164. — Ny fihavanana hoatra ny landy: maty isika, ifonosana; velona itaflana, ha ny madilana arahim-panondro.

Friendship is like silk: if we are dead, it is wrapped around us; living, we wear it; and the thin is followed by the forefinger.

I.e. to add to and improve it, as the weaver does with the forefinger and thumb the thin portion of the silk she is spinning. True friendship therefore should be strengthened. Compare Nos. 195, 213, 414.

165. — Ny fihavanana hoatra ny jiafotsy: raha vao, mikasaosaoka, raha tonta, misy romoromony.

Friendship is like a stiff cloth: when new, it rustles (nicely), but when old, it is full of rents.

A tit-bit for the pessimists. The jiafotsy is a coarse rough cloth made from the leaves of the Roña palm. Being stiff, it does not readily adapt itself to the person of the wearer, but soon becomes limp and is then the more readily spoiled.

166. — Ny fihavanana toy ny rāty: raha henjanina, ta'aka; ary raha ketralzina, miboraka.

Friendship is like a bad rope: if pulled tightly, it breaks; if pulled lightly, it comes undone.

Rāty is the dry leaf of a kind of pandanus, made into a rope.

167. — Fihavanana' ny Mamoladahy: tsy mihavana roa taona.

Friendship of the Hen-pecked: it doesn’t last two years.

The Mamoladahy are a tribe west of the Capital, who are said to be governed by their wives, as the name implies.

168. — Ny fihavanana aza ataoao toy ny jiafotsy: intelo asampina, ka miovotra hiany.

Don’t let your friendship be like stiff cloth: though thrice thrown over the shoulder, it still slips off.

Compare No. 265.

169. — Ny ahialzy tsy ilzavanana.

Distrust hinders friendship.

170. — Maloiom-pihavanana va hianao? Are you sick of friendship?

171. — Aleo very tsikalakalan-karena toy izay very tsikalakalam-pihavanana.

Better lose a little money than a little friendship.

172. — Ny tsikalakalan-karena manam-pahalaniana, fa ny tsikalakalam-pihavanana tsy manam-pahalaniana.

The little things and acts which preserve wealth fail, but those which preserve friendship fail not.

173. — Toy ny jaka: tsy hanin-kahavoky, fa noson-kena mitam-pihavanana.

It is like the jaka: not enough to satisfy, but enough to retain friendship.

Lit. not food to fill, but meat to hold fast friendship. The jaka is a piece of meat presented by friends to one another at the Annual New Year’s feast called the Fándrona. Compare No. 1337.

174. — Ny voky tsy mahaleo ny tsaroana.

A good belly-full doesn’t equal a kind remembrance.

175. — Fitia mifamaly mahatsara ny fihavanana.

Love returned promotes friendship.

176. — Fitia tsy mivaly mahafohisohy saina.

Love not returned hinders friendship.

Lit. makes little, or discourages, the mind.

177. — Ny havan-dratsy tsy mahaleo ny sakaiza tiana.

A bad relative doesn’t equal a beloved friend.

The word havana’ is used interchangeably for ‘relative’ and ‘friend.’
178.—Tantanam-by sy tsofa vy: havana mpanjary havana.
An iron hammer and an iron file: one friend makes another.
Compare Prov. xxvii, 17.

179.—Tsy misy tombo sy hala; fa ny iray vy nahitana, ary ny iray angady nananana.
There is no difference; for one is the iron by which it was found; and the other the spade by which it was obtained.
I.e. wealth or possessions of any kind. Said of mutually helpful friends or relatives.
Lit. excess or hatred is a thing which causes diminution.

180.—Ny kary asa mitsoka amin' Andriamplatsa mahazo, ka indri­ndra fa ny havana.
Even the wild-cat that begs of Lord Shrimp gets (something), much more then the friend.
Compare Matt. vii. 11.

181.—Anao aho ka mora; fa raha an' olona aho, dia sarotra.
I am your's, so I am kind; but if I were another's, I should be hard.

182.—Atody tsy afindra reny; ro tsy afindra vilany.
An egg not removed to another mother; broth not removed to another pot.

183.—Mpisakaiza toa mpiombon-dray; mpifankatia toa mpiombon-dreny.
Friends are like those who have one father, and lovers like those who have one mother.
I.e. they are brother and sister.

184.—Raha revom-potaka, rano no manala; raha revon-teny, vava no manala; raha revon' alahelo, havana no itarainana.
Get into the mud, water will remove it; get into a dispute, the mouth will get you out of it; be overtaken by sorrow, you can appeal to your friends.

185.—Nyfo tsy mandrz'nga, ka raha mandalo alzo mtsaz'ka hz'any.
The heart isn't lame, so when I pass, I give a look in.
There may have been a little difference between them, but the heart is still sound and moves its owner to look in on an old friend.

186.—Ny fo tsy mandringa, ka raha mandalo aho mitsidika hiany.
The heart isn't lame, so when I pass, I give a look in.

187.—Izay hay'az'na tsy ho andri'ana tsy akory, ary izay manaja tsy ho andevo tsy akory; ka tsara ny mifanajav.
Receiving honour won't make you a noble, and giving honour won't make you a slave; so it is well to honour one another.
Compare No. 1783.

188.—Zavariz'ny fitia manan-tombo, ka intelo no miaraha.
To be too much in love and give a treble salutation.

189.—Nahaona no ho tia vao ka manary kolokolo?
Why do you say you love him, yet begin to desert him?
Lit. leave, or throw away, the after-growth of rice.

190.—Tia hiany ka be maio.
You love, yet are too shy (reserved.).

191.—Mody tsy tia, koa lefaka.
You pretend dislike, yet are still obedient.

192.—Longo ratsy tsy menatra izay hitsoriaka.
A bad friend is not ashamed of slipping away from his friendship.

193.—Mifankatia amin' amalona: ka nony sendra tia, nobolotany.
An eel's friendship: it slips away just when you begin to like it.
OF THE HOVA OF MADAGASCAR.

194.—Try ny varotra no taloha, fa ny fíhavenana.

It wasn't business that was first, it was friendship.

195.—Atoavy fitia landihazo : ka ny madilana tentenana, ary ny maito tohizana.

Love me as you do cotton : add to the thin, and re-join the broken.

Be kind and gentle ever. Be as patient with me as you are with the cotton you are weaving. Compare No. 164.

196.—Atoovy fíhavenam-bava sy tanana : koa raha marary ny tanana, dia mitsoka ny vava, ary raha marary ny vava, dia misafo ny tanana.

Let your friendship be that of the mouth and the hand : if the hand is hurt, the mouth blows it, and if the mouth is hurt, the hand strokes it.

197.—Ny havana atoovy toy ny andry ombiz'lay mora : ny aloha (1) voasafosafy, ary ny aoriana (2) voatehatraka.

Treat your friends as the kind herdsman does his oxen : the foremost are stroked, and the hindmost patted.

1 Or, kity=little. 2 Or, lehiko=big.

198.—Aza atao fitia voangizivy, mbola lavitra hiandy ka kivy.

Don't love me as you do the bramble-bush,* and be in fear while yet far off.

199.—Atoovy fitia voamfo : mbola lavitra hiandy dia ampoizina.

Love me as you love the vóamfo :† look out for me while yet far away.

Both these proverbs contain a play on words, as will be readily seen.

200.—Atoavy fitian-dranon' en'ka : madiz't'm-pz'ady, fa mahatondrano.

Let your love be like misty rain : little in coming, but flooding the river.

The rains often come down in perfect torrents on the uplands of Madagascar, but these sometimes fall over a limited area and last at most for a few hours of each day. It is not those that usually cause the rivers to rise and overflow their banks, but the misty rains, that are pretty general and often continue for several days together. Compare No. 1244.

201.—Aza misaitay, toy ny fitia tsy ho ela.

Don't be in a hurry, like love that won't last.

202.—Aza manao fitia rano trambo : be fíhavy, ka mora lasa.

Don't let your love be like a summer torrent : much at first, but soon gone (or, soon coming and soon going).

Compare Nos. 200, 1244.

203.—Aza manao fíhavena-molotra : tezitra vao mifanatona.

Don't show lip-love and be angry before you come together.

204. — Aza manasakaiza vahiny.

Don't make friends of strangers.

205.—Aza manao fitia paraky, ka hatreo am-bava no ho miakatra hiany.

Don't love me as you do tobacco, from the mouth and upwards only.

Tobacco is taken in the form of snuff, not sniffed up by the nostrils, but kept in the mouth between the front teeth and gums. See Chap. vii.

206. Aza manao fíhavenan' amboa, ka taolana iray no isarahana.

Don't make it a dog's friendship, to be broken over a bone.

207. — Aza mandalo tanána misy havana.

Don't pass by a place where there's a friend.

208. — Aza manao fitia mifono avona.

Don't let your love be wrapped up in pride.

* Voangivy, a species of Solanum. † Solanum indicum, L.
209.—Aza asesiky ny fitia tanteraka, ka tsy mahalala ny ranonorana ho avy.
Don't be so much in love that you can't tell when the rain is coming.
Compare No. 1752.

210.—Aza tsy tia olona, fa ny olona no harena.
Don't dislike people, for they are wealth (i.e. the means of getting it).

211.—Aza kely fisian-kavana loatra.
Don't have too few friends.

212.—Aza manao an-tohim-bato amin-kavana.
Don't be too ready to break with your friends.

213.—Aza atao fihavanam-bato, ka raha tapaka, tsy azo atohy; fa ataovy fihavanam-dandy, ka raha madilana, azo tohizina.
Don't let your friendship be as a stone which, if broken, can't be joined together again; but let it be as silk which, if too slender, can be added to.
Compare Nos. 164, 195.

214.—Aza manao fihavanam-kerana, ka tomany handratra ny sasany.
Don't have the friendship of rushes and try and injure others.
Lit. cry out; from the sound the papyrus reeds make in rubbing against each other.

215.—Aza mila lolot' amalona aman-kavana.
Don't be on the look-out for a friend's faults.
Lolot' amalona signifies the wriggling of an eel, hence, any crooked way.

216.—Aza manao sakazza manody.
Don't prove a false friend.
Lit. a friend who retaliates, injures.

217.—Aza atao fitia varavarana, tiana hiany, fa atotosika.
Don't love me as you do a door, liked, but pushed to and fro.

218.—Aza ny havana no asian-dratsy, fa tsy ho tra tran' ny hafa tsy akory.
Don't do wrong to a friend or relative, for you won't get another.

219.—Aza mifanadidy, fa ny havanao tsy mahasora-tena toa voa-tango.
Don't blame one another, for your friend can't mark himself like a cucumber.

He isn't really responsible for what he is. He didn't make himself; therefore bear with him. A good specimen of the way in which the natives make a ready but senseless excuse.

220.—Aza manao arahaba mamba: tsy fitia, fa tahotra.
Don't salute a crocodile: it isn't love, but fear.
Don't fear me, but love me. Compare No. 810.

221.—Aza sarotra ihamboana toa havan-dratsy.
Don't make yourself difficult to boast of, like a good-for-nothing relative (or friend).

222.—Havako raha misy patsa; fa raha lany ny patsa, havan-tetezina.
He is a near relative while there are shrimps (to be had); but when they are done, he is only a distant relative.
The little fresh-water shrimps that abound in the rice-fields and shallow streams are considered a delicacy and eaten as a relish with the rice.

223.—Raha voatohina ny aty, marary ny afero.
If the liver is poked, the gall-bladder feels it.
A favourite proverb, like No. 1026.

224.—Aza manao tsinay homana aty.
Don't let the entrails eat the liver.
Analogous to the foregoing.
225. — Aza atao fivelv amponga ny havana : ka ny iray anabaviny tambazasana, ary ny iray kosa anahinny hodabodabohana.
Don't serve your friends as you do the ends of a drum: gentle to the one, and rough to the other.
Lit. don't let friends (or relatives) be struck like a drum; the female end, i.e. the treble end, being touched lightly, and the male end, i.e. the bass end, struck heavily.

226.— Raha mihavana aminay, aza milela-tanana.
If you are friendly with us, don't lick your hands.
Perhaps said by sellers of honey, who wish their friends to give no evidence of their being interested parties.

227.— Aza misoroka adidy ka tsy manan-tiana.
Don't shirk responsibility and have no one beloved.

228.— Raha soasoa no ataon-drahavana, izaho irery mahatan-kady vory, roa lahy mahasakana arivo.
If it's good that my friend does, I alone can hold the ditch (or fosse), and two men can stop a thousand.
Old villages and homesteads in the central provinces were always defended by deep fosses, and the narrow pathway across could be easily held by a few resolute defenders.

229. — Lajim-bato, vato; lajin-kazo, hazo; lajin-kavana, havana.
The side of a stone is a stone; the side of wood is wood; the side of a relative (i.e. a distant relative) is a relative.

230.— Ny amboa aza atao noho ny malala.
Don't let a dog be preferred to a beloved one.

231.— Mafanafana, hoatra ny latza ataon-kavana.
Rather warm, like the reproach of a friend.

232. — Tsy tia ka manaratsy.
Dislike brings abuse.

233. — Tamam-panomo manambitamby; vava mitezitra mpamalifaly.
Accustomed to strike hard, he (now) pats gently; the scolding tongue (now) makes joyful.
A pleasant change.

234. — Ny maty aza te-ho maro.
Even the dead wish to be many.
The Malagasy are a very sociable people, and their desire for the company of their fellows follows them to the grave. Thus the occupants of the family tomb are said to be ever seeking additions to their numbers; and should any relative die at a distance and be buried in a temporary grave, it is believed that he cannot rest until he is charitably disinterred and carried to the last resting-place of his own kith and kin. [A large family grave near Ambôhimanga is called Befilana, i.e. 'many desires' or 'desiring much.']

235. — Mita be tsy hanin' ny mamba.
Cross in a crowd, the crocodile won't eat you.

236. — Asa vadi-drano, tsy vita tsy ifanakonana.
You can't dig ground under water unless you do it together.
Lit. turning over ground that is under water is not finished unless by hiding one another. People are said to hide or cover one another, when they are on opposite sides of a big stone they are carrying on two poles. Hence ifanakônana indicates many doing work unitedly. The rice-fields are under water just before planting-time, and it requires two or three labourers working together to dig up the clods properly. Compare Nos. 1215, 1220, 1211, 1408, 1414, 1548.

237. — Ny hazo tokana tsy mba aia.
One tree doesn't make a forest.

238. — Tonâro tokana tsy mahazo hao.
One finger won't catch a louse.
These two proverbs are generally mentioned together and signify the necessity of union to accomplish many purposes, like our "Union is strength." The latter proverb indicates a necessary, popular, and indeed almost universal employment carried on in highways as well as byways.

239.—Raha oloha iray no tsy tia ahy, mitoto koba hatavvy aho; fa raha ny be sy ny maro no tsy tia ahy, hisotra tsingala ha faty aho.

If one person dislikes me, I'll prepare rice-cakes and get fat, but if the many dislike me, I'll swallow a tsingala [a very small water-beetle, fatal if swallowed] and die.

240.—Raha monina anosy, lavitra oloha-kiresahana.

If you live on an island, you are far from people to talk with.

Compare Nos. 271, 1045, 1049.

241.—Olon-drery tsy mba vahoaka.

One person doesn't make a multitude.

242.—Ny be no basy.

The many are guns.

243.—Ny roa no tsara noho ny iray; raha lavo, misy mpanarina.

Two are better than one; if (one) falls, there's another to raise him up.

244.—Roa lahy miditra ala: ka izy tokiko, ary izaho tokiny.

Two men entering the forest: it's "He is my confidence, and I am his."

245.—Ny andro iray ihonana toy ny andro zato.

One day of meeting equals a hundred others (when there is no gathering of friends).

246.—Toy ny tsindranolahy an-keniheny: ka ny tamana miray no miray.

Like the locusts in the marsh; those who can unite do unite.

The tsindranolahy is one of the many species of locusts found in Madagascar.

247.—Tsy mety raha fony tsimbôtry¹ miaraka hiany, ka adrisa² vao hianary.

It isn't right to have gone together when young and leave one another when old.

(1) Tsimbôtry = a young locust; (2) adrisa = a full-grown locust.

248.—Misy rony¹ miaraka-misotro; misy ventiny² miaraka-mitsako.

If there is gravy, we drink together; if there is meat, we chew together.

Lit. (1) gravy of it; (2) substance of it.

249.—Izao izika izao maty iray hazo, velona iray trano.

As for us, we are one in life and one in death.

Lit. we have one plank (i.e. bier) in death and one house in life.

250.—Izay iray donafo, iray dinidinika.

Who are one in smoke are one in talk.

The ordinary native house has no chimney, and as the inmates sit round the fire chatting over their family affairs, they get a fair share of smoke as well as heat. This proverb is the same in meaning as the three following.

251.—Izay iray trano iray dinidinika.

They of one house are of one talk.

252.—Izay iray zasa no iray tafasiry.

They who are one as regards children are one in chat.

253.—Izay iray vatsy iray aina.

They who are one in food are one in life.

254.—Raha mandika ny soa nifanekena aho, tsy satry, fa avin-draha.

If I break the good (covenant) agreed on, I do it unwillingly.

Lit. it is not intended, but I am turned aside by something.
255.—Ny hevitra tsy azo tsy amin' olombelona.
Knowledge is unattainable apart from others.
Lit. thought is not obtained except from men.

256. —Maso sy orona, ka alahelo iraisana.
Eyes and nose: they join in sorrow.

257.—Toy ny vatsin' Andrianalabe, ka tsinjarain-kiombonana hiany.
Like the woodman's victuals: divided out to be shared in.

258. —Toy ny famaky mijinja hazo: ka ny ahy momba ny azy.
Like the axe cutting down the tree: mine (i.e. the axe) goes with his (i.e. into the wood).
A mutual advantage or otherwise. The axe takes away the pieces of wood it has chopped from the tree, but the tree retains a piece from the broken edge of the axe.

259.—Tapak' il'aketa, ila tsintsina: izay hekely azo iaraha-mizara.
Half of half a locust or of a linnet:* whatever little is got should be fairly divided.

260.—Aza manao ahy sy azy.
Don't say 'mine' and 'his.'
A variation of meum et tuum.

261.—Ampombo malemy sy kiswa: ka faty no hisarahana.
Soft husks and (greedy) hogs: death only parts them.

262.—Fanirin-tsahondra, ka ny aloha tsy mihotra, ary ny aoriana manao izay hiloviana.
The growing of aloe-flowers: the earliest grows slowly, and the latest makes haste to catch them up.
Lit. goes not beyond. They are mutually obliging, like true friends.

263. —Ny iray tsy tia mafana, ary ny iray tsy tia mangatsiaka; ka ataovy marimaritra hiraisana.
One likes heat, and the other likes cold; pray agree on something and be friends.

264. —Ny teny ierana tsy mba loza.
An agreement brings no harm.
Compare No. 543.

265. —Tsy misy mangidy noho ny sakay, fa raha teny ierana, dia hanina.
There is nothing hotter than capsicum, but if agreed on, it is eaten.

266. —Aza asiana angam-potsy sy anga-mainly, fa ataovy angana iray hiany.
Don't put in a white dye and a black dye, but let there be one dye only.
Uniformity and not diversity.

267. —Imérina akanga tsy roa volo, fa iray hiany.
Imérina is a guinea-fowl, not of two colours, but of one only.
Compare Nos. 11—13.

268. —Trano atsimo sy avaratra: ka izay tsy mahalena talofana.
Houses north and south: we shelter in the one that doesn't leak.
Native houses are all detached residences, but they are often built so near each other that a single step will take the dweller from under a bad roof to the shelter of his neighbour's good one.

269.—Aza atao tanantananana ivelan' ny fahitra lahy aho.
Don't treat me as a castor-oil plant and leave me outside the cattle-pen.
Let me be amongst the many.

* More accurately, a species of Fan-tailed Warbler (Cisticola madagascariensis, Hartl.)—
270.—Aza mandeha singany toy ny kiraron’ Ibenahy.
Don’t go alone like Ibenahy’s shoe.
He had only one, poor fellow, but did his best to look smart in it and doubtless felt a grand as many another with two.

271. Aza manao moni manaraka.
Don’t live alone.
See No. 140.

272.—Aza mitandorona toy ny voangory ho ritra.
Don’t gather together like the voangory (beetle) about to die.

273.—Aza manao omby tokana manaraka ny arivo.
Don’t be like one ox following a thousand.

274. - Aza atao mitsoaka an-tonony, hoatra ny tohi-rofian’ ankizy.
Don’t let it slip out at the joint, like the string tied by a child.
The string made from the Roﬁa palm.

275.—Aza manao toy ny tandindona: miaraka hiany, fa tsy azo ho namana.
Don’t be like the shadow: a constant companion, but not a comrade (i.e. a friend).

276.—Maro tsy azo tompointa: roa mifamono, telo mifanoro trano, fa iray no mahasoa.
Many can’t be served: two fight each other, three burn each other’s houses, but one does good.
Compare Matt. vi. 24: “No man can serve two masters.”

277.—Maro foana toa tanam-poza.
Too many (by half), like crabs’ feet.
“Too many cooks spoil the broth.”

278.—Izay akaiky ny vilany feno arina.
They who are near the pot get black.
Compare Nos. 188, 1071-1076.

279.—Mikambany-dratsy, toa gadra-lava.
To be in bad company, like convicts in irons.
Compare No. 1737.

280.—Lambarana voahosotra arina; tafaray samy ngerona.
Dark cloth smeared with soot; two black things joined together.
The dark blue Bengal or Pondicherry cloth.

281.—Miaraaka amin’ ny ferena, ka ny tsara fanahy no maimbo.
Being with the diseased, the goodwill will be affected.
Compare Nos. 1070-1076.

282.—Raha tsy marary, aza miray ondana amin’ ny marary.
Unless you are sick yourself, don’t share the same pillow with a sick person.
Generally refers to judicial sickness, and is often used to justify the desertion of any one who has become obnoxious to the authorities.

283.—Aza mifonoka ambanin’ ny maimbo.
Don’t keep company with any one in bad odour.
A “take care of yourself at any price” proverb.

284.—Tain’ omby an-tany mena: raha tsy miombona afo, tsy miaza.
Cowdung on red earth: it won’t come off except by fire.
A bad case; punishment only severs the union.

285.—Aza manao foly mena tohizan-drofia.
Don’t join the bad to the good.
Lit. don’t join roﬁa (thread) to silken thread. Roﬁa is a rough kind of thread made from the young pinnate leaves of the Roﬁa palm, useful enough in its way, but quite unfit to be joined to fine soft silk.
286.—*Aza manaono tsikombakomba ifanaovana.*
Don’t join in a bad object.

287.—*Aza manâady miara-komana, hoatra ny mpiandry ratsy.*
Don’t creep to eat together, like a company of bandits.

288.—*Aza manaono volo-ngita misiandray tendro.*
Don’t unite in wrong doing, like curly hairs on a woolly head.
   Lit. don’t let curly hairs catch hold of each other’s tips. There is surely a conspir-
   acy amongst them. They will curl up and try to take each other by the ends,
   comb and brush them as you may.

289.—*Aza mantsim-bao miray, hoatra ny rongony.*
Don’t get bad before you unite, like hemp.
   Referring to the preparation of hemp. It is boiled and allowed to get well-nigh
   rotten before it is worked up into threads.

290.—*Nahoana no manaono kitaço miara-þeno.*
Why do you all fill one bag?
   The good shouldn’t be associated with the bad.
   (To be continued.)

J. A. HOULDER.

---

**GEOLICAL NOTES OF A JOURNEY IN MADAGASCAR.**

I.—*Introduction.*—In the course of the year 1891 it fell to my lot to undertake a long and interesting journey of about 1200 miles in the island of Madagascar, during which I was able to make a few geological notes that may not be unworthy of record. Leaving the Capital, I proceeded in a north-easterly direction as far as Imérimandrâso,† in the province of Antsihanaka; then struck due east, reaching the sea at Fênoarivo, a town situated about lat. 17°25’S. From here I followed the eastern coast, mostly along the water’s edge, as far as the Bay of Diego Suarez, in the extreme north of the island; and thence I travelled down the north-western coast as far as the River Mévarâno, in lat. 15°37’S., finally proceeding by boat to the Island of Nósibé (long. 48°15’E., lat. 13°20’S.), visiting several of the smaller islands on the way. It is of course impossible to give a detailed account of the geological features of the country traversed during such a journey; but, as so little is known of the geology of Madagascar, a general sketch may not be without value. I may say that specimens of all the different rock-types met with on the route were collected, and I hope to give a detailed description of them as soon as practicable.

For the sake of convenience, the part of the island travelled over may be divided into four sections: (1) that between the capital and

---

† Except when otherwise mentioned, the native names are those of towns and villages.
the east coast, (2) the east coast (that is, the northern half of it), (3) the northern end of the island, and (4) the north-west coast and islands. These I shall now briefly describe in order.

II.—The Country between the Capital and the East Coast.—By far the most predominant rock between Antananarivo, the capital, and the east coast is a hornblende-granitite-gneiss. This rock, which covers so wide an area in the eastern half of Madagascar, is, for the most part, of a greyish or bluish-grey colour and of medium texture, and consists essentially of felspar (orthoclase and plagioclase), quartz, dark mica, and hornblende. It not infrequently becomes garnetiferous, but otherwise generally varies little in mineralogical composition. For many square miles (how many I cannot say) in the neighbourhood of the village of Sàhatavy, about 20 miles west of Fenoarivo (east coast), the rock assumes a very distinctly banded structure, consisting of layers of white felspar (orthoclase and plagioclase), quartz, and dark mica, and is also somewhat garnetiferous. This is the most distinctly and beautifully banded gneiss that I have seen anywhere in the island. The prevailing direction of the strike of the rock between the capital and the Antsihanaka province, including the latter (the limits of which province may be given as about long. 48° 20' E. to long. 49°E., and lat. 17°S. to lat. 18° S.), is north-west and south-east, or north-north-west and south-south-east, although the general strike of gneiss in the island is a few degrees east of north and west of south. When I speak of the strike of the rock, however, I mean the strike of the foliation. As far as my observations of the Madagascar gneiss and its allied rocks go, the foliation appears to coincide with bedding,—at any rate with the chief divisional planes. East of the province of Antsihanaka, however, as far as the coast, the rocks assume the prevailing trend of a few degrees east of north and west of south.

In the Antsihanaka province itself another type of rock comes into great prominence, though not to the exclusion of the gneiss: this is olivine-norite. (See the map, No. 1.) It occupies a very large area (not improbably at least 200 square miles), though its precise boundaries are unknown. It rises into numerous fairly big hills, and is doubtless the rock underlying Lake Alaotra,* as it is found abundantly on both sides of the water. The grains of olivine in this rock are surrounded by a shell of hypersthene, outside which is a layer of actinolite. But norite without olivine also occurs. Occasionally the norite contains almandine-garnet. It is generally, though not always, fairly well foliated. The strike of this norite is also north-west and south-east, or north-north-west and south-south-east. Numerous patches of amorphous quartz, often milky-white in colour, make their appearance in the norite and crop out on the surface.

Coarse hypersthene-rock occurs in a massif or immense boss on the west side of Lake Alaotra. At the north and north-east end of the lake there is a very large exposure of quartz-magnetite rock, covering an area of many square miles. In some portions of it the magnetite appears to be almost or quite as abundant as the quartz. Occasionally, as between the villages of Imérimandròso and Tsàarahlonènana, the

* For an account of this extensive ancient lake, see my former paper in Quart. Journ. Geol. Soc. vol. xlv. (1889) p. 306.
magnetite is replaced by thin layers of a golden-looking mineral, which proves to be a ferruginous actinolite. In the south-east of Antsihanaka the gneiss is exceedingly coarsely foliated, some of the folia swelling out to a foot or even a yard in thickness. Amongst these pegmatite and graphic granite occasionally occur, as, for instance, at the village of Mangalaza. These are apparently part and parcel of the crystalline rock itself, and not fissure-injections. Very thick folia of hornblende, with a little felspar, are also noteworthy.

Other rocks occurring in this province of Antsihanaka are:

- Crystalline limestone and serpentine, near Ambatondrazaka, the capital of the province;
- Hornblende-pyroxene-granulite (123*), pyroxenite (Hunt) (113), and nepheline-basalt (124), near Amparafaravola, a village on the west side of Lake Alaotra;
- Limburgite (114, 115), near Mount Ambongobé, south-east of the village of Ambatondrazaka;
- Also a kind of trap-granulite (236).

The country between the Antsihanaka province and the east coast is of a very mountainous character and is largely occupied by forest, the rock being so thickly covered over with soil and decayed vegetation that there are comparatively few good exposures. Sufficient evidence is, however, forthcoming to show that the rock is chiefly gneiss. About 6 or 8 miles east of the village of Ankaitomboka (long. 49° E., lat. 17° 20' S.), on the eastern boundary of the Antsihanaka province, a form of trap-granulite without a rhombic pyroxene occurs (264). About 5 miles east of the same village another form of the same rock occurs (283), but this time without garnet. Some of the trap-granulites might perhaps be styled norites, but their structure is thoroughly granulitic. Olivine-basalt (329) occurs also to a small extent in this neighbourhood. Between the villages of Tsarasambo and Sålăngina (about 25 miles west of Fenoarivo) there is an exposure of garnet-rock, consisting of red garnet and ordinary green hornblende, though some portions of it are composed almost exclusively of garnet. It may be an extreme form of trap-granulite. There are also, especially as one nears the sea, several dykes of dolerite, subophitic in texture, which run in a generally north-and-south direction. It matters not from what point in the interior the country is traversed to the east coast, these dolerite-dykes are invariably met with. On the road, for instance, from the port of Tamatave to the capital there are at least six or eight such dykes, the most westerly of which is about 45 miles, and the most easterly about 8 miles, from the east coast. This fact, along with the almost unvarying similarity in mineralogical and textural character of the rock composing these dykes, points to the conclusion that they run continuously for great distances along the lower eastern slopes of the island. If the freshness of their condition be any criterion of their age, they belong to a comparatively recent geological period.

III. — The East Coast.— Perhaps the most notable fact in regard to the geological structure of the northern half of the east coast (as also, so far as I can learn, of the southern half) is the preponderance, among

* The numbers in parentheses throughout this paper refer to the microscopic slides in my collection.
the rocks exposed, of dolerite. From Fenoarivo to, say, lat. 14° S.*—a
distance of about 200 miles (and my journey led me for the most part
along the shore)—one sees comparatively little else than this dolerite;
occasionally, however, the underlying gneiss comes to the surface. The
question arises therefore,—Whence has it been derived? The only
satisfactory explanation of its occurrence seems to be that it has flowed
from large fissures farther inland, which at present are represented by
the dykes above referred to. This I conclude from the following
facts:—(1) The exact similarity, for the most part, in mineral composi-
tion and texture of the dyke-rock with that on the coast. I have exami-
ned microscopically several dozen sections of both. They consist
almost always essentially of plagioclase and augite, and show subophitic,
or very seldom typically ophitic, texture. Occasionally they contain
also a slight amount of olivine. (2) The persistence of this one type
of rock for so great a distance along the coast in a north-and-south
direction. This is easily accounted for on the supposition of a dyke
or series of dykes a few miles inland (which, as before stated, actually
exist) running more or less parallel with the coast, from which lava has
issued. (3) In some places the rock is distinctly traceable as a lava-
sheet for several miles inland; and as there is no large volcanic vent
or series of vents ranging parallel with the coast, from which it could
have flowed, the dykes above referred to must be looked upon as its
source. For these reasons I conclude that fissure-eruption has occurred
on a large scale on the eastern side of Madagascar. The subophitic
and ophitic textures also seem to suggest that the flow has been of
considerable thickness.

The lava-sheet has been, at least in some places, enormously thick.
A few miles north of the coast-town of Antalaha (lat. 14° 57' S.), for
instance, it covers the country to a great depth for several miles
inland—how many I cannot say. In other localities numerous hills,
some hundreds of feet in height, composed entirely of dolerite, stand
as witnesses to the great volume of the lava-flow. This thickness
may account for the prevalently doleritic texture of the rock; only
occasionally is it basaltic. The lava has in many places been entirely
removed by denudation, and in other places it is covered by dense
impenetrable forest. The rock is almost always compact in texture,
though in a few places it is vesicular, for example, at the locality known
as Ambatofaingainy (532), lat. 15° 8'S., about halfway between Ngontsy
and Antalaha, where it is amygdaloidal, the vesicles being filled in with
calcite, quartz, dark green chalcedony, chlorite, and zeolites; the
cracks in the rock being occupied by ferruginous matter and chalcedony.
The rock at this locality is a basalt, or perhaps an andesitic basalt. A
quite exceptional type of dolerite occurs at Antalaha itself (271), the
tolerably large crystals of plagioclase and augite being embedded in
brown tachylytic glass. This glass occupies more than half of the rock
and is crowded with black trichites. At one place (about lat. 15° S., a
mile or two from the sea) I noticed some volcanic breccia. Here and
there are to be seen volcanic dykes cutting through the gneiss or granite
on the sea-shore, the rock from which sometimes proves to be the usual

* When the longitude is not given, the place indicated is on or near the coast.
subophitic dolerite and sometimes basalt. A doleritic dyke (376), for instance, occurs immediately south of the small village of Antséranâmbê, south of Antongil Bay. The rock at the margin of this dyke contains a considerable amount of black tachylyte (278). A basaltic dyke is to be seen 2 or 3 miles north of the village of Manômpana, opposite the island of Ste. Marie. In this instance it cuts through dolerite, the basalt itself assuming a somewhat andesitic habit (373). Another dyke of basalt (317) (approaching to dolerite in texture), which may be called doleritic basalt, occurs at the village of Tânjona in Antongil Bay. Doubtless other dykes occur which are covered by the sand of the seashore.

Although by far the greater part of the lava has consolidated in the form of dolerite, there are one or two localities where it has assumed a much finer grain and occurs as basalt. At Isôavinandrilana, for instance, the capital of the province of Sâhambâvany (lat 14° 10' S.), many square miles of country are covered by a basalt of exceedingly fine grain and of somewhat andesitic habit (275). At the River Lokôho, again, some 3 or 4 miles south of Isôavinandriana, the rock is also a basalt (310) with andesitic habit. At Amboânîho (lat. 15° 25' S.), the capital of the Ihârana province, basalt also occurs (303—307).

At this same town of Amboânîho, and for several miles north and south of it, as also for some distance inland, occurs another type of rock in great abundance, namely, felspar-porphyry (302, 465, 468). Spreading, as it does, over a wide area, and forming very thick masses, there can, I think, be no doubt as to its being an actual lava-flow; but from what source it has proceeded I cannot say. Nothing, however, suggestive of volcanic cones is to be seen anywhere, so that this flow also may possibly have issued from a fissure or fissures in the crust. It varies more or less in character. Sometimes it is dark-coloured, almost black, with phenocrysts of flesh-coloured crystals of orthoclase. Its prevailing colour is, however, purplish. Occasionally the rock is quite or almost free from phenocrysts of felspar, when it may be called felsite. Felspar-porphyry, together with felspar-porphyry breccia (300), both of a purplish colour, occur in a hill 500 or 600 feet high, about 1 mile south of the village of Amboânîho (lat. 13° 25' S.), the breccia lying above the porphyry, and this again being underlain by somewhat altered basalt (304—307), which forms the base of the hill. In other places the felspar-porphyry becomes spherulitic (for instance, about 12 miles south of Amboânîho), the spherules being small, but very numerous.

Felspar-porphyry occurs in small quantity also farther north, namely, about 2 miles south of the village of Andrâvina (about lat. 12° S.).

Quartz-porphyry (453, 454), felsite? (449), and rocks with abundant epidote are also found in the neighbourhood of lat. 13° 17' S., a mile or two from the sea.

In one or two localities occur considerable areas of granitite (biotite-granite), as, for instance, in the neighbourhood of Vôhîjânahârî (lat. 16° 10' S.), the capital of the Mânânara province. Another extensive area, but of unknown limits, north of Antongil Bay, in the neighbourhood of long. 50° E., lat. 15° 20' S., taken as a central point, consists, for the
most part, also of granitite. All the slides taken from the rock of this locality show under the microscope that it has been subjected to much mechanical disturbance, the structure being that known as cataclastic. The rock has here been very extensively invaded in all directions by dykes and bosses of epidiorite (387); this is especially the case some 8 or 10 miles north of the head of Antongil Bay (in the neighbourhood of the village of Fizony); but epidiorite also occurs now and then in dykes as far south as lat. 12° S. and as far north as lat. 13° 15', where it forms fairly high hills (364). The epidiorite occasionally shows spheroidal weathering. In one locality (about long. 50° 10' E., lat. 15° 5' S.) I found in the bed of the River Sâhaffitra numerous blocks of chiastolite-slate and argillaceous schist, but I nowhere met with these in situ. Quartzite occurs also in various localities in the neighbourhood of this granitic area. Of the precise field-relations of these rocks I cannot, I am sorry to say, give any particulars, having crossed the area only in one direction, and that somewhat hurriedly; but that the granitite is eruptive seems to be indicated by the existence of the chiastolite-slate, and also, not improbably, by the quartzite.

Aplite occurs also in considerable quantity in various localities, as 2 or 3 miles north of Manompana (lat. 16° 43' S.), at Mânambató (lat. 16° 33' S.), at Manâkambahiny (long. 49° 43' E., lat. 15° 8' S.), and at Ampânobè, 2 or 3 miles from the sea (lat. 13° 40' S.).

Other rocks found on this eastern coast-line are:

Hornblende-schist (263) (probably much altered epidiorite).

Augitic quartz-diorite (312) . . . . Village of Sahaka, opposite the island of Ste. Marie.

Mica-schist, crowded with crystals of blue kyanite, often a couple of inches in length.

Norite (374, 375) . . . . . . . . . Three miles north of the village of Andranovôla in Antongil Bay; 4 or 5 miles south of Sôanierâna, at the head of Antongil Bay (269, 270); and also in the neighbourhood of the village of Sahaka, opposite the island of Ste. Marie.

Diabase (279) . . . . . . . . . . . A few miles north of the town of Vôhimárina, lat. 13° 20' S.

Hypersthene-dolerite ? (363) (or norite ?). Village of Mandrfsy, opposite the island of Ste. Marie.

Epidote-rock (425) . . . . . . . . . Long. 50° 10' E., lat. 15° 5' S.

Epidote-schist (556) . . . . . . . . . Near Soamiânina, opposite the island of Ste. Marie.

Volcanic tuff (446) . . . . . . . . . About lat. 13° 50' S.

It may not be unworthy of note that pieces of pumice from Krakatoa lie strewn along the entire length of the east coast.

Before concluding the remarks relative to the northern half of the east coast, it may be mentioned that, although the rivers are numerous, none
of them can be spoken of as large. Close to the sea, however, most of
them assume a considerable width, but this is owing to the heaping-up
of sandbanks by the ocean waves. A few miles inland they are mere
streams. Some of them form lagoons several miles in length, and what
is sometimes given as the northernmost limit of the numerous lagoons
of the east coast is not actually correct, although those north of Tama­
tave are by no means so numerous or so large as those south of it.

IV.—The Northern End of the Island.—The part of the island here
referred to is that which lies north of lat. 13° S. In the neighbourhood
of Andravina (lat. 12° 28’ S.), on the eastern sea-board, and some miles
south, there are numerous patches of thick loose sand extending 3 or 4
miles inland. These are apparently marine deposits. The River
Lokia, a few miles north of lat. 13° S., marks as nearly as possible the
boundary-line between the crystalline and the sedimentary rocks in the
northern part of the island; for while immediately south of the river there
are here and there a few outcrops of sandstone lying on the crystalline
rock (granitite), north of the river the central mountain-mass (which is
merely the end of the great mountain-chain forming the backbone of the
island) is composed of sedimentary strata, sandstone appearing first,
succeeded a little farther north and overlain by oolitic limestone (467,
511, 519). This mountain-mass is not improbably 1200 or 1400 feet
high. On the east side of the island it approaches the sea, being very
steep, and leaving for the most part a flat belt of low-lying land at its
eastern base of only a mile or two in width, and averaging perhaps 100
or 200 feet above the sea. On its western edge it is much more broken
up and somewhat lower in altitude, and is composed of fossiliferous
sandstone and oolitic limestone (480, 516). A comparatively flat area
of varying width, but probably averaging about 20 miles, extends from
its western base to the sea. Its extreme northern limit, where it forms a
steep bold front running for some 15 or 20 miles in an easterly and
westerly direction, and where it is composed mostly, if not entirely, of
oolitic limestone, occurs at lat. 12° 45’ S. The dip of the rock is
generally 10° to 15° N.W., and the actual thickness of the limestone
must be very considerable. The River Lokia, therefore, which runs
from west to east, is probably situated where the northern coast of the
island lay in Jurassic times, and may be taken as the present northern
limit of the outcrop of the gneiss and allied rocks that form the greater
part of the eastern half of the island. I say ‘Jurassic times,’ because,
judging from the fossil contents, which have been examined by Mr. R.
B. Newton, F.G.S., there can be no question as to the age of these
sandstones and limestones (though the latter may be in part Cretaceous),
for although many of the fossils have a wide range of distribution, some
of them can be classified with certainty as belonging to the Jurassic
series of rocks. (See his paper, following the present one.)

Between lat. 12° 45’ S., where the mountain-range very abruptly ends,
and Diego Suarez Bay (about lat. 12° 15’ S.), the chief feature of interest
is the mountain of Ambôhitra, which is situated about one-third way
across the island, being nearer the west than the east coast. The
position of its highest point is about long. 49° 10’ E., lat. 20° 40’ S. It

* [The sandstone fossils alluded to here are from the Antankarana province, on the north-
western boundary of the central hill-range.—R. B. N.]
runs in a direction north and south for a distance of 10 or 12 miles and is probably about 5000 feet high, the highest point I attained being 4100. It is an extinct volcano, and has poured out lava which has flooded the low-lying country from sea to sea, and from Diego Suarez Bay in the north to about lat. 12° 35' on the eastern, and about 12° 50' on the western side of the island to the south.* The area thus covered by the lava is probably no less than 1200 square miles. One small crater, now occupied by a lake, I discovered high up on the mountain, and another and larger lake, probably also a crater, is said to exist near the summit. The rock, from whatever locality it be taken, whether from the town of Diego, on the southern side of Diego Suarez Bay, or any other part of the lava-bed, or from any part of the mountain itself, is remarkably homogeneous in character: it is an olivine-basalt of a dark grey colour, the olivine-crystals being largely altered to serpentine. The upper part of the bed, where not decomposed into soil, is often very cellular, but for the most part the rock is compact. I nowhere found any traces of lapilli or ashes. Some of the numerous streams issuing from the mountain have excavated valleys through the lava to a depth of 200 or 300 feet. One of these streams (the Marfarano), which flows into the Bay of Rôdo on the north-east coast (lat. 12° 38' S.), has cut through the lava-bed and into the underlying rock. Around the base of Ambôhitra a goodly number (probably a score or two) of parasitic cones exist, some of which show breached craters, but none of which are in a good state of preservation. One of these (south-east of Ambôhitra) I examined very cursorily. Some of the layers on the sides of the much-worn cone consisted of breccia, from which I picked out olivine-basalt, augite-andesite (477, the only specimen I met with in this part of the island), and a fine-grained sandstone, which had doubtless been brought up from the underlying strata. It may here be also mentioned that at the village of Ankatoka, in the Antankarana country, south of Ambôhitra mountain, there are some hot springs; and about 1½ mile south of the village of Anfôrano, at the south-eastern base of Ambôhitra, there is what I take to be a crater-lake, known as Tanôvo, about a mile in diameter.

The mountain-mass lying immediately south-east of Diego Suarez Bay, referred to in the note below, is composed chiefly of reddish and greyish limestone (472, 473), which belongs to the Cretaceous series (probably Upper). In some places (as in the town of Ambôhimârina) it assumes the aspect of ruined masonry. The strata appear to have a very slight dip northwards. That part of the mass on which the town of Ambohimarina stands (long. 49° 26' E., lat. 12° 27' S.) reaches an elevation of 1400 feet above the sea, and about 800 or 1000 feet above the lava-flooded plain to the south and west. No part of the mountain-mass rises much higher than this. In the limestone I found several specimens of a fossil echinoid, which Mr. R. B. Newton identifies as Lampadaster Grandidieri. A microscopic section of the rock in which these occur shows it to be 'largely composed of Globigerina.' The rock may therefore be called 'a Globigerina-limestone.' [R. B. N.]

* Immediately to the south-east of this bay, however, there is a mountain-mass, covering an area of probably 100 square miles, which stands out high above the lava-bed; of this I shall speak by-and-by.
same section shows other forms of foraminifera, such as Frondicularia, Nodosaria, Bulimina (?), etc.

Evidence of recent elevation of the northern end of the island is to be found in several places. On the low-lying narrow platform adjoining the sea at the base of the mountain-range immediately north of the River Loki, above mentioned, there are distinct patches of coral-bed, as also rock formed of sand and comminuted sea-shells. Again, at a considerable elevation above the sea, on the island of Nosimtsio (long 48° 35' E., lat. 12° 52' S.), north-west of Madagascar, Mr. Parrett gathered shells which, being compared, were found to be perfectly identical with those lying on the sea-shore. The north-west of the island, as far south at least as lat. 14° 20' S. (probably much farther), has also been recently raised, as is proved by the existence of numerous sea-shells lying a few miles inland at a height of, at any rate, 100 or 200 feet. Further, in some of the larger vesicles on the surface of the lava-bed east of the mountain of Ambohitra, some 4 or 5 miles south of the town of Ambohimarina, spoken of above, I found the remnants of a kind of oyster-shell still firmly attached. The distance from the present coast-line where these were found was 8 or 10 miles, and the height above sea-level about 300 or 400 feet.

All these facts put together seem to point to the following conclusions in regard to the geology of the northern end of Madagascar:—(1) During some portion or portions or the whole of Jurassic and Cretaceous times this part of the island was beneath the sea. (2) It was afterwards raised, and, judging from the apparent absence of fossils later than Cretaceous, was probably above the sea during the interval between Cretaceous and recent times. (3) Then came subsidence to the extent at least of submerging the mountain-mass immediately south-east of Diego Suarez Bay and the part now forming the island of Nosimtsio (probably much more). (4) Afterwards elevation once more took place, but in quite recent times, the low-lying country between lat. 12° 45' S. and this mountain-mass being perhaps excavated (possibly by marine action) during the upheaval, probably leaving the said mountain-mass for a while as an island. (5) During this upheaval (probably the latter part of it) the volcanic activity which brought into existence the mountain of Ambohitra commenced. This seems to be shown by the occurrence of the oyster-shells in the cavities of the lava at the locality above mentioned, which must have been at that time at or below sea-level, but which is now, as before stated, some 300 or 400 feet above it and 9 or 10 miles from the east coast. (6) The maximum of upheaval seems to have been attained in the neighbourhood of Diego Suarez Bay, or immediately south of it; and as the north-western coast appears to have been raised to a greater distance south than the north-eastern, the latter has probably experienced the minimum of upheaval.

North of Diego Suarez Bay there is a triangular headland known as Baobaomby, but of this little seems to be known. So far as I can make out, however, it appears to consist chiefly of limestone, or limestone and sandstone, with a few extinct volcanic cones.

V.—The North-west Coast and Islands.—The more or less abrupt western edge of the great central mountain-range of the island is, in the
north-west (a little south of lat. 13° and thereabouts), composed chiefly of brownish sandstone, except at the extreme northern portion, where, as has been already stated, it consists mostly of oolitic limestone. This sandstone is generally of coarse texture, containing in places numerous large round pebbles. The western base of this range as far as the sea is mostly occupied by a belt of low-lying land, or, rather, low undulating hills of varying width, and reaching probably nowhere a greater height than 600 or 800 feet, though isolated mountains here and there rise to a considerable elevation above the general level. These mountains sometimes consist of sandstone—for example, Angaraony (long. 48° 12' E., lat. 14° 20' S.); sometimes of plutonic rocks, as Bézavona (long. 48° 8' E., lat. 14° 3' S.), etc. Angaraony, which reaches an elevation of perhaps 1000 feet above the ground below, with its comparatively horizontal sandstone strata, stands out as a witness to the great erosion which this part of the island has undergone. That the sandstones are of contemporaneous age with the limestones is shown by the fact that in certain localities—for instance, a mile or two south of Andranosamonta (long: 48° 4' E., lat. 14° 13' S.)—the limestones lie in beds distinctly intercalated in the sandstones and conformable with these, to which, nevertheless, they are always subsidiary. The limestones in this locality are very largely composed of lamellibranchiata, such as Astarte Baroni, etc.* These lie about on the ground (having weathered out from the matrix) in such quantities that they might be literally gathered in cartloads. This frequent alternation of sandstone and limestone would seem to point to a successive rising and falling of the land in this part of the island at the time of their deposition.

Some 4 or 5 miles north of Andranosamonta (300 or 400 feet above the sea and a mile or two from the shore) the limestone, as shown by its fossil contents, belongs to the Oxfordian series, one of the commonest species being Perisphinctes (Ammonites) polygyratus, Reinecke. This lies on the surface of the ground in great numbers, but unfortunately the limestone in which it is embedded has decayed into a mere clay, and thus the fossils are in a bad state of preservation, both they and their matrix being abundantly occupied by septaria filled with calcite. A few miles west of Ankaramy occurs a black crystalline limestone, which, according to Mr. R. B. Newton, contains an organism called Girvanella. At Andranosamonta itself I was fortunate enough to find parts of the first fossil reptile that has been discovered in the island. It proves to be a new species of Steneosaurus, which Mr. R. B. Newton has named S. Baroni.† It may be noted that immediately north of this village selenite occurs in the clay.

This belt of low-lying land on the north-western coast consists therefore mostly of sandstone, though limestone is also abundant, the predominant dip of both being very slightly seawards. The sandstone is mostly of medium grain and brownish colour, and generally turns red in weathering. In some places spherical or oval nodules, about the size of a hen's egg, of ferruginous matter which has probably

* See Mr. R. B. Newton's paper (following this) for names of other fossils found here.
segregated from the surrounding mass, jut out from the exposed surface of the rock. Fossils gathered from the limestone show it to be mostly Jurassic, but occasionally Cretaceous (Neocomian), and on the coast-line mainly Eocene (Nummulitic Limestone). That this portion of the island has been recently elevated above the sea to the extent of at least 200 or 300 feet has been already stated; to this I need not therefore again recur.

In *Quart. Journ. Geol. Soc.* vol. xiv. ( 889) pp. 326, 327, I spoke of some strange rocks resembling erratic blocks lying on the surface of the ground in the neighbourhood of the village of Mahitsihazo (long. 48° 5' E., lat. 14° 17' S.), whose existence I could not then account for, suggesting, with a good deal of doubt, that they had been possibly brought there by glacial action. The difficulty of accounting for their occurrence is now solved. I find from microscopical examination that these rocks are trachyte. But how came the blocks into their present position? The explanation is simple. Nearly the whole of this low-lying land, from the village of Melaka (long. 48° 18' E., lat. 13° 45' S.) to that of Mahitsihazo, was once flooded with trachytic lava, which has since been largely denuded, leaving patches, sometimes many square miles in extent in various places, thus allowing the underlying sandstones and limestones to reappear at the surface. In other places mere blocks of rock, some of them as large as small cottages, are the only remnants left of the lava-bed, but those immediately north of Mahitsihazo have apparently rolled down from a higher level. The curiously and deeply guttered appearance of these latter blocks is probably due to the action of rain alone. The trachyte varies in texture from fine to coarse-grained, and in colour from buff or brownish to whitish. It is in places decayed and altered into clay, and is often somewhat fissile. Not infrequently it has weathered into small cuboidal blocks of an inch or two in diameter, the interstices being filled in with ferruginous matter, the blocks often becoming detached one from the other and covering the ground. Passing through the country in one direction only, I failed to gather sufficient data as to the direction of the lava-flow to indicate its source.

A mountain named Bezavona (long. 48° 8' E., lat. 13° 55' S.), probably not less than 1200 feet high, is specially worthy of mention from the fact that it consists of the comparatively rare rock foyaite (491), the mineral with low double refraction proving to be nepheline. In long. 48° 8' E., lat. 14° 3' S., there is a hill (some 10 or 12 miles south of Bezavona) known as Ankitsika or Ambôhibainga, probably 700 or 800 feet high. The rock is here volcanic, but in this case it is nepheline-phonolite (292, 294).* Not far from the hill of Ankitsika (some 5 or 6 miles north-north-west of it) occurs an interesting form of haüyne-nepheline-phonolite with well-formed crystals of melanite (268, 314, etc.). There seems to have been little, if any, actual outflow of lava from Ankitsika mountain. It is of interest to note the existence of foyaite, nepheline-phonolite, and haüyne-nepheline-phonolite in such close association.†

* Possibly some of the trachyte mentioned above may prove on further examination to be nepheline-phonolite.
† Since writing the above paper, I have found that nepheline-tephrite also occurs in the neighbourhood of Bezavona mountain.
The narrow promontory running north, which lies on the line of long. 48° E., and forms the gulf (Port Radama in some maps) at the head of which is the village of Andranosamonta, is chiefly composed of basalt, being olivine-basalt (282) on its eastern edge, and basalt without or with but little olivine on its western edge (254). In one locality (about halfway along the length of the promontory on its eastern side) I found in the basalt large nests of beautifully striped onyx and multicoloured Egyptian jasper. On the western side very large nodules of green chalcedony (237) occur in the basalt. In the olivine-basalt of the small island of Ankazoberva, south-west of the large island of Nosibe, Egyptian jasper, banded in various colours and of rare beauty, is found.

Immediately south-west of Anorontsanga (long. 47° 58' E., lat. 13° 50' S.) there are four islands (excluding islets of little note): Ambariovalha, Beroffa, Kâlakajôrò, and Antânifâly. The first three of these are volcanic, and are composed wholly of olivine-basalt similar to that above mentioned (256, 504). The rock is remarkable for the abundance of amygdules or nests of segregated minerals which it contains. These amygdules are generally of large size, often attaining to a diameter of a couple of feet. They are frequently hollow within (geodes), and consist for the most part of pure crystalline quartz, but sometimes of agate, onyx, or green (237) or brown chalcedony (501). Occasionally well-crystallized calcite, generally whitish, sometimes olive-green, accompanies the quartz, and is also often found filling fissures in the rock.

The island of Antânifâly, however, which is the westernmost of the group, consists entirely of Nummulitic Limestone, in which Assilina spira, de Roissy, and several species of Nummulites (see Mr. R. B. Newton's paper) are the commonest fossils. About 30 miles or so north of these islands (lat. 13° 30' S.) there are three islets near the mainland: Kivônjy, Antsoha, and Ankazoberavy, the last two, and probably also the first, being volcanic, the rock again being olivine-basalt, which on Antsoha is columnar, the columns, however, being much bent and irregular. Kivonjy is a round beehive-shaped islet, the rock of which, from a distance, has a whitish colour. It may possibly be trachyte.

Farther north again is the large island of Nosibe, which is in the possession of the French. This island is for the greater part dotted over with volcanic cones of no great height, which are in a fair state of preservation. There are two fine crater-lakes on its southern edge. The only specimen of the rock which I gathered from this island proves to be nepheline-basalt (265).

Another island, Nosimitsio, farther north again (long. 48° 35' E., lat. 12° 52' S.), which, however, I have not seen, is also volcanic. On the east coast of this island there are said to be some fine exposures of columnar basalt, and, as was mentioned before, shells have been here gathered at a height of 200 or 300 feet, exactly corresponding to those lying on the shore.

Thus we see that, while trachytic and phonolitic lava has been poured out in great quantity in the north-western part of Madagascar, basaltic lava has been erupted in equal, if not even in greater, measure; and that, while trachyte seems to be confined to the mainland not far from the sea, basalt occupies parts of the coast line of the same, and
apparently forms, with the one exception already mentioned, all the islands in the region. Basalt is not, however, entirely absent several miles inland, as it may be picked out of the beds of some of the rivers immediately below the western declivity of the central mountain-chain, as, for instance, close to the village of Ankaramy, about 20 miles from the coast.

On the sea-coast at Ambôdimadíro (long. 48° 14' E., lat. 13° 37' S.) a number of islands form the anomalous basalt make their

Looking over the translation of Dr. Brandstetter's article, "The Relationship between the Malagasy and Malayan languages," I find the two following imperfect renderings, which it may be well here to correct:—

Annual, No. xviii., p. 175, sec. 59. Instead of "Contraction is spoken of.... stand near one another," read, "Contraction (Sammbastufung) is spoken of in the Malayo-polynesian languages when two words, such, for example, as the Malayan tuwan and tun, master, coexist in the same language (tun being a contracted form of tuwan)."

No. xix., p. 352, sec. 72. Instead of "The Malayan uses the numeral....three tails," read, "The Malayan uses numerals as follows: e.g. three dwarf stags=pelanduq tiga ekur, i.e. dwarf stags three tails."

R. Baron.
apparently forms, with the one exception already mentioned, all the islands in the region. Basalt is not, however, entirely absent several miles inland, as it may be picked out of the beds of some of the rivers immediately below the western declivity of the central mountain-chain, as, for instance, close to the village of Ankaramy, about 20 miles from the coast.

On the sea-coast at Ambôdimadîro (long. 48° 14′ E., lat. 13° 37′ S.) a goodly number of dykes of a rather anomalous basalt make their appearance (see description by Dr. Hatch in *Quart. Journ. Geol. Soc.* vol. xlv. 1889, p. 345), reminding one of those on the sea-shore near Belfast in the north of Ireland. Here it may be mentioned also that an interesting rock allied to Rosenbusch’s camptonite, together with an andesite, occurs east of the village of Jangoa (long. 48° 19′ E., lat. 13° 40′ S.).

We see, therefore, that in this north-western part of Madagascar both intermediate and basic lavas occur, consisting of trachyte, phonolite, haiyne-nepheline-phonolite, nepheline-tephrite, andesite (rare), basalt, and olivine-basalt.

At Ambâvatoby, a small bay on the mainland south-west of the island of Nosibé, coal of excellent quality is said to have been obtained (see *Annales des Mines*, 1854, 1856, 1866). I visited all the points in this bay where coal is said to exist, and could find nothing but thin seams of carbonaceous shale intercalated among (Jurassic?) sandstones. What there may be below the surface I cannot of course say, but I am strongly inclined to doubt altogether the existence of coal. This carbonaceous shale, it may be mentioned, occurs at several points on the roundish headland south of Nosibé.

Such is a brief account of some of the more salient features in the geology of those parts of Madagascar traversed during my journey, and I trust that, in spite of its imperfection, this account will not be found altogether devoid of interest from the geological point of view.

R. BARON (Ed.).


P. 306.—In first paragraph under “Crystalline Schists, etc.,” instead of “For instance .... 60 or 80 miles,” *read*: “For instance, a large area in the interior, reaching from about the capital to at least 100 miles north of it, and probably 60 or 80 miles in width, consists of gneiss, with the strike of the foliation running generally in a north-westerly or north-north-westerly and south-east or south-south-easterly direction, or approximately thereto.”

P. 311, lines 9 and 10 from top.—For “It is a reddish rock..... decayed gneiss,” *substitute*: “This rock may be described as sillimanite-schist, being composed of sillimanite and quartz, with abundant almandine-garnet, by the presence of which the rock is coloured red.”

On map.—For “bosses of diorite” *read* “cones of nepheline-phonolite.”
ON A COLLECTION OF FOSSILS FROM MADAGASCAR.

I. Introduction.—The fossils contained in this collection were procured from a number of localities in the northern and north-western parts of Madagascar by the Rev. R. Baron, during an extensive journey which he undertook in 1891, as a missionary of the London Missionary Society. They may be regarded as supplemental to those that he collected some few years previously in the north-western districts, and which were described in 1889 before this Society as representative of Eocene, Cretaceous, and Jurassic rocks.

The present collection, besides comprising organic remains from these different horizons, contains a few terrestrial shells referred to Achatina panthera, Achatina like A. Layardi, Bulimus (Rachis) punctatus, and Pomatius (Tropidophora) virgata. These were found in a Quaternary deposit capping the hill of Ambôhinsarina at a height of over 1400 feet above sea-level, and they are known to exist on the island at the present day. The Tertiary (Eocene) specimens consist entirely of foraminifera. They were obtained from the island of Antânifaly (N.W. coast) and have been determined as Nummulites allied to N. Bellardi, N. perforata, N. complanata, and Assilina spira; species which have a wide distribution, though mostly confined to South European countries, Egypt, West Asian localities, and India.

The Cretaceous fauna contributes one specimen of Lampadaster Grandieri?, found in a red limestone, immediately beneath the subsoil of Ambômari hill, which also contains Frondicularia, etc., and dense masses of Globigerinæ; while examples of Belemnites pistilliformis prove the presence of Neocomian rocks north of Andrânosambo village.

Among Jurassic fossils a new species of gasteropod has been described, besides several lamellibranchs; while a form of Perna with extremely anterocconvex valves has been doubtfully referred to a Syrian species. In studying the Jurassic fauna of Madagascar, one is struck with its resemblance to that of England, Europe, Eastern Africa, and India. Such forms as Trigonia pullus and T. costata occur in all these regions, Ceromya concentrica and Modiolus imbricata are recorded from Eastern Africa and Madagascar, while Stephanoceras Herveyi, Corbula pectinata, and Rhynchonella concinnula are found alike in Madagascar and India. The Jurassic rocks of Eastern Africa extend from Abyssinia through Shoa, Mombassa, Mtaru to Mozambique, at which latter locality Beyrich† has reported the discovery of a Phylloceras (allied to) heterophyllum, a species also found in Madagascar.

Several cephalopods have been described from East African localities by Beyrich,‡ Douvillé.§ Tornquist,|| and Futterer,*** many of them being referred to Indian forms, and the correlation-tables given by the last-named author prove very conclusively that a close relationship exists between these widely separated Jurassic regions.

In completing my work on the fossils shortly to be described, I wish to record my obligations to the following specialists for their kindly assistance

‡ Ibid, pp. 96-103.
and advice: To the late M. Gustave Cotteau for identifying the Cretaceous echinoid; to Prof. T. Rupert Jones, Dr. G. J. Hinde, Mr. E. Wethered, Mr. E. T. Newton, and Mr. W. W. Watts, for their help in identifying the limestone-structures; to Mr. G. C. Crick for suggestions regarding the cephalopods; and to Mr. Edgar Smith for examining the post-Tertiary mollusca.

It is important to note that Mr. Baron, following up a former precedent in connexion with his first series of Malagasy fossils, has most generously given the present collection to the Geological Department of the British Museum.

II. — Previous Work on the Palæontology of Madagascar.— The earliest record bearing upon this subject is by Buckland,† who in September 1821, described a rock of Secondary age from Point Lougi or Loquez, on the north-eastern coast, somewhat resembling New Red Sandstone, but containing no organic remains. The recent limestone formations occurring round the coast-line of Madagascar were also referred to as being "composed of granulated fragments of shells agglutinated by a calcareous cement," the shells being too broken to allow of their determination.

Later in the same year, James Sowerby‡ described Isocardia minima from the English Cornbrash, and stated that he had "similar ones from Madagascar." This would form the first reference to a recognized fossil mollusc from that country.

During 1854 an anonymous author§ reported the discovery, by some French naval officers, of lignite-deposits containing plant-impressions on the Island of Nosí-Bé and at neighbouring localities in the north-west. These deposits were stated to be of, probably, Secondary age.

In the following year Herland|| called attention to a recent limestone with Nummulites which he had found bordering parts of the coast-line of Nosí-Bé, during his survey of that island.

M. Guillemini¶ in 1866 described very fully the coal districts in the north-west, but made no allusion to the presence of fossils, and therefore no statement as to the age of the beds. The occurrence of Secondary fossils in the southern parts of the island was announced by M. Grandidier** in 1867, and one of the specimens was described in the succeeding year by the late Paul Fischer†† as a Jurassic species, under the name of Nerinea leiogyra.

MM. Crosse and Fischer‡‡ during the same year noticed some terrestrial shells of Quaternary age which had been collected by M. Grandidier near Cape Ste. Marie, in the extreme south. They were found associated with Epyornis-remains in the sand-dunes, which here rise to a height of 142 metres (466 feet), the species being closely allied to those existing on the island at the present time. They were determined as Bulimus Grandidieri, C. & F., B. subobtusatus, C. & F., B. Favannei, Lamarck, Helix sp., and Cyclostoma (Otopoma?) Grandidieri, C. & F.

* Excluding references to Quaternary vertebrata.
‡ Mineral Conchology; vol. iii. (1821) p. 171.
M. Grandidier,* in 1871, mentions that he had, during 1865 and 1866, collected fossils belonging to the Carboniferous epoch on the north-western coast at the Bay of Passandava, but states that they were accidentally destroyed by fire, together with his notes, sketches, and other valuable data made during that period. [The nature of these fossils is not stated; they probably consisted of plant-remains from the lignite-deposits which have been regarded as of Secondary age.]

The first reliable proofs of an Eocene fauna were obtained by M. Grandidier from near St. Augustine’s Bay, on the south-western coast, and the specimens were identified by Fischer† in 1871 as:—

*Alveolina* (like) *ovoidea*, d’Orbigny, or *subpyrenaica*, Leymerie.

Orbitoides (like) *papyracea*, Boubée.

*Triloculina* (like) *trigonula*, d’Orbigny.

*Ostrea pelcydion*, Fischer,

like *O. Villet*, Coquand, or *Perna Mulleti*, Deshayes.

*Ostrea Grandidieri*, Fischer.

*Nerita Schmiedtiana*, Chemnitz.

*Terebellum* (like) *obtusum*, J. de C. Sowerby.

In 1872 M. Grandidier‡ noticed the enormous development of Jurassic rocks in Madagascar (overlain in parts by a narrow band of Nummulitic limestone containing *Nerita Schmiedtiana, Alveolina*, etc.), which was stated to extend from the southern border of the Bay of Narinda to the western slope of the granitic mountains protecting Fort Dauphin (south-east corner).

Fischer§ described another series of fossils in 1873, collected by M. Grandidier from the Jurassic rocks of Tulléar and Morondava in the south-western portion of the island. His determinations and horizons were as follows:—

*Nerinae leioyra*, Fischer.

*Natica* (near to) *Clio*, d’Orb. [Oxfordian].

" *canaliculata*, Morris & Lycett [Great Oolite].

" *dubia*, Römer [Kimeridge].

*Solarium* (near to) *polygonum*, d’Archiac [Great Oolite].

*Trochus* (near to) *Ibbetsoni*, Morris [Great Oolite].

*Corithium eribote*, d’Orb. [Oxfordian].

" (like) *russense*, d’Orb. [Oxfordian].

*Alaria* sp.

*Rhyncholites* (like) *gigantea*, d’Orb. [Oxfordian].

*Ammonites fimbriatus*, J. Sowerby [Lias].

" (group) *heterophyllus*, J. Sowerby [Lias].

" *Parkinsoni*, J. Sowerby [ Inferior Oolite].

*Astarte excavata*, J. Sowerby [ Inferior Oolite].

" (group) *depressa*, Münster [Oxfordian].

" " *minima*, Phillips [Great Oolite].

" " *phyllis*, d’Orb. [Oxfordian].

" " *alta*, Goldfuss [Lias].

*Rhynchonella tetrahedra*, J. Sowerby [Lias and Inferior Oolite].

*concinna*, J. Sowerby [Great Oolite].

M. de Fromentel determined the corals as:—

*Montiivalia trochoidea*, M.-Edw. & Haime [ Inferior Oolite].

---

In 1877 the Rev. J. Richardson,* of the London Missionary Society, published details of his journey through the southern districts of Madagascar. In the vicinity of Arborão he collected some well-preserved Secondary fossils of Jurassic age (wrongly referred to the Neocomian by the Rev. James Sibree†), which were figured, to form the plate accompanying his pamphlet, but without names or descriptions. These figures represent an echioid and an ammonite, both subsequently described and re-figured by the present writer as Stomeclizinus (allied to) bigranularis, Lamarck, and Stephanoceras Herveyi, Sowerby, respectively; a Nerinoë; a Rhynconella; a Terebratula; and two lamellibranch shells. This plate is of great interest, for it contains the first published illustrations of a Jurassic fauna from Madagascar, and I am indebted to the Rev. George Cousins for calling my attention to it. The Rev. R. Baron§ in 1886 recorded the occurrence of an extinct form of Equisetum in a siliceous sinter-deposit or geyserite which he found in one of the valleys close to some extinct volcanic craters, near Ambôhidrambo (north-east of Antananarivo). He also mentions the finding of numerous fragments of fossil plants in an ironstone-and-shale deposit on the plain of Ankay (Central Madagascar), one being recognized as Calophyllum parviflorum, Bojer (a dicotyledonous plant).

In 1887 Cortese|| referred to a lignite-deposit in the neighbourhood of Amapyrusbibe (near Bêtsiboka river) which he regarded as of Pliocene age, but the lignite of Nosi-Bê and the neighbouring region he** identified as doubtfully of Perm-Carboniferous age in the succeeding year.

In 1889 I reported†† upon a collection of fossils obtained by the Rev. R. Baron from various localities in the north-west, and included in it some references to a few specimens belonging to the Rev. Dr. Deane, which were collected by the Rev. J. Richardson in the south-west. Two of these latter specimens were figured, as previously mentioned, in Mr. Richardson’s plate published in 1877. An examination of Messrs. Baron and Richardson’s fossils confirmed the work of previous observers as to the existence of Eocene and Jurassic rocks in Madagascar, while a Cretaceous fauna was apparently identified for the first time.

The Eocene fossils consisted principally of foraminifera, referred to Alveolina oblonga, Nummulites biarritzensis, Assilina spira, etc.

The Cretaceous included such forms as Nautilus Fittoni, Belemnites pistilliformis, B. conicus, B. polygonalis, B. binerius, Alectryonia ungulata, A. pectinata, A. Deshayesi? Gryphœa vesicularis, etc.

The Jurassic rocks were represented by Stephanoceras Herveyi, Belemnites Sauvaniausus, Nerita Buvignieri, Nerinoë (allied to) Eudesia, Pteroperna costatula, Modiola imbricata, Pholadomya ambigua, Ceromya concentrica, Asta, Baroni (n. sp.), Sphara madagascariensis (n. sp.), Terebratula maxillata, Rhynconella obsoleta, Stomeclizinus (allied to) bigranularis, Isastræa, etc.

* Lights and Shadows; or Chequered Experiences among some of the Heathen Tribes of Madagascar;" 1877. Plate [fossils] and route-map [Antananarivo]. 8vo. The fossils are referred to on pp.38 and 68.
†† R. B. Newton, op. cit. cit.
ON A COLLECTION OF FOSSILS

Later in the same year (1889) M. Gustave Cotteau* described, but without figuring, two Cretaceous echiuroid s collected by Colonel Rocard at Antsingy, south of the Bay of Diego Suarez, in the extreme north of the island. These were determined as Guettarina Rocardi (n. sp.) and Lampadaster (n. gen.) Granidiieri (n. sp.).

Early in 1890, the late Prof. Neumayer† summarized the more important results which he considered deducible from the determinations of Mr. Baron's fossils made by myself in the previous year. He instituted a comparison between the Uitenhage (Neocomian) formation of South Africa and the Neocomian beds of Madagascar, taking the Belemnites for his palæontological standard. The only species of this cephalopod occurring in the former is B. africanus, referred to the group Absoluti, which is typical of the boreal region and the northern part of the temperate zone.

The belemnites of Madagascar are represented by the groups Hastati, containing B. pistilliformis; and Notocelii, containing B. conicus, B. polygonalis, and B. binervius; both of which groups include typically equatorial forms, and, though widely distributed in Middle European regions, do not occur in northern territories or in boreal areas. This evidence was regarded, together with other details, as demonstrating the existence of land in Cretaceous times extending from South Africa across the Indian Ocean. The whole of this subject was subsequently enlarged upon in Dr. W. T. Blanford’s‡ Presidential Address before the Geological Society during the same year.

A list of the known fossils from Madagascar was published by Mr. Baron§ in 1890. One hundred and five species were enumerated, with their horizons and localities.

In April 1893, M. Gautier¶ directed attention to the occurrence of Alectryonia (Ostrea) ungulata at Mâhamâvo (lat. 15° 30' 45" S, long. 44° 10' 50" E.) in the north-west, and alluded to the rocks containing them as of Jurassic age, specifying the strata on a map which accompanied his remarks. This was an error of judgment, as the species referred to was typically Cretaceous.

In May 1893, I described¶ the first recorded Secondary reptile from Madagascar. This interesting specimen was discovered by Mr. Baron at Andranosamonta village, in the north-west; and from its association with certain forms of molluscan remains (to be afterwards alluded to) was judged to be of Lower Oolitic age. This new species was named Steneosaurus Baroti.

Subsequently, in the same year, M. Stanislas Meunier** determined some Cretaceous oysters collected by M. Gautier at Mahamavo as Ostrea frons [= O. pectinata], Ostrea santonensis [= O. Deshayesi], both of Sénonien age; and Ostrea columba [should be Gryphaea vesicularis], of Cénomanien age. These species were well illustrated by figures of the natural size.

M. Meunier refers in the same communication to the occurrence of Inferior Oolitic lamellibranchs at Belâlîtra (west of Mojanga, lat. 15° 40' S., long.

---

‡ "Geological Notes: a complete List of the Known Fossils from Madagascar;" Antananarivo Annual for 1890, no. xiv. pp. 242-245.
** "Fossiles Malagaches;" in Le Naturaliste for 1893 (August), ser. 2, no. 154, pp. 175, 176 [with five illustrations].
FROM MADAGASCAR.  

45°20' E.), resembling Modiola; to the finding of Jurassic specimens of somewhat different horizon at Andrànomena (lat. 14°15' S., long. 45°26'10" E.), representing Natica, Pinna, Astarte, and Rhynchonella; and to the discovery of Dinosaurs relics at a place called Motèty.

Finally, Mr. J. T. Last,* in a popular newspaper article, mentions that he has collected in the northern part of Madagascar (at a spot about 20 miles east of the Bay of Narinda) the remains of a gigantic Dinosaur, which are now located in the British Museum.

III. Jurassic Fossils.—[The technical descriptions given by Mr. Newton are here omitted.—R. B.]

Cephalopoda.

BELENIITES HASTATUS, Blainville. Horizon.—Oxfordian. Loc. Andranosamonta village, landing-place. [England, Southern Europe, and India.]

BELENIITES SAUVANAUSUS, d'Orbigny. Horizon.—Oxfordian. Loc. —Andranosamonta village, landing-place. [France.]


Gasteropoda.

[Internal cast of a Patelloid shell.] Horizon.—Lower Oolite. Loc.—3 miles north of Iraony.

[A Naticoid shell.] Horizon.—Lower Oolite. Loc.—About 3 miles north of Iraony.

NATICA sp. [Casts.] Horizon.—Lower Oolite. Loc.—About 10 miles S.E. of Andranosamonta village.

EULIMA? sp. This is a sandstone-impression of a small specimen, probably referable to this genus; it was found associated with Astarte depressa, Pteroperna costatula, and Trigonia pullus. Horizon.—Oolite (Lower?) Loc.—Antankirana province, north-western boundary of the central hill-range. According to Mr. Baron, the sandstones containing this shell are largely developed in this region, but fossils are rare.

TROCHACTEONINA RICHARDSONI, sp. nov. The name of Trochacteownina Richardsoni is proposed for it, in honour of the Rev. J. Richardson, of the London Missionary Society, to whom we are indebted for the earliest published figures of Jurassic fossils from Madagascar. Horizon.—Oolite (probably Lower), from the same rocks as those which contain Steneosaurus Baroni. Loc.—Andranosamonta village.

Lamellibranchiata.


PERNA LATOCONVEXA, sp. nov. Horizon.—Oolite (probably Lower), from the same rocks as those which contain Steneosaurus Baroni. Loc.—Andranosamonta village.

GERVILLIA IRAONENSIS, sp. nov. Horizon.—Lower Oolite. Loc.—About 3 miles north of Iraony.

LIMA IRAONENSIS, sp. nov. Horizon.—Lower Oolite. Loc.—About 3 miles north of Iraony.

PTEROPERNA (allied to) COSTATULA. Horizon.—Oolite (probably Lower). Loc.—Antankirana province, on the north-western boundary of the central hill-range.

* "The Hot Springs of Madagascar ;" in The Field for May 26th, 1894, vol. lxxxiii. pp. 767,
ON A COLLECTION OF FOSSILS

TRIGONIA PULLUS, J. de C. Sowerby. This is a sandstone-impression accompanying Pteroperna costatula, Astarte depressa, etc. It has a wide distribution, having been recorded from the Antalo Limestones of Abyssinia; from Shoa, S. of Abyssinia; and from Cutch in India. Horizon.—Oolite (probably Lower). Loc.—Antankarana province, on the north-western boundary of the central hill-range.

TRIGONIA COSTATA, Parkinson. This species has been recorded from Abyssinia by W. T. Blanford, and from India by J. de C. Sowerby. Horizon.—Oolite. Loc.—About 3 miles north of Iraony.

ASTARTE (allied to) DEPRESSA, Goldfuss (Münster). Horizon.—Oolite (probably Lower). Loc.—Antankarana province, on the north-western boundary of the central hill-range.

MYTILUS MADAGASCARIENSIS, sp. nov. Horizon.—From the Oolite (probably Lower), associated with Steneosaurus Baroni. Loc.—Andranosamont village.

MOGLIOLA ANGUSTISSIMA, sp. nov. The specimen was obtained from the matrix enclosing the remains of Steneosaurus Baroni. Horizon.—Lower Oolite. Loc.—Andranosamont village.


CORBULA GRANDIDIERI, sp. nov. Horizon.—Oolite (probably Lower). Loc.—About 2 miles south of Andranosamont village.

PSEUDOTRAPEZIUM VENTRICOSUM, sp. nov. Horizon.—Oolite (probably Lower). Loc.—About 2 miles south of Andranosamont village.

PSEUDOTRAPEZIUM DEPRESSUM, sp. nov. Horizon.—Oolite (probably Lower). Loc.—About 2 miles south of Andranosamont village.

PSEUDOTRAPEZIUM ELONGATUM, sp. nov. Horizon.—Oolite (probably Lower). Loc.—About 2 miles south of Andranosamont village.

Brachiopoda.

RHYNCHONELLA (allied to) PLICATELLA, J. de C. Sowerby. This species has been already recorded from near Ankoala.* Horizon.—Jurassic. Loc.—Hill-range between the River Lokia or Loquez and the River Rodo, northeast coast.


Plante.

There are some obscure plant-remains in a lignite of uncertain age obtained from Ambavatoby on the west coast. This lignite is probably Cretaceous or Jurassic, and has been noticed "as older than Tertiary" (Annales des Mines, ser. 5, vol. vi. 1854, pp. 576); it has also been doubtfully referred to a Permico-Carboniferous horizon by Cortese (op. cit. Boll. R. Com. geol. Ital. One of the specimens collected by Mr. Baron shows the cell-structure of Equisetum (fide W. Carruthers, F.R.S.), and another appears to be an impression of a fern.

IV.—Note on the Structures of some Limestones from Madagascar.—A number of limestones collected by Mr. Baron from various localities, extending from Janjina, in South-west Central Madagascar, to the northern parts of the island, have been carefully sliced and microscopically examined. They mostly present ordinary oolite structures, the granules exhibiting the usual concentric and radiate characters. Many of these limestones

contain organisms, such as foraminifera (Criztellaria, Lizxxtuaria, Lizxgiznulzna, etc.), mollusca (Lerineza), polyzoa, corals, etc., but the most interesting form determined is that of Grizvanella, which appears to enter largely into the composition of these rocks. The minute tubules of this genus, which occur in spherules of a variety of sizes, are best seen in a black crystalline rock obtained from west of Ankaramy, off the north-western coast. The Grizvanella-spherule in this specimen is extremely large, and measures 10 mm. in diameter. Another limestone from the Antankarana province exhibits a similar structure, and, according to Mr. Wethered, resembles his species Grizpisolidica,* from British Jurassic strata. This genus, although regarded at the time of description by Messrs. Nicholson and Etheridge, Jun., as possessing rhizopodal affinities, is now generally considered to belong to the calcareous algae. It has a wide distribution both geographically and geologically, having been discovered in limestones ranging from Cambrian to Jurassic times, and is recorded from Britain, Europe, America, and Australia. None of the organisms mentioned, however, assist one to fix the precise age of the rocks in which they are found, although I am in favour of assigning them to the Jurassic period, and this chiefly on account of the presence of a brachiopod allied to Rhizxchonella plicatella in one of the limestones collected from the neighbourhood of the River Lokia or Loquez, and from which many of these rock-specimens were procured.

Lastly, a microscopic examination has been made of the Cretaceous limestone forming the Ambôhimârâna hill (south of Diego Soarez), in which the specimen of Lixmpadaster was discovered. This having been proved to be largely composed of Globizgerina, it is suggested that it be termed a Globizgerina-limestone.

V.—List of all the recognized Fossils from Madagascar.

QUATERNARY.

Mammalia.

Megaladapiz madagascariensis, Forsyth Major.†
Hippopotamus Lemerlei, Grandidier & Milne-Edwards.‡

Sus sp.†
Bos sp.†
Potamocherus sp.†

Aves.

Aépyorniz cursor, M.-Edw. & Grandidier.||
Hildebrandti, Burckhardt.¶

¶ "Ueber Aépyornis;" Palzontolozische Abhandlungen (Dames & Kayser); vol. vi. (1893) pp. 127-145, pls. xiii.—xvi.
ON A COLLECTION OF FOSSILS

Aëpyornis Mulleri, M.-Edw. & Grandidier.*

Æpyornis Mulleri, C. W. Andrews.†

Mullerornis agilis, Betsileo; M.-Edw. & Grandidier.*

Reptilia.

Crocodilus robustus, Grandidier & Vaillant.‡

Testudo Grandidieri, Vaillant.§

Mollusca.

Achatina panthera, Férussac.

Bulimusus (Rachis) punctatus, Anton.

Pomatias (Tropidophora) virgata, G. B. Sowerby.

Planorbis trivialis, Morelet.¶

Limnea Hovarum, Tristram.¶

Bulimus Favannei, Lamarck.

Grandidieri, Crosse & Fischer.

subobtusatus, Crosse & Fischer.

Helix sp.

Pleurotoma tigrina, Lamarck.**

Vertagus recurvus, G. B. Sowerby.**

Lamellibranchiata.

Paphia glabrata, Gmelin.††

Lucina tigrina, Linnaeus.

TERTIARY.

Eocene.

Mollusca.

Neritina Schmideliana, Chemnitz.

Terebellum (like) obtusum, J. de C. Sowerby.

Lamellibranchiata.

Ostrea pelecydian, Fischer.

Grandidieri, Fischer.

hippocastanum, Fischer.

¶ These species were collected by the Rev. Jas. Wills, at Sirabé, in Northern Betsileo.
** Obtained by Mr. Last from Ambatomifoko, south-west coast.
†† Obtained by Mr. Baron from Fiherinana, south-west coast.
Foraminifera.

Alveolina oblonga, d'Orbigny.

,,,, longa, Czjzek.

,,,, (allied to) oooidae, d'Orbigny.

Nummulites Beaumonti, d'Archiac & Haime.

,, subbeaumonti, de la Harpe.

,, acutus, J. de C. Sowerby.

,, obesus, d' Archiac & Haime.

,, biarritzensis, d'Archiac & Haime.

,, Ramondii, Defrance.

,, (allied to) Bellardii, d'Archiac.

,, perforatus, d'Orbigny.

,, complanatus, Lamarck.

Assillina spira, Roissy.

Orbitoides (allied to) papyracea, Boubée.

Orbitolites (?)..

Rotalia (?)

Triloculina (like) trigonula, d'Orbigny.

SECONDARY.

CRETACEOUS.

Mollusca.

Cephalopoda.

Nautilus Fittoni, Sharpe. Upper Cretaceous.

Belemnites conicus, Blainville.

,, polygonalis, Blainville.

,, pistilliformis, Blainville.

,, binervius, Raspail.

,, Neocomian.

,, Banellibranchiata.

Alectryonia unguulata, Schlotheim.

,, pectinata, Lamarck.

,, Deshayesi (?), Fischer de Waldheim.

Gryphaea vesicularis, Lamarck.

Exogyra ratisbonensis, Schlotheim. Middle Cretaceous.

Lima sp.

Pecten sp. \ Neocomian.

,, Upper Cretaceous.

Echinodermata.

Lampadaster Grandidiier, G. Cotteau.

Gueffaria Rocardi, G. Cotteau.

,, Upper Cretaceous.

Foraminifera.

Globigerina sp.

Frondicularia sp.

Nodosaria sp.

,, Upper Cretaceous.

Bulimina ?

Jurassic.

Reptilia.

ON A COLLECTION OF FOSSILS

Mollusca.

Cephalopoda.

*Belemnites Sauvanausus*, d'Orbigny.

*Perisphinctes* (allied to) *polygyratus*, Reinecke.

*Rhyncholites* (allied to) *gigantea*, d'Orbigny.

*Stéphanoceras macrocephalum*, Schlotheim.


*Herveyi*, J. Sowerby. Lower Oolite.


*Lytoceras fimbriatum*, d'Orbigny.

*Phylloceras heterophyllum*, J. Sowerby. Liass.

Gasteropoda.

*Nerita Buignieri*, Morris & Lycett.

*Nerinea* (allied to) *Eudes*, Morris & Lycett.

*Natica* "", *intermedia*, Morris & Lycett. Lower Oolite.

"", "", *Verneuilii*, d'Archiac.

"", "", *cincta*, Phillips.

"", "", *canaliculata*, Morris & Lycett.

"", *Clio*, d'Orbigny. Oxfordian.

*Natica* dubia, Römer. Kimeridge.

*Nerinea leiogryra*, Fischer. Jurassic.


*Solarium* (near to) *polygonum*, d'Archiac. Great Oolite.

*Trochus* "", *Tobetsoni*, Morris.

*Alaria* sp.

*Eulima* sp.

*Trochacteonina Richardsoni*, R.B.Newton (sp. nov.). Lower Oolite.

Lamellibranchiata.

*Ostrea Sowerbyi*, Morris & Lycett.

*Alectryonia gregaria*, J. Sowerby.

*Perna mytiloides*, Lamarck.

"", *orientalis* (?), Hamlin.

"", *latoconvexa*, R.B.Newton (sp. nov.).

*Pteroperna costatula*, Deslongchamps.

*Gerilliira iraonensis*, R. B. Newton (sp. nov.).

*Lima iraonensis*, R. B. Newton (sp. nov.).

*Modiola imbricata*, J. Sowerby.

"", *angustissima*, R. B. Newton (sp. nov.).

*Mytilus madagascariensis*, R. B. Newton (sp. nov.). Lower Oolite.

*Cardium Grandieri*, R. B. Newton (sp. nov.).

*Cypricardia rostrata*, J. Sowerby.

"", (allied to) *bathonica*, d'Orbigny.

*Pseudotrapezium ventricosum*, R.B. Newton (sp. nov.)

"", *depressum*, R. B. Newton (sp. nov.).

"", *elongatum*, R. B. Newton (sp. nov.).

*Trigonia pullus*, J. de C. Sowerby.

"", *costata*, Parkinson.

*Astarte* (allied to) *angulata*, Morris & Lycett.

"", "", *depressa*, Münster (Goldfuss).

"", *alta*, Goldfuss. Liass.

"", *phylis*, d'Orbigny. Oxfordian.
FROM MADAGASCAR.

Astarte (allied to) minima, Phillips.
,, (?), Baroni, R. B. Newton.
,, (allied to) excavata, J. Sowerby.
Sphæra madagascariensis, R. B. Newton.
Corbula pectinata, J. de C. Sowerby.
Pholadomys ambigua, J. Sowerby.
Ceromya concentrica, J. de C. Sowerby.
Opis (allied to) trigonalis, J. de C. Sowerby.
Lucina Bellona, d'Orbigny.
Myopsis dilata, Phillips.
Nucula ovata, Zieten. Lias.

Brachiopoda.
Terebratula maxillata, J. de C. Sowerby. Lower Oolite.
Waldheimia perforata, Piette. Lias.
Rhynchonella (allied to) variabilis, Schlotheim.
,, plicatella, J. de C. Sowerby 
,, concinna, J. Sowerby. Lower Oolite.
,, obsoteta, J. Sowerby.
,, (allied to) tetrahexa, J. Sowerby. Lias & Lower Oolite.

Echinodermata.

Pentacrinus sp. Lias (?).
Acrosalenza sp. Lias.
Stomechinus (allied to) bigranularis, Lamarck. Lower Oolite.

Actinozoa.
Montilvaltza trochoides, M.-Edw. & Haime. Lower Oolite.
Episimilia Grandidieri, Fromentel.
Isastra Fischeri, Fromentel. Lias (?).
Thamnastrea.

Foraminifera.

Textularia sp.
Cristellaria sp. Jurassic (?).
Lituola ?
Marginulina sp.
Nummulites sp.
Planorbulina sp.

Plantaé.

Girvanella sp. Calcareous Algae (?). Jurassic (?).
Equisetum sp. Equisetaceæ.
L.M.S. CHURCHES AND CONGREGATIONS, AND
CHRISTIAN LIFE IN MADAGASCAR.

GREAT success has followed missionary work in Madagascar. One remarkable illustration of this is the fact that, in connection with the London Missionary Society's Mission alone, there are in Madagascar to-day a total of more than fourteen hundred buildings which have been erected and are used for public worship. We may call these buildings churches, chapels, or meeting-houses, or christen them by any new name we please, but the simple-minded people in Madagascar are content to call them Tràno-fiang'ômana, i.e. "Houses for gathering together in" (tràno, house; fiang'ômana, gathering). The same buildings are, in nine cases out of ten, used as school-houses during the week. These fourteen hundred buildings are of various sizes, the largest having ample accommodation for a thousand or even more worshippers, while not more than forty or fifty could meet in the smallest. Their merits too are various, ranging from the really beautiful Chapel Royal, and the four substantial stone Memorial Churches, with others, in the city of Antananarivo, to the simplest, frailest, and most miserable sheds, made of sticks and rushes, without either doors or windows, in which, in some small country places, the people gather, and in which simple services are held.

In order to meet the religious wants of the people, it must be admitted that there is no absolute necessity for a few out of these fourteen hundred churches connected with the London Missionary Society's Mission in Madagascar. Strength and funds have been unnecessarily expended in their erection. They are one of the unhappy results of different Missions occupying the same field. Only within the past month I expressed my surprise to some native Christians that a rude place of worship had been erected for a very limited and scattered population within reasonable distance of a church already in existence, and I asked the reason for erecting the new place. The reply I received was this: "Raha tsy nanaovan'ana, dia tsy maintsy ho nanaovan'ny hafa, na ny Besopy, na ny Katolika," i.e. "If we had not put it up, either the Norwegian Mission, or the Roman Catholic Mission, would have been sure to have built a church."

Unworthy structures as some of our churches undoubtedly still are, great advance has been made in church building in Madagascar during recent years. The building where I first attended public worship in Antananarivo in 1863, and in which I afterwards first preached to a Malagasy congregation, was a long, low, narrow shed, which for many years had been used as a Government carpenters' workshop. It was dark and dirty and infested with small vermin and rats, these latter frequently running races round the top of the low mud walls while the service was being held. This shed was succeeded, in 1866, by a modest brick building with thatched roof; and that again has been succeeded by the church which was publicly opened on the 9th May this year, and of which the account published in the Madagascar News says: "This
new church is constructed entirely of burnt brick and stone, and is very solidly built throughout of these materials, no sun-dried brick being used in any part of it, or of its boundary walls and gateway. It consists of a nave 78 feet long, 36 feet wide, and 27 feet high to the wall-plates, with a shallow chancel recessed 6 feet and carried by a bold pointed arch. The north front shews a lofty bell-turret with open arches, and crowned with a low zinc-roofed spirelet, 85 feet high to the finial. Two tall lancet windows occupy the central portion, and boldly projecting buttresses enclose the chief entrance and porch. Doublets of smaller windows are placed on each side of the main gable. The church is also lighted by lancet windows on each side, and by a tall triplet window in the chancel. To relieve the monotony of red brick in the interior, a large surface of wall around the windows is plastered with lime, and can be hereafter ornamented. A deep gallery, with pierced tracery front, gives accommodation for about 300 people."

The mother-church of the district at present under my charge is at Fianarantsoa, in the Betsileo province. The main walls of this church are built of sun-dried bricks, faced, in some of the more exposed parts, with burnt bricks, and having finishings of wrought stone. There are three entrances. The windows are of tinted cathedral glass, sent out from England. The area is seated, and at the north end of the building there is a deep gallery. The strong massive roof is covered with native-made tiles. The building will comfortably accommodate a congregation of seven or eight hundred.*

Many of the churches in the villages of the central parts of Madagascar, which have been built during the past ten years, are models of what village churches should be. With their lofty tiled or thatched roofs, they form the principal object in the villages, and are conspicuous features in the landscape, and the interiors of these village churches are often models of neatness. At a village called Ankaronosy, about four miles from Fianarantsoa, there is a church which fairly represents a good modern village church in Madagascar. The walls of that church are built of sun-dried bricks; the wood of the roof is strong and is neatly framed and put together; the covering is grass thatch; the door is well made and is fitted with hinges, bolts, and lock; the windows have some little architectural ornamentation and are glazed with embossed glass; inside, the walls are surmounted with a suitable cornice, and both walls and cornice are carefully plastered and neatly coloured; the raised platform at the south end is faced with wrought stones, and has stone steps leading up to it, and the greater part of the area of the church has forms, on which some of the congregation sit. This building can honestly be spoken of as a model village church, and none could wish to see a more appropriate country place of worship even in England. There are many equally becoming in different parts of the island, and a few considerably better.

With some small assistance from the Mission, the natives of Madagascar connected with the London Missionary Society build their own churches, which are looked upon as the property of the people gathering

* For knowledge of how to make and how to build bricks, the Malagasy are indebted to the missionaries. It is one of many indirect benefits they have received from the missionaries who have lived and laboured among them.
in them, and not as belonging to the Mission. The cost of building a
curch varies much in different parts of Madagascar. Such a village
church as I have referred to costs about £20 in the Betsileo province.
This sum, however, does not pay for all the work, but it about meets
the actual outlay in £. s. d. In building churches in this country we
do not set about the work as many congregations do in England. We
do not first employ an architect, and then a builder, and then skilled
workmen for various parts of the building, and spend £10,000 when we
have only £5,000 in hand, and so cripple ourselves for five, ten, or
twenty years to come. No; in this respect I think we are wiser than
some of our friends at home. In building a church in Madagascar, the
people not only give a donation of money, but they also often do much
of the work connected with the building with their own hands, and for
this they do not look for any payment. As a rule, when a new church
is to be erected, the ground is levelled, and the foundation prepared, by
the congregation, who make an appointment for a certain morning,
when the men, women, and children come in a body with spades and
baskets and do the necessary work. An estimate is also often made of the
number of bricks which will be required, and then a division is arranged
—as many to Mr. So-and-so, and so many to Mrs. So-and-so, according
to the social position occupied, or the supposed ability to furnish the
number. These good folks then either set to work and make the bricks
themselves, or undertake to be responsible for them. In the case of the
tiles with which our church at Fianarantsoa is covered, the men, women,
and children voluntarily carried the 24,000 tiles from the place where
they were made and burnt to the building, a distance of more than a
mile, and involving hundreds of journeys to and fro, and up and down
a rather steep hill.

Of all the difficulties connected with church building, that of getting
the heavy timbers required for the roof is the greatest in most parts of
Madagascar. There are no timber-yards where the wood required can
be selected and purchased. In the neighbourhood of the forests there
are wood-cutters, and it is usual to make a bargain with these to cut
down huge trees and to reduce them with their hatchets to within a
few inches of the dimensions required. These wood-cutters, however,
do nothing but fell the trees and square them roughly to your dimen-
sions. You must get them to where you want them to be—fetch them,
perhaps forty or fifty miles, from some valley in the dense forest, through
which you must cut your way before you can advance. The difficulty is
enormous, for there is no other way of getting your beams from where they
lie in the forest than by actually dragging them over hills and valleys, up
steep, rugged, and precipitous places, through morasses, swamps, and
rivers, to the spot where you want them to be. In connection with work
of this kind, however, we have often had the proverb verified that “Many
hands make light work.”

To bring the heavy beams for a church from the forest, the male
members of the congregation turn out on an appointed day, and carrying
with them uncooked rice and cooking vessels, are prepared to camp out
for the time required. On reaching the spot in the forest where the tree
has been felled, they fit strong ropes or tough creepers to each end of
the roughly cut beam, and then making a pull, and a strong pull, and a
pull all together, and a good many such pulls, with an indefinite number of groans and shouts, in two or three days perhaps the beam gets near its destination. Having been successfully brought thus far by the men, a message is sent forward to the village or town in which the church is building, whereupon the women also turn out and go to meet the party from the forest, and join their husbands, sons, or brothers, or sweethearts, in bringing the beam home. The excitement increases as the destination is neared, and culminates in hearty mutual congratulations, and vigorous hand-shaking and loud shouting, with strange gesticulations and lurid waving of their flowing robes, when the terminus is really reached.

This is the way in which the heavy beams are often secured. Other necessary timbers are carried by two or four men on their shoulders, while lighter poles and planks are carried by one individual on the head or shoulder.

In all parts of Madagascar where I have lived and laboured, or where I have visited, the Sunday is as well observed outwardly as in any place with which I am acquainted in England or Scotland. It was not so when I first arrived in the island, for then the public markets were held, bazaars were opened, government and other business was carried on, and the ordinary occupations of the people were followed as on the other days of the week. This change in the outward observance of the Sabbath is one of the many great changes which have come over Madagascar by the blessing of God on missionary labour. Saturday is, in most places, the great washing day and bathing day, and, among the women, hair-doing day, for our religious population like to be clean and to have clean clothes (at least the outside ones) on Sunday morning. On a fine Saturday the banks of the rivers in the neighbourhood of the large towns are white with the clothes which have been washed in the streams and then spread on the bank to dry. When Sunday morning dawns, a pleasant quiet reigns throughout all the towns where Christianity has established itself and made any progress—a quiet which is broken only by the sound of the church bells or native-made trumpets (large conch-shells), and by the companies of clean-looking and neatly-dressed natives going to public service.

This is a marvellous contrast to the state of things which existed in Madagascar in days which are remembered by some who still live. Then, the few disciples of Jesus Christ were wont to leave their homes at night and cautiously to steal along by separate paths to the house of a friend they trusted; and there in the dark they sang and prayed and repeated to one another portions of God's Word, but all in a soft undertone of voice, lest they should be heard and betrayed. And then, e'er the morning broke, they returned to their homes in the same cautious quiet manner in which they had left them.

With us in Fianarantsoa the bell is first rung at 7.30 a.m. This first ringing is a sort of general reminder that it is Sunday morning. At 8.30 the bell is rung again. This ringing No. 2 is to announce that it is time to start for church. Yet once more, at 9 o'clock, the sound of the bell is heard. This ringing No. 3 is to indicate that the hour for commencing the service has arrived, and those who are not already in the church quicken their steps to get there. The need for these three ringings will be apparent when it is remembered that only
one here and another there among the natives has a time-piece, and that there are not any public clocks.* With the great majority of people in Madagascar, time is estimated by the position of the sun in the heavens, or by the length of the shadow cast by various objects.†

One thing among many others which we have sought to teach the Malagasy Christians is, that as God blesses and prospers them, they should give to Him and for the extension of His kingdom, and also for the relief of the poor and suffering; and the practical outcome of this teaching is, that at the doors of our churches there is nearly always something into which, as they enter, the people can drop their offerings. This “something” varies. It is seldom so substantial as the receptacle which meets you in every church lobby in Scotland, nor is it always so neat as many of the weekly-offering boxes which we find in churches in England. At my church in Fianarantsoa, at each of the three doors, there is a neat wooden stand, on the top of which a clean white plate is placed. These are suitable and becoming, but in some of our churches I have seen plates not so clean or white; also basins of various sizes, age, colour, and condition; also empty sardine tins, and empty jam tins, and even empty gunpowder canisters, placed at the church door to receive the weekly offerings! Education concerning what is becoming is progressive, as it is concerning a thousand other matters. Many of the Malagasy Christians never enter church on Sunday morning without making an offering, however small it may be. There are a few—first cousins perhaps of some in Christian countries—who have eyes, but do not see the plate, or who have got into the chronic condition of looking in another direction just as they are coming to the spot where the plate stands.

Our churches in Fianarantsoa are provided with comfortable seats, and so are many others in the more important towns of Madagascar, but only a limited number of the churches in the country districts are thus fitted; and where seats have been introduced, they often exhibit a variety which does not lend enchantment to the appearance of the interior of the building. They appear to have been placed in the church by different donors, each of whom had his or her idea of height, length, and pattern. The Malagasy custom in their homes is to squat on the mud floor, which they cover with neatly plaited rush mats, and that is the posture taken by the congregations in the great majority of our country places of worship; but, whether using seats, or squatting on the ground, the men always occupy one part of the building, and the women the other. Husband and wife, brother and sister, mother and son, never sit side by side in our churches. This is not altogether peculiar to religious assemblies; it is often followed in other public gatherings.

On special occasions—such as the opening of a new church, and on Christmas Day—our congregations present a much gayer appearance than at the ordinary Sunday services. At such times many of the people appear in various-coloured silk and cotton skirts and jackets and robes, and some who are wealthy enough to purchase, or to hire, such things, come decked out in European attire, the native ladies wearing hats.

* One has recently been placed in the Roman Catholic Cathedral at Fianarantsoa, and there are four in Antananarivo. I do not know of any others.
† See Annual XVIII., pp. 222, 223.—EDS.
bonnets, and dresses, of both modern and antiquated fashions. There are exceptions, but as a rule, these articles of European clothing do not become the Malagasy, and I fear that their comfort is greatly interfered with by wearing them rather than the simple and becoming native lamba; but, as in England, so in Madagascar, it is somewhat difficult to repress female vanity in relation to dress. Some of the provincial native gentry, who are not accustomed to boots, think it becoming to wear them on these special occasions. They frequently become too irksome to be very long endured by feet unaccustomed to such restraints, and it is not uncommon to witness their quiet removal during the progress of the service, and at the close to observe the owner either carrying the smart pair of boots in his hands, or else to see them in the care of a faithful slave, to whom they have been handed to carry home.

An ordinary Sunday morning service in L.M.S. churches in Madagascar includes singing, reading the Word of God, prayer, and a sermon. From the commencement till the close of the service, the behaviour of the congregation is, as a rule, reverent and becoming, and during prayer all bow down and close their eyes; even the children cover their faces with their hands or with their loose lamba, and there is seldom any noise to irritate or to disturb the person who may be leading the public devotions of the people. In many churches the door is closed during prayer, and a deacon keeps guard to prevent anyone either coming in or going out. To the generally reverent and becoming behaviour of the Malagasy in church, I am obliged, however, to notice one exception. Notwithstanding all that we have said against it, many Malagasy will take snuff during public service. The stimulant is not taken in small pinches up the nostrils, but in good large quantities in the mouth; and as it is sooner or later ejected again, they either make the churches very dirty with their spitting, or they make use of the small spittoons with which they provide themselves. In handling the snuff-box, or in passing it to their neighbours, and in shuffling about for the spittoon, there is now and again a little to offend the differently educated taste of the missionary.

The singing is the most popular part of the service in Madagascar and is entered into very heartily. In many of our Betsileo churches the people stand during singing. This is a modern movement, for they used to squat from the moment of going into church until the service was over. The Hymn-book in general use contains 342 hymns. Some of these are purely native compositions; others have been written by the missionaries, and others again are translations or adaptations of English hymns. "When I survey the wondrous Cross," "Mothers of Salem," "Rock of Ages," "Abide with me," and many other well-known hymns have been translated and are sung at our services from time to time.

The Malagasy are very fond of singing, and during the days of persecution the Christians often solaced themselves with their hymns. How different the conditions under which they sang then, and in which they sing now! On several occasions during the persecutions the words of their sacred songs were sung with their dying breath. While the cruel flames were gathering round those who were burnt to death on the spot where the Children's Memorial Church in the capital now
stands, it is said that they sang a hymn, two verses of which may be translated:—

“There is a blessed land
Making most happy,
Never thence shall rest depart,
Nor cause of trouble come.

“The departure of this life,
Just a moment’s pang,
Is all that separates
From that blessed land.”

The Bible is, of course, always read at our public services in Madagascar by the missionary or the native who is conducting the service, and a good proportion of the congregation follow the reading in their own Bibles. It has become a habit to bring the Bible to church, and in some of the larger congregations it is quite refreshing to hear the rustling noise, as the people turn over the pages of their Bibles or New Testaments to find the chapter which has been announced for reading.

We have not yet very many books in Madagascar, and we certainly are not flooded with all sorts of doubtful literature, as are some of the countries which boast of advanced civilization and education; but if Protestant missionaries continue their labours, and the British and Foreign Bible Society is liberally supported, there is a happy prospect of Madagascar being filled with the Sacred Scriptures. In 1893 there were 20,000 Bibles and over 24,000 New Testaments received into the island—no inconsiderable number to add to the many thousands already in the hands of the people. For printing the Malagasy Scriptures and for most of the cost of translating them, we are indebted to the British and Foreign Bible Society of London; and by the generosity of that noble Society we can sell a complete Bible in Madagascar for one shilling, and a New Testament for four-pence.

The devotional part of our public services, as conducted by an average native, does not reach a very high standard. Profound reverence, consciousness of guilt, a deep sense of need, and earnest longing for blessing, are not frequently manifest in the public petitions of our people. There is also an unfortunate running in ruts among them, and with some who offer prayer in public, it is frequently easy to tell beforehand what the wants will reveal themselves to be, and to prophecy the words in which these brethren will present their petitions. On the other hand, it must be acknowledged that there are men and women among the Christians of Madagascar who really draw near to God in prayer and pray in the Spirit; some have been known to have been quite broken down while engaging in prayer, and to be obliged to give up because their utterances were choked with sobs. Native prayers sometimes strike you by their singularity; but is not that also the case now and again with English ones? The L.M.S. Chronicle or January, 1894, told of a good old man at a prayer meeting in England, whose petition was: “O Lord! may we not only be justified and sanctified, but may we be missionarified as well.” That sounds a little strange. Among the singular petitions which I have heard presented in Madagascar was that of a village pastor, whose prayer was; “Aoka izohay ho araka ny teny
voalaza ao amin’ ny Romana toko viii., andininy 8,” i.e. “May we be like the words which are written in Romans viii., ver. 8.” It sounded rather strange for this coloured brother thus to mention the book, chapter, and verse, and I fear that his memory had failed him, for the special verse mentioned hardly points out a condition to be longed for.

The sermon is generally listened to with attention by a Malagasy congregation, whether the preacher is a native or a missionary. Many Malagasy are born orators and can speak fluently and effectively on any topic, and not a few among the Christians are intelligent and earnest preachers, who are well able to exhort and instruct a congregation. Of course the sermons preached in Madagascar on ordinary occasions have not that depth of thought which characterizes many of the discourses delivered from pulpits in England and Scotland; but then there is very little demand for such. The general intelligence of the majority of the people has not yet reached a very high standard, and in a Malagasy congregation there are always some present who cannot read, and others to whom Christianity is still a novelty. Many, even among the members of our churches, are still “babes,” or if not that, they are only as boys and girls in Christ, for whom good “milk” is better food than “strong meat.” Such food is served out to them every Sunday by many of the native preachers, of whom there are a large number connected with our churches. The position they occupy is almost exactly that of the village, or local, preacher at home, and for supplying the pulpits they are regularly “planned” from time to time. Some of these men are intelligent and faithful preachers. The following is the outline of a sermon to which I listened from one of them, and will, I think, confirm my opinion of them. The subject of his discourse was Salvation, from the text: “God hath not appointed us unto wrath, but to obtain salvation......” In his treatment of the subject, this native preacher had six divisions, which were: i. Salvation is a good thing; ii. Salvation is to be found in one Person only; iii. Salvation is sufficiently abundant for all to partake of it; iv. Salvation has not to be paid for, but is a free gift; v. Salvation has not to be fetched from afar, but can be had just where you are; vi. Salvation is ours the moment we believe in Jesus Christ.” Enlarging on each of these particulars, this man laid before the people very earnestly and faithfully the way of salvation through our Lord.

The aid of illustrations is often called in by our native preachers to unfold the meaning of the text, or to carry home and enforce its lessons. These illustrations vary much in their value and force and in their correctness and beauty. In the class of bad or inferior ones, the reader will probably place the following. One of our good men was preaching from the text: “Beware of false prophets, which come to you in sheep’s clothing, but inwardly they are ravening wolves;” and in explaining the reference to the wolves being in “sheep’s clothing,” he said: “Sheep in that part of the world have their wool cut off every year, and the wind often blows at the time and scatters some of the wool about. The wolves watch their time and opportunity, and having previously rolled in sticky mud and covered their bodies with it, they come to the place where this scattered wool is lying about. They then roll in it, and the wool adhering to the sticky mud gives them
the appearance of sheep, and in this condition they craftily enter the flock as members of the fraternity and ensnare the poor sheep”!

The following is better—I venture to think really good. The preacher was wanting to influence the congregation to rid themselves of all selfishness in seeking to get to heaven, and was trying to encourage the people to use efforts to take others with them. He had recently returned from a visit to Antananarivo, and while there he had been privileged to go inside the Queen’s Palace. “I went,” he said, “to the Palace. How shall I tell you about it? How shall I describe what I saw? I cannot do it. It is beyond my powers of description. It was surpassingly grand. It was the height of excellence. It was the ideal of the beautiful. What mirrors! What sofas! What chairs! What ornaments! What bright decorations! On this side, and on that side, and all around, there was everything that the heart could wish for and all that the soul could desire. While I was admiring all this, a voice seemed to say to me: ‘R—, this is a fine place! This is grand! This is splendid! Would you like to live here?’ I seemed to reply: ‘Yes; certainly, I should like to live here.’” “And then,” he added, “again the same voice seemed to speak and say: ‘But R—, if you were the only inhabitant of this beautiful place? If you had to live here alone? If neither your wife, nor children, nor any of your relatives or friends were with you to keep you company, would you still like to live here? Would you be happy here?’”

In answer to these enquiries, he said, “I seemed passionately to exclaim: ‘No, no! The beauty would not satisfy me. The grandeur would not make me glad. The ease and glittering ornaments would not make me happy. No; if I had not somebody for my companion, and if there were not others to share it with me, I should be miserable even in this beautiful Palace.’”

The services of the Malagasy preachers are, as a rule, quite voluntary; even though they may have to walk some distance to take services, they do not often receive any remuneration. With one or two exceptions, none of the native pastors are supported by the L.M.S. In the great majority of the churches the office of pastor is honorary, and for the support of themselves and their families during the week they follow their ordinary occupations. In some few places the people are beginning to understand that, in spiritual as well as in temporal things, “the labourer is worthy of his hire,” and at one place well known to me the members of the church decided to give a fee of sixpence to the preacher at every service; and a laudable effort is being made in a few towns to support the pastors of the churches. After a service which I once conducted in the Chapel Royal at Antananarivo, a huge joint of raw beef and the sum of eight-pence in money were sent to me by the secretary of the church. Such is, I believe, the usual “fee” given to those who are invited to occupy the pulpit in that prominent church in the Capital city, where Malagasy Royalty and the Court assemble for public worship.

In Fianarantsoa our morning service closes about 11 o’clock, and our second Sunday service commences at 2.30 in the afternoon, and in most of its details is a repetition of that held in the morning. The interval between the morning and afternoon services is occupied first in taking the mid-day meal; and when that is over, the adults who are
willingly gather in the churches for Bible classes, while the children and young people assemble in other buildings for Sunday School and religious instruction suited to their age and capacity. The Bible classes and Sunday School close at 2.30, when, as I have said, the afternoon public services commence. At the close of the services a united prayer meeting is held in one of the three churches in rotation, which is frequently attended by four or five hundred people.

In Madagascar we do not hold evening services. Malagasy habits do not favour meetings after dark. There are no regular or paved streets in any of the towns or villages, and no public or private street lamps; so that it is not pleasant, and is sometimes dangerous, to go about after dark. The natives commence to cook the most important meal of the day soon after sunset (which is never later than a quarter to 7 o'clock), and the meal is eaten as soon as it is ready. Immediately after this they spread their mats on the floors of their huts, lie down, make themselves comfortable, and are very soon in dreamland.

The attendance at public worship in the larger towns does not vary more than at home. In those parts of Madagascar where missionary work has been carried on for many years, going to church on Sunday has become nearly as much a habit with the people as in England and Scotland.

In some of the country districts, however, truth compels me to state that the attendance at church is not always a voluntary act on the part of the still ignorant and non-Christian natives. The heads of the tribes and some of the more important chiefs and others do sometimes use a little more than moral influence to get the people to church. We missionaries think their conduct in this matter mistaken zeal, but the chiefs do not always take our view, and reply to us that whatever brings the people within the sound of the Gospel, which otherwise they would not come to hear, is not only lawful but good. Even some of whom we might expect better things are a little wide of the mark in the kind of influence which they bring to bear upon the still ignorant and heathen portion of the population to get them inside the churches. About three years ago the pastor of one of our country churches called on me, and during our conversation I asked him about the congregation, the services, and the general progress of the work at the village where he lived, which is about half a day's journey from the Mission station. He replied that they were getting on first-rate, that they were doing splendidly, and that in fact there was quite a revival among them. He further said that on Sunday there were as many outside the church as there were inside, and that one preacher, with some who could sing, held a service outside the building, while the ordinary service was conducted inside. This was quite a new condition of things, and I was greatly interested and asked the pastor if he could account for it. In answer to my enquiries the good man went on to tell me, with much self-satisfaction, that they had appointed overseers in the district, and that they had made and put in force local laws to the following effect: Every adult not attending public service on the Sunday was to be fined three-pence, unless illness or any other equally satisfactory reason could be given for non-attendance; and every overseer not attending the service himself was to be fined one shilling. The good man volunteered the
further information that one half of the fines were added to the church funds, and the other half went into the overseers' pockets!

It need hardly be said that we missionaries do not approve of the use of such means, but sometimes we are powerless to prevent them in places far away from us. If any reader is inclined to be very severe in his or her criticism of the way in which some of our churches are filled, let me remind such that a similar condition of things was once found in Great Britain. In 1508 the Kirk Session of Aberdeen decreed a six-penny fine for every absence from a service; elders and deacons to pay two shillings. Thirty years later a citizen and his wife could not stay at home on the Sabbath under a penalty of 13s. 4d.; in 1651 gentlemen were to be "damned in 6s. 8d., men in 3s. 4d., and servants in twenty pennies." Snuff-taking in church was fined 6s. 8d.

Incidents occasionally happen in connection with our Sundays and our Sunday services which will perhaps sound a little amusing to those unaccustomed to such things. Any minister in England would, I suppose, think it rather strange if, when on his way to church on Sunday morning, some good soul on the other side of the road should shout out to him and say: "Mr. So-and-so, have you got a supply of vaccine now? because Mrs. So-and-so wants to have her child vaccinated." Such happened to me when on my way to church on Sunday morning.

The following too would, I suppose, rather shock many good folks at home. One Sunday I preached morning and evening in one of our churches in Fianarantsoa, and I hoped that serious impressions had been made and useful lessons taught. However, immediately at the close of the afternoon service, I found that thoughts on other subjects had been in the mind of at least one member of the congregation, for before I left the platform, this particular native gentleman approached me and, in a very confidential tone of voice, said: "Sir, if you have got one of those long coats which are worn in cold weather, do please allow me to buy it." On one occasion, when out in the country and speaking to the headman of the village about God and Jesus Christ, I was most unceremoniously interrupted by a woman who wanted to know if I would not give her my white umbrella, or, if I would not do that, if I was willing to exchange my good white one for her old blue one! At the port of Tamatave we were standing singing a hymn in the middle of the public service, when a young fellow entered the building and made straight for the precentor and delivered some message. Then and there Mr. Precentor vacated his position and left the church, with the result that the singing broke off in the middle of a verse and came to an abrupt and ignominious termination.

Approval of what is said by the preacher in his sermon is frequently expressed during the delivery. This is not done by shouting "Hallelujah!" or "Amen!" as among Wesleyans and at Salvation Army gatherings, but by a click made by the tongue and lips. A volley of these clicks is no uncommon sound when the preacher happens to put the truth in a novel or striking manner.

In drawing this paper to a close I wish to refer briefly to the character of the native Christians who are connected with the churches of which I have been writing. Malagasy Christianity, like that of many other countries which have had far longer and greater advantages, is not per-
AND CHRISTIAN LIFE IN MADAGASCAR.

fect; but my personal opinion is that many of the Christians in Madagascar will bear favourable comparison with the average Christian found in other places. Some of them, if put in the balances, would doubtless be found wanting. In some, serious defects of moral character have been discovered. Some have excrescences more or less ugly. In only a few is faith so strong, love and devotion to Jesus Christ so deep and true, and the moral character so absolutely transparent, as we should like to see these things. Our Christians might be better than they are, but, with equal truth, it may be said that they might be far worse. When offering prayer, I once heard a Malagasy say: "O Lord, some among us make a profession of religion, and their names are on the preachers’ list, but it is not from love, it is only hypocrisy." That is undeniably true of some. There is no flock, the proverb says, without one black sheep. A profession of Christianity is popular in the interior of Madagascar now-a-days; but, at the same time, we cannot but magnify the grace of God which during recent years has been and still is working among the Malagasy, and undoing much of what the Devil has been doing since Madagascar had an existence.

In estimating the character of professing Christians in Madagascar, we must bear in mind that we are now only among the first generation of such. The older fathers and mothers to-day in Madagascar were born in homes surrounded with heathen darkness, and their environments in early life were ignorance, superstition, idolatry, and sin. It is no small matter for such to leave the ways of their forefathers and to live in all respects as Christians should do. A conscience has had to be created in them in relation to many sins, and many stubborn prejudices have had to be overcome. Some of the older men and women, although they have come out of the darkness and have accepted Christianity, and are followers of Christ and members of our churches, have great difficulty in getting free of old thoughts and superstitions and in throwing off all old associations. During an itinerating journey which I took about three years ago, I met a member of one of our churches, a man very well known to me, so we stopped and exchanged greetings and had a short conversation by the hill-side. I learned that he was returning home from a distant village, where he had been to attend the funeral of a friend who had been killed in an attack made on the village by a band of robbers. The conversation led to my asking this man how his friend had been killed. Was he, I asked, shot by a musket ball, or speared? or how came it to pass that he was mortally wounded? My enquiry as to whether his friend had been killed by a musket ball immediately arrested his attention and called forth a quick reply in the negative. "Oh, no, no!" he said, "shot? shot? oh dear, no, no! It could not have been that; impossible! My friend had a charm against bullets which made him quite invulnerable to any shot which the robbers could have fired."

But while faithfulness has led me to record that little story, it is not difficult for me to give illustrations of stronger and nobler and more enlightened Christians who are connected with our churches.

Our Lord said: "By their fruits ye shall know them." We do not wish any other standard than that to be applied to the members of our churches in Madagascar. It is, we may be sure, the truest and best,
or the Lord Jesus would not have given it. What then are some of the "fruits" which we rightly look for in professing Christians? Is not honest voluntary confession of guilt, and willingness to make restitution for the past, one of them? You may find that among the Malagasy. Not very long ago one of our young men came under religious impression. He was convinced that his past life had not been all right, particularly was he conscience-stricken that, on one occasion, he had stolen money belonging to a missionary, of the value of about eight shillings. At the time I am referring to he professed penitence, and he shewed the sincerity of his repentance in this way: The missionary who was the owner of the stolen money was not on the spot, but the young man went to another missionary and, after confessing his crime, said: "I should like to do as Zacchæus did and restore four-fold, but I am not wealthy and cannot do that, but I would like to give back eight shillings more than I took," and he handed to the missionary the sum of sixteen shillings. Such a voluntary confession of wrong-doing, and such a voluntary act of restitution, are surely "good fruit" which testify that the tree on which they are found is "good."

And is not sympathy with those who are in trial and sorrow also a mark of good Christian character? We find this among Malagasy Christians. Three years ago the Rev. R. Roberts died, after a very short illness, at a small town a long day's journey from any European, leaving a young wife and infant daughter. On the day of his death the Hova Governor of the place, who is a professed Christian, wrote a letter to the wife, who herself was ill and prostrate with grief, which translated into English reads as follows: "My heart is indeed full of sorrow when I think of you and the baby. My great desire is that you should look to Jesus Christ, Who is the Consoler we love. Even those who know not the Saviour control their grief when overtaken by trouble such as this, much more should we, who have hope, do so. I repeat what I have said, Madam: Cast this great trouble upon God. If you carry the bereavement to our dear Friend, Jesus Christ, it will verily become light. May God ever be with you and the baby, saith your relative, R—.

And is not anxiety for the spiritual welfare of relatives and friends also another "good fruit" looked for in the Christian? This too is found among the Malagasy. One of them, who had a mother and sister and mother-in-law unconverted, recently wrote thus: "My conscience was constantly making me uneasy about them, for I thought God would require their blood at my hands. Both by faithful warning and encouragement I and my brother did what we could to lead them to repentance, and we frequently considered by what means we could draw them to Jesus Christ; but all seemed in vain, and we were inclined to give up in despair. We thought about it again and decided to give up speaking about Christianity to them, and to take to praying for them. Praise God! for He has answered those prayers. By the preaching of an evangelist my mother was converted; and then, by the influence of my mother, my sister and my sister-in-law were led to throw away their idols and to trust in Jesus Christ." That Malagasy closed his communication with this brief exhortation: "Oh! Christians, cease not to pray for those you wish to see saved, for although it may look
as though your prayers are not answered, if your faith does not fail, and you continue to pray, God will yet send the answer.”

And is not cheerful submission to the will of God another trait of Christian character? This also is discovered among Malagasy Christians. Within a recent date, the missionaries at Ambóżimandrəso were witnesses of this in one of their teachers. This teacher’s child was sick nigh unto death, and as he and his wife were worn out with watching, they were sent to lie down, having been promised to be called, should a change take place in the little one. This change came all too soon, and they were called in time to witness the going home of their little treasure. The mother silently wept, mingling her tears with those of the missionaries, whose hearts were still bleeding from a similar bereavement. The evangelist wept not, but said: “Let us sing,” and struck up a hymn, the literal translation of which is something like this:—

“O Jesus, Who loves us,
How sweet to us Thy words!
Our hearts are weak and faint,
But Thou art very strong,
Thy love to us, O Jesus,
Oh, ’tis very sweet!”

I must not enlarge. My paper is perhaps already too long. In closing let me just say that, in estimating the character of native Christians in Madagascar, we should not only bear in mind the comparative newness of Christianity as the religion of the Malagasy, but we ought to remember the fact that many of the native Christians are crippled and hindered in their religious life by the evil example and influence of some of the Europeans who, for trading and other purposes, have taken up their residence in Madagascar. A short time ago one of our best and most intelligent native evangelists said to me (in Malagasy): “You,” referring to the missionaries, “are like those who carry soap and wash dirty clothes to make them clean; but they,” referring to some of the foreign residents in the place, “are like others who bring soot and sprinkle it on the recently washed clothes; so when can you expect the clothes to be clean?”

J. Pearse.
THE DISEASES PREVALENT IN MADAGASCAR.

1.—GEOGRAPHY.—This important island lies between lat. 11°57' and 25°38' S. It extends for about 1000 miles from north to south, its greatest breadth being 350 miles, with an area of 225,000 square miles, and a population of from three to four millions. The southern and western parts of the island are comparatively level, but the interior, throughout a great part of its extent, rises into an elevated table-land from 2000 to 5000 feet above the sea. The east coast is skirted by a belt of low land of varying width. To this succeeds an undulating grassy country, bounded towards the interior by hills covered with dense forest. The central plateau is generally treeless and covered with grass, except in the valleys, where rice is cultivated. The soil on the coast is alluvial. In the interior a red soil predominates over a large part of the country. The island is watered by numerous rivers and streams, some of large size, which form considerable deltas, and these mostly fall into the sea on the west coast. On the east the streams are very numerous, but have a short course, rising as they do in the eastern range, which forms the water-parting of the greater portion of the island. There are few inland lakes, but along the east coast there are extensive lagoons, separated from the sea by land varying from a few yards to one or two miles in width. We have thus a coast zone of level or undulating country, then a forest zone, and finally the great central plateau, which is diversified by hills, some of which, as those of the Ankàratra mass, attain an elevation of 8000 to nearly 9000 feet.

2.—CLIMATOLOGY.—The only parts of the east coast for which we have meteorological observations are the French island of Ste. Marie and the port of Tamatave. Lombard gives the mean annual rainfall of the former at 2646 mm. I subjoin the mean monthly rainfall, in inches, of Tamatave, from October, 1880, to September, 1881, and from January, to September, 1882:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13.02</td>
<td>11.62</td>
<td>6.46</td>
<td>11.35</td>
<td>2.19</td>
<td>8.52</td>
</tr>
</tbody>
</table>

Rainfall

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13.45</td>
<td>7.41</td>
<td>5.21</td>
<td>4.18</td>
<td>5.20</td>
<td>6.33</td>
</tr>
</tbody>
</table>

For Diego Suarez, in the north, the temperature (Centigrade) and rainfall are given thus:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>25.3</td>
<td>25.0</td>
<td>25.3</td>
<td>25.1</td>
<td>24.3</td>
<td>22.8</td>
<td></td>
</tr>
<tr>
<td>29.8</td>
<td>28.9</td>
<td>29.1</td>
<td>29.4</td>
<td>28.7</td>
<td>27.6</td>
<td></td>
</tr>
<tr>
<td>Rainfall</td>
<td>0.382</td>
<td>0.093</td>
<td>0.071</td>
<td>0.011</td>
<td>0.000</td>
<td>0.009</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>21.6</td>
<td>20.6</td>
<td>22.3</td>
<td>23.9</td>
<td>24.5</td>
<td>25.2</td>
<td></td>
</tr>
<tr>
<td>26.6</td>
<td>25.9</td>
<td>26.9</td>
<td>27.8</td>
<td>28.3</td>
<td>28.8</td>
<td></td>
</tr>
<tr>
<td>Rainfall</td>
<td>0.028</td>
<td>0.000</td>
<td>0.000</td>
<td>0.006</td>
<td>0.008</td>
<td>0.119</td>
</tr>
</tbody>
</table>

At Nôsl-Bé, off the north-west coast, the dry season extends from April to October, the rainy season from November to March. The
temperature at Nosi-Bé is wonderfully equable, oscillating between 25° and 31° C.

For Antananarivo, the capital, on the central table-land, and at a height of nearly 5000 feet, the mean monthly temperature (F.) for 1882, and the average monthly rainfall, in inches (1881—85), are as follows:

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean Temperature (F.)</th>
<th>Average Rainfall (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>67.49</td>
<td>0.79</td>
</tr>
<tr>
<td>Feb.</td>
<td>67.88</td>
<td>0.25</td>
</tr>
<tr>
<td>Mar.</td>
<td>67.88</td>
<td>0.79</td>
</tr>
<tr>
<td>Apr.</td>
<td>67.49</td>
<td>0.25</td>
</tr>
<tr>
<td>May</td>
<td>64.48</td>
<td>0.79</td>
</tr>
<tr>
<td>June</td>
<td>60.58</td>
<td>0.25</td>
</tr>
</tbody>
</table>

The north-eastern shores of the island near Vohimarina are comparatively healthy, but fevers are prevalent at the new French port of Diego Suarez in the north. The more elevated parts of the south coast suffer but little from fever. Fever is endemic along the east and west coasts and in the islands near to the shore. Both on the coasts and on the islands it manifests a high degree of intensity, especially among Europeans and the Hova belonging to the central province of Imérina, when they visit the low country. The coast tribes, however, enjoy a comparative immunity from the disease.

The French island of Ste. Marie, on the east coast, deserves the evil repute which it has obtained since its first occupation. The forest zone is not exempt from malaria, which is met with especially in the humid valleys, such as Beforona, which are more or less shut in by mountains. The valley of Angavo, again, although at an altitude of about 3000 feet, is excessively malarious; the natives, who are here mostly of Hova origin, suffer severely from the malarial cachexia.

In the bare, open, central province of Imerina, at an elevation of 4000 to 5000 feet, as well as in the Betsileo country to the south, fever is not endemic; but to the west of Imerina, in the Vónizòngo district, where the elevation is less, and the country level, grassy, and in parts marshy, almost every one suffers from enlargement of the spleen. This organ is not unfrequently found to stretch across the abdomen to the right iliac crest. The malarial cachexia is very general here, while frank attacks of fever are rare. The Antsihanaka country, to the north of the capital, especially in the neighbourhood of the Alaotra Lake, is highly malarious.

Segard,* whose experience was chiefly confined to the east coast, found the tertian type of fever to be the most common; the stages were well marked at the beginning, but became irregular in the relapses, which rapidly induced anæmia and debility. Bilious fever, he says, was characterised by violent headache, suffusion of the face, redness of the eyes, marked gastric catarrh, excessive vomiting, bilious diarrhoea, pain in the region of the liver and gall bladder, high fever with feeble morning remissions, followed by a long convalescence. He also observed the bilious hæmaturic form, and a considerable number of pernicious cases, mostly of the comatose variety. He observed two cases of mania with hallucinations in persons suffering from fever. The lymphatic glands often became enlarged. He noticed also in some

---

* Arch. de med. nav. 1886.
cases a generalised mealy eruption to accompany the fever, and urticaria was very common.

The months most charged with fever cases were January, February, and March—that is, during the rainy season—February and March being the worst, and almost equally unhealthy.

At Diego Suarez, out of 1,563 cases admitted into hospital, or 65 per cent., were for malarious diseases. The deaths occasioned by these diseases amounted to 46 per cent. of the total deaths; most of the pernicious cases were of the comatose form. The most common form of fever here is the intermittent, and the most common type of intermittent is the quotidian. The intermittent variety is most frequent in March, April, and May; the remittent in January, February, and March; but the greatest number of deaths from this form occur in March and April.

The seasonal prevalence of malarial fevers in the aggregate will be seen from the following table, which gives the number of cases of fever per 100 of patients treated in hospital from June, 1866, to December, 1867:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>65</td>
<td>67</td>
<td>50</td>
<td>35</td>
<td>43</td>
<td>66</td>
<td>38</td>
<td>71</td>
<td>61</td>
<td>92</td>
</tr>
</tbody>
</table>

The remittent is the most common form among the new arrivals. The bilious haematuric fever is also met with, and the cases of this fever are not limited to any season.

Nosi-Bé, on the west coast, with its rocky and clayey soil, with its climate, which, according to Barnier, "is perhaps of all countries that where the variations of temperature are the least accentuated," is nevertheless one where malaria is the predominating disease. Of 2,674 cases of endemic disease treated at Nosi-Bé from 1862 to 1880, no less than 2,600 were due to malaria, and 44 to liver disease, which may or may not have had a malarious origin. The following figures show the number of cases treated, and deaths from malarial affections and diseases of the liver, in the different races:

<table>
<thead>
<tr>
<th>Treated</th>
<th>Died</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Europeans and Creole</td>
</tr>
<tr>
<td>Malarious Diseases,</td>
<td>2,600</td>
</tr>
<tr>
<td>Liver Diseases,</td>
<td>44</td>
</tr>
</tbody>
</table>

The 2,600 cases of malaria are thus classified:

<table>
<thead>
<tr>
<th>Cases Treated</th>
<th>Died</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malarial Fever,</td>
<td>2,063</td>
</tr>
<tr>
<td>Pernicious Fever,</td>
<td>197</td>
</tr>
<tr>
<td>Ictero-haematuric Fever,</td>
<td>185</td>
</tr>
<tr>
<td>Anaemia,</td>
<td>91</td>
</tr>
<tr>
<td>Cachexia,</td>
<td>91</td>
</tr>
<tr>
<td>Enlarged Spleen,</td>
<td>6</td>
</tr>
</tbody>
</table>

| Total | 2,618 | 133 |

* Cartier, Arch, de med. nav. 1888. † Guiol, Arch, de med. nav.
Guiol states that at Nosì-Be the quotidian type is the most frequent; next follows the tertian, which, however, is often consequent on the quotidian, but which in many cases is the initial form of attack. Among the pernicious forms those in which there is a determination to the cerebro-spinal centres are the most frequent; next come those cases in which there is an exaggeration of the phenomena of depression; then, those in which abdominal symptoms or excessive reaction predominate. There was only one case out of 179 of pernicious fever in which pulmonary symptoms occurred.

In order the more clearly to show the nature of the fever met with in Madagascar, I shall briefly narrate the results of a journey of a party of missionaries from Betâfo, in the interior, to Mânanjara, on the east coast, at a fairly healthy season of the year.

The party numbered thirty-two in all, and consisted of eight adults and twenty-four children, of ages varying from one to sixteen years, and generally in good health. None of the children, and only four or five of the adults, had previously suffered from fever. The journey occupied seven days in the end of September and the beginning of October. The weather was dry throughout. The road for a considerable part of the way lay through forest and near to streams, but not through, or near to, any extensive swamps; and the party was not subjected to any unusual fatigue or hardship by the way.

The whole party arrived at Mananjara in good health. Four or five took ill on the third day after their arrival; some remained well for nine days, others for a period of three weeks or longer. In those that took ill three days after reaching Mananjara the period of incubation could not have exceeded three or four days, inasmuch as for the first day or two the route is through a healthy country. In most instances the fever by which the party was attacked was of a remittent or pseudo-continued form, characterised by high temperature, lasting from three to seven days, without any intermission or even marked remission, accompanied by severe bilious vomiting, and in some instances by bilious diarrhoea. During the continuance of the fever there were partial sweats, affording no relief.

In one case—that of a child four years of age—towards the end of the attack there occurred rigidity of the limbs, with pain, so that it could not bear to be touched or moved. Following upon this condition, an algid attack set in, the whole body becoming like ice; even the breath seemed cold. The algid symptoms disappeared, and along with them the fever, leaving the patient helplessly weak. After a month’s respite, in this instance, intermittent fever appeared. In another case, bilious fever became converted into the intermittent form, and although the patient seemed better and had recovered his appetite; swelling of the feet and giddiness ensued. In most instances a fortnight or three weeks of freedom from fever followed the bilious remittent attack; but sooner or later intermittent fever of a tertian or irregular type supervened. In the case of one or two of the sufferers the fever began as an intermittent of the quotidian type, which later on changed into tertian. In one instance the primary form of attack was intermittent, and the relapse remittent, accompanied with diarrhoea.

After leaving Mananjara for Mauritius one of the party, an adult,
died of fever during the voyage. On reaching Mauritius, in the middle December, 1886, several of their number were anaemic and weak, with enlargement of the spleen, and continued to have frequent attacks of intermittent fever. One child had to be admitted to hospital for ulcerative stomatitis affecting the bones of the face.

To sum up, twenty out of the thirty-two who performed this short journey contracted fever in one form or another; and although only one died, many of those who had been attacked with fever and survived were left in a state of great debility and anaemia. The whole history appears to me to show that the same cause produces alike the bilious remittent and the intermittent forms of fever.

The first attacks of the fever contracted by the Hova are generally severe. Those who survive are said to be *vakin' ny taso*, or "broken to fever," and those so broken are selected in preference to others for trading and other purposes in the low country; not that the "fever-broken" secure any immunity from relapses, but it is held, and I think justly, that the subsequent attacks in their case will be of a less dangerous character. Although the central provinces are singularly free from endemic malaria, they were visited during the years 1877, 1878, and 1879 by a remarkable epidemic of fever that deserves notice.

Dr. Guldberg, of Christiana, who resided long at the capital, witnessed this epidemic; and it is chiefly on particulars supplied by him that the following account of it is based.

During the seven years Dr. Guldberg resided at Antananarivo, he treated 1,435 cases of malarial fever. Of these—

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1877</td>
<td>111</td>
</tr>
<tr>
<td>1878</td>
<td>342</td>
</tr>
<tr>
<td>1879</td>
<td>889</td>
</tr>
</tbody>
</table>

Total: 1,342 cases.

During the four years 1883-1886 he had only met with 93 such cases, and these had doubtless been contracted either on the coast or in the Vonizongo district. The epidemic began in 1877, reached its height in 1879, but in 1880 a certain amount of malarious disease was still observed to prevail, from February to May or June, in certain low-lying districts, though after 1879 it was seldom fatal. It will be remembered that 1879 was a year when fever was widely prevalent in India and Cyprus.

The disease was generally prevalent all over the central provinces,—in the south among the Betsileo, in Imerina among the Hova, and in the north among the Sihanaka. It did not extend to the feverish districts of the east coast. From the other districts I have obtained no accounts, nor am I able to say where it originated. The information I have received makes it probable that it first appeared in the Betsileo country, to the south, and extended northwards; but this is not quite certain. The nature of the epidemic was what may generally be described as bilious remittent. At first I thought that it might have been an outbreak of recurrent fever, or of the bilious typhoid of Griesinger. This, however, does not appear to have been the case. All the medical men who witnessed it concur in regarding it as malarial.

In mild attacks it began with rigors; but in serious cases these were
THE DISEASES PREVALENT IN MADAGASCAR.
absent. The fever lasted from four to seven days, was accompanied by intense headache, pains in limbs, loins, nape of neck, and pit of stomach, with bilious vomiting, and sometimes with diarrhoea, simple or sanguineous. Sub-delirium was often present. In the worst cases, jaundice occurred. There were morning remissions, with exacerbations in the afternoon or evening. During the exacerbation there were great heat of skin and hurried respiration, followed in the milder cases by sweating. This series of phenomena was repeated daily, and in a certain number of cases terminated in a frank intermittent. The fever was liable to relapse, and these relapses generally occurred about a week or a fortnight after recovery from the first attack. Such relapses were liable to recur repeatedly. Dr. Gùldberg notices the frequency with which enlargement of the spleen was observed in patients who had suffered from the fever. It is not stated whether the relapses were of a remittent or of an intermittent type. In favour of the view that this epidemic, which was certainly very fatal in many districts, and respecting which it is to be regretted that no more precise information can be obtained, was malarial in its nature, may be mentioned the distinctness of the remissions, its tendency to merge into genuine intermittent fever, its repeated and irregular relapses, the consecutive enlargement of the spleen and the cachexia, its preference for low damp localities, and the recurrence of the epidemic at a certain season of the year.

Typhoid Fever is, so far as I know, rare in the low country, but it is one of the most common diseases of Imerina, where it was well known by the natives and distinguished from malarial, or country fever (tazo an-tsaha), as threshold fever, or tazo an-drindrina. As observed in the capital, typhoid fever follows its classical course.

Typhus Fever is quite unknown. Diphtheria, as an epidemic malady, is never seen in the central province, and I have never heard of it in the low country. I have witnessed only a few sporadic cases of membranous laryngitis.

Erysipelas is very uncommon, at least in the capital. I can scarcely recall above a few cases of the disease.

Cholera broke out, for the first time, at Nosi-bé, off the west coast, and on the adjacent mainland of Madagascar, in 1859. It was introduced from Mozambique, but it certainly could not have spread to any extent, and it has never reached the centre of the island or the east coast.

Dysentery is endemic along the coast-line. At Diego Suarez dysentery is one of the most fatal diseases, and is apparently most common from July to October. On the east coast the disease is moderately frequent, but in certain years becomes so general as to be justly regarded as epidemic. The Hova troops, during the war in 1884, encamped west Tamatave, suffered greatly from this disease. On the central table-land acute dysentery is upon the whole rare.

Diarrhoea, simple and inflammatory, and Cholera Infantum, are both remarkably common in the capital; the latter is only met with during the warmest months.

Smallpox (nendra) has frequently spread all over the island in murderous epidemics. Whether it is really endemic in the country is doubtful. The native name for the disease points to its introduction from the
THE DISEASES PREVALENT IN MADAGASCAR.

Swahili coast. Its frequent outbreaks in past years were generally connected with the introduction of slaves from Africa. Measles breaks out in an epidemic form at intervals of a few years. It not unfrequently assumes a severe type and carries off many victims. It often becomes complicated with bronchitis and broncho-pneumonia. Scarlet Fever is entirely unknown. Influenza broke out at Antananarivo in June, July, and August, 1890. It was frequently followed by fatal pneumonia.*

Bronchial affections among adults are comparatively rare; but during the cold season acute bronchitis and broncho-pneumonia carry off many of the native children. Pneumonia is at least as frequent among the natives of Madagascar (in the interior) as it is in England. On the coast, from what I have observed, acute respiratory diseases are less frequent than in the interior. Phthisis is far from rare in Imerina, and runs a rapid course. It is by no means prevalent on the coasts. Acute Rheumatism, so far as I can judge, is not a common disease among the natives, although muscular and syphilitic rheumatism are very common. Syphilitic diseases are widely diffused, especially throughout the central province. No disease is more commonly met with than the condylomatous affection called by the natives têty. It appears chiefly at the mucous orifices and axillae as mucous places. It usually affects children under the age of puberty, and when one takes the disease, it spreads to all the members of the family who have not already had it. It is followed in many instances by the constitutional symptoms proper to syphilis—periostitis, phagedæan ulcerations of the skin and mucous membranes, destruction of the soft tissues of the throat, and sometimes of the bones and cartilages of the palate and nose. The women who have suffered from the disease in childhood often suffer from abortion, or give birth to syphilitic children. As in the Lithuanian syphilis, it is rarely, if ever, possible to trace any initial hard sore, or to obtain any history of one. This form of disease is seldom propagated by sexual intercourse.

Leprosy is widely prevalent in all parts of the island with which I am acquainted, and is met with amongst all classes.

Gravel and Stone are exceedingly common in the central province, but much less so in the rest of the island. Gout is a common disease among the rich officers, who live well and take little exercise; but it is seldom seen amongst the common people.

Diabetes is comparatively rare, although cases are occasionally observed.

Beriberi was observed in an epidemic form at Diego Suarez in 1866 and 1867, when it caused a considerable mortality. It is not endemic in the country generally, although I have observed some three cases in the capital, which presented all the symptoms of the acute disease, and all of which ended fatally.

I have just received a report of the Medical Mission at Antananarivo for the year 1890, published by Drs. Fenn and Moss. As the pathology of the central table-land of Madagascar is highly interesting, I shall briefly analyse the figures there presented. The cases of disease treated in the Hospital, excluding surgical and obstetric cases, numbered in all 429. These may be thus classified:—

The diseases prevalent in Madagascar.

<table>
<thead>
<tr>
<th>General Diseases</th>
<th>Heart Diseases (functional)</th>
<th>122</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diseases of the Respiratory System</td>
<td>100</td>
<td>Diseases of the Alimentary System</td>
</tr>
<tr>
<td>Phthisis</td>
<td>14</td>
<td>Diseases of the Liver</td>
</tr>
<tr>
<td>Heart Diseases (organic)</td>
<td>61</td>
<td>Diseases of the Nervous System</td>
</tr>
</tbody>
</table>

The percentages furnished by some of the more important diseases were:

- Pneumonia: 12.3
- Dysentery: 3.0
- Typhoid Fever: 1.7
- Bronchitis: 8.4
- Diarrhea: 6.3
- Intermittent: 10.2
- Pleurisy: 0.7
- Enteritis: 0.7
- Remittent: 0.0
- Organic Heart Disease: 14.2
- Acute Rheumatism: 0.47
- Chronic Rheumatism: 1.7

The reason that syphilis does not appear in this table is that it is not generally an hospital disease, and for the same reason, diarrhoea, unless severe, would be treated in the dispensary. These figures must not, therefore, be taken as indicating the absence of the one, or the comparative rareness of the other. Indeed, syphilis, as the Report truly says, is all but universal. The extraordinary prevalence of organic heart affections cannot be explained by any corresponding prevalence of acute rheumatism. Nothing struck me more in Madagascar than the extraordinary prevalence of heart disease, of uric acid deposits in the urine, of stone in the bladder, and the prevalence of syphilitic diseases to which I have already alluded. Pneumonia, although common, does not, as a rule, furnish such a large proportion of cases as it did in 1890, when influenza was epidemic.

For an account of an epidemic of choreamania in Madagascar, see Edin. Med. Jour. 1867 [reproduced in Annual xiii., p. 19].


By Andrew Davidson, M.D., F.R.C.P.Ed., etc.

Additional Notes on the Diseases of Madagascar, by Dr. C. F. A. Moss.

It is a difficult task indeed to be called upon to offer any comments on the elaborate study by Dr. Davidson of diseases met with in Madagascar, which forms a chapter in his work on Geographical Pathology. Subsequent observations only serve to corroborate the truth of the opinions he offers and to further confirm the facts he has established.

Our warrant for writing at all on the subject is supplied by an experience of six years' medical mission work in Antananarivo, during which time, though the numbers of out-patients seen by individual doctors have fallen very far below Dr. Davidson's figures, owing to the number of doctors now practising in this city, yet the number of those treated in hospital has, on the contrary, very largely increased, accommodation being offered for a larger number of in-patients by our new Hospital at Isoavinandrina.

To Dr. Davidson's account of Malarial Fever there is nothing to add. The subject of Typhoid Fever, however, is one on which a few remarks may be offered. Frequent inquiries that have been made do not
THE DISEASES PREVALENT IN MADAGASCAR.

corroborate the statement that typhoid fever is what the natives know as *Tàzo an-drindrina* (or *Tazon-drindrina*). The presence of so much typhoid fever has resulted in the natives adopting our name for it, consequently it is always spoken of as *Tifoïdra*. But the fever known as *tazon-drindrina* appears to us to be that form of malaria, whether intermittent or remittent, which attacks natives of the capital and the surrounding neighbourhood, the fever indigenous, that is to say, to the capital, as distinguished from that in more highly malarious districts. I am always told that the fever of Vônizôngo or Ambôdîn' Angâvo, e.g., is not *tazon-drindrina*, but that form contracted by people who have never left the capital or visited a truly malarious district is what is known by that name. It is very easy to go thus far, but when one essays to speak of the particular features of that fever, one’s difficulties begin. It would appear to be a malarial fever, sometimes intermittent, sometimes remittent in character, sometimes mild, sometimes, on the contrary, very severe and obstinate to deal with. “Capital fever” is held by many to be neither an easy form to experience nor to treat.

To return to the subject of typhoid fever. A glance at our statistics of hospital patients shows that during the 5 years from 1890 to 1894, he numbers treated were respectively 7, 8, 29, 107, 99. The monthly incidence for the three years 1892, 1893, and 1894 is as follows:

<table>
<thead>
<tr>
<th></th>
<th>1892</th>
<th>1893</th>
<th>1894</th>
<th>1892</th>
<th>1893</th>
<th>1894</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>7</td>
<td>17</td>
<td>18</td>
<td>July</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Feb.</td>
<td>0</td>
<td>17</td>
<td>22</td>
<td>Aug.</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>March</td>
<td>1</td>
<td>21</td>
<td>4</td>
<td>Sep.</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>April</td>
<td>2</td>
<td>9</td>
<td>1</td>
<td>Oct.</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>May</td>
<td>4</td>
<td>13</td>
<td>3</td>
<td>Nov.</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>June</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>Dec.</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Arguing from the figures of 1893 and 1894, one would deduce roughly that typhoid fever is a disease of the first half of the year, or rather, it is rife from January to July, but is scarcer from August to December. This corresponds broadly with the division into summer and autumn, when typhoid fever is epidemic, and winter and spring, when it is sporadic.

The onset of the rainy season in November is followed speedily by an increase in the cases of typhoid fever. To those living in Antananarivo the constant appearance of this disease causes no surprise. The city is one set on a hill; the houses are in many places so closely packed that there is only just space for one person to pass between them. The access to these houses is in most cases not by a road, but by a narrow path, winding in and out between them. On both sides of the principal roads of the capital, the houses are arranged in this fashion.

From this, two facts are obvious: the one, that the close proximity of the houses calls for a very perfect system of drainage and disposal of refuse, if the public health is to be retained; and the other, that there must be a good supply of pure water brought from a distance, if the needs of the 100,000 people of Antananarivo are to be efficiently met. Alas! it is precisely those two points that constitute the great drawbacks of the city. The uncleanly surroundings of the houses, the entire lack of any system of drainage, the universal disposal of all refuse

* The Hospital was almost closed for these months.
THE DISEASES PREVALENT IN MADAGASCAR.

just where the people like to throw it, even the slaughtering of cattle on the public highways, are very potent causes of a state of chronic ill-health; and if another is wanted, it is that many of the wells and springs at the foot of the hill, from which almost the entire water-supply is derived, must inevitably be very much contaminated. No direct analysis of the water has been made, but the fact stands to reason that the water cannot be pure. Recent events, however (Nov. 1895), may now warrant the hope that before long these pressing needs may receive adequate attention.

The site of the city is also one that renders any attempt at improvement in these respects very difficult. At a few feet, in almost every part of the city, rock is reached, and the problem therefore of the drainage and water-supply of Antananarivo is one which would require very skilful engineering to solve. It is therefore hopeless to expect that so long as the town keeps on growing, while its requirements in this respect are unattended to, there will be anything but a chronic incidence of typhoid fever.

With regard to the actual course of the fever, there is little to be said. There are, as usual, different types of epidemics, sometimes severe, sometimes mild. Fortunately the majority of the cases are of the milder type. Malaria tends naturally to complicate typhoid fever, as it does everything else; and there is a type of fever on the borderland between malarial and typhoid fevers which it is exceedingly difficult to understand; combining the symptoms of both, it follows the true course of neither, and resists the ordinary treatment of each. Among other epidemics, Small Pox, Measles, and Whooping-cough are of frequent occurrence; but the former, though often excessively severe, is rarely seen. Lastly, Influenza, which has taken the round of the whole world from China to Peru, has not omitted to visit us. In the dry seasons of 1890 and 1893 there were epidemics, that in the latter year developing into a true pandemic. It resembled influenza everywhere else, alike in its effects on patient and doctor: the doctor was wanted everywhere, and almost the whole population constituted the patient. Since the epidemic of 1893, influenza has never really died out; sporadic cases occur now and then, and occasionally for a week or two there seems to be an epidemic once more. But it has not been so severe, either in its spread, or in its effect on individuals, as it was in that year.

A large number of cases of Disease of the Respiratory Tract come for treatment. Croupous Pneumonia is very common, 284 cases having been received into hospital during the five years above cited. Cardiac complaints are exceedingly common, being due to malaria, syphilis, and hard manual labour far more than to rheumatism.

It may be noted that there seems some tendency to increase in the number of cases of Disease of the Nervous System, but these do not appear very frequently, although they show a considerable variety. Choreamania has never been seen by the writer, but it is heard of almost every year as affecting the populations of country districts more or less distant from the capital. During the early part of 1895 it was exceedingly prevalent and gave much trouble to missionaries in the country.
An account of disease in Madagascar would be very incomplete if mention were not made of the extraordinary number of cases of "stomach-ache" that flock to the out-patient Dispensaries. The people often eat very large quantities of rice, etc., at a time, and Nemesis seems to overtake them in the form of Dyspepsia.

Diseases of the Pelvic Organs are of great frequency and every variety. Leprosy, to which Dr. Davidson alludes, and to which he gave special study, is not very frequently seen in the out-patient clinique, and patients suffering from it cannot be admitted to the wards of an ordinary hospital. It is, however exceedingly common, especially in certain parts of the island. Near the village of Antsřabe the Norwegian Mission has a Leper village, where 250 inmates are accommodated. It is impossible to bestow too much praise on the humane work of this institution. When one contrasts the care and attention received by the patients there, their order, cleanliness, and employment, with the deplorable and filthy condition of the leper in his own home, one wishes such villages might be increased a hundredfold. In that district there is a very large number of lepers, 200 near one town, 100 near another, and so on. In the Leper village recently opened by the Rev. P. G. Peake of Isoăvina there are at present 23 inmates; but as its advantages become better known, the numbers will doubtless increase largely. The Roman Catholics also have a Leper village near the capital. A small village has newly been erected for lepers at Fianarantsoa, in the founding of which Mrs. A. S. Hackett has taken the lead.

Two complications that are next to universal among patients in Madagascar are specific disease, more or less latent, and Entozoa.

It may be of interest to insert a statistical table showing the percentage of cases of disease of various systems treated in hospital, and also one showing the actual number of cases of certain of the more prevalent diseases:—

<table>
<thead>
<tr>
<th></th>
<th>1890</th>
<th>1891</th>
<th>1892</th>
<th>1893</th>
<th>1894</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory System</td>
<td>22.3</td>
<td>20.1</td>
<td>24.2</td>
<td>18.6</td>
<td>23.5</td>
</tr>
<tr>
<td>Circulatory</td>
<td>12.7</td>
<td>11.0</td>
<td>14.7</td>
<td>5.8</td>
<td>3.4</td>
</tr>
<tr>
<td>Alimentary</td>
<td>23.6</td>
<td>20.3</td>
<td>24.6</td>
<td>27.8</td>
<td>32.8</td>
</tr>
<tr>
<td>Nervous</td>
<td>2.7</td>
<td>4.5</td>
<td>6.7</td>
<td>4.7</td>
<td>3.8</td>
</tr>
<tr>
<td>Gynecological Cases</td>
<td>21.5</td>
<td>22.7</td>
<td>22.4</td>
<td>12.6</td>
<td>20.5</td>
</tr>
<tr>
<td>General Cases</td>
<td>22.5</td>
<td>13.6</td>
<td>18.4</td>
<td>23.8</td>
<td>22.0</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>53</td>
<td>45</td>
<td>80</td>
<td>78</td>
<td>104*</td>
</tr>
<tr>
<td>Phthisis</td>
<td>14</td>
<td>24</td>
<td>40</td>
<td>29</td>
<td>18</td>
</tr>
<tr>
<td>Typhoid Fever</td>
<td>7</td>
<td>8</td>
<td>29</td>
<td>107†</td>
<td>97‡</td>
</tr>
<tr>
<td>Malarial</td>
<td>48</td>
<td>38</td>
<td>67</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>&quot; Cachexia</td>
<td>20</td>
<td>14</td>
<td>50</td>
<td>54</td>
<td>27</td>
</tr>
</tbody>
</table>

In discussing Surgical disorders, the most prominent fact to notice is the comparative absence of accidents. There are here no railroads, no mines, no mills, and there is no machinery; consequently the fearful accidents inseparable from such advantages are wanting. Children may fall off a wall and sustain a fracture, or they may swallow one of the small weights used for weighing money, or they may fall among thorns. We see cases sometimes of severe injury caused during robber raids. There are cases of Cancer and many of Tumours of various descriptions, which the people are sometimes far from willing to have touched. But, on the whole, surgical complaints are less common than medical
disorders. As might have been expected, we have had this year to treat several cases of wounds received in battle. For a few days after the bombardment of the capital men were brought in, variously, and many of them severely, wounded. At the time of writing there is appearing a caricature, as it were, of these cases, little boys having injured themselves by setting a light to cartridges that were thrown away during the fight!

Diseases of the Eye are not very numerous; but epidemics of Purulent Conjunctivitis occur not infrequently, and Cataract, generally senile, is also common. In some parts of the island eyes are often destroyed by small bits of the husk of the rice-grain flying up while being threshed and adhering to the delicate tissues of the cornea. Nothing occurs here at all approaching to the great prevalence of eye-disease in China or Egypt.

Calculus is not uncommonly met with, but it has not been possible yet to examine into the question of its comparative prevalence in different districts. Undoubtedly there are many places where it is never seen, but it is too soon to say precisely where they are. Elephantiasis is occasionally seen in the capital; on the S. E. coast I have heard that cases of that disease are more numerous.

Diseases of the Bones and Joints are comparatively rare, with the exception of Chronic Periostitis from specific disease.

Experience seems to show that there are few diseases that are not to be met with in Madagascar. There is great scope for the study of such matters as the various forms of Malarial Fever incident to this country, but time unfortunately fails for exhaustive investigation of these conditions.

It may be well to add that this paper has been written more for the general than for the professional reader, which will account for the brief allusions made to some matters of great interest to the medical mind.

C. F. A. Moss, M.B., C.M.
MADAGASCAR IN THE YEAR 1840.

HERE recently came into my hands a small book of 41 pp., entitled "The Persecuted Christians of Madagascar; a series of interesting Occurrences during a residence at the Capital from 1838 to 1840; extracted from the correspondence of the Rev. David Griffiths, late missionary to the Island. Addressed to his Wife, and printed at the request of her friends. London: Cornelius Hedgman, 12 London Wall. MDCCCXLI."

I had long known all the more important works bearing on Missions in Madagascar, but this small book I had never before had an opportunity of seeing. I imagine only a small edition was printed, for circulation chiefly among the friends of the writer. The book contains three sections, and describes very graphically the efforts made by Mr. Powell, Mr. Griffiths, and Mr. Jones (or Johns*) to assist the persecuted Christians.

Mr. Powell was a doctor in the service of Queen Ranavalomanjaka, but he sympathised deeply with the persecuted Christians, and finally, in order to help some of them to escape, he gave up his position and even risked his life. He also incurred money losses in this cause, amounting, according to Mr. Griffiths' estimate, to a thousand dollars.

Mr. Griffiths gives in detail the various steps taken to help some of the oppressed and persecuted Christians to escape to Mauritius, and tells of the sad failure of these plans through the betrayal and capture of the refugees near Andranomafana, and of the subsequent martyrdom of nine of them. Part of this account was reprinted in News from Afar for February last. An interesting fact has been related to me by one who knew friends of Mr. Griffiths. The deep impression made upon the mind of Mr. Griffiths' son, who was then but a lad of 12 or 13, led to his conversion. Later on he became a minister of the Gospel, but he died while still a young man.

The main facts contained in these journals, so far as they affect the Christians, have been embodied in the accounts of the Persecution contained in The Martyr Church and other works. But the journals have also great value for the side-lights they incidentally throw upon the general state of the country and the extreme wretchedness of the people at the time of Mr. Griffiths' visit. To those who know Madagascar as it is today, and who are at times inclined (and, alas! not without reason) to denounce the prevailing corruption of the official classes, and the oppression which the common people suffer, it will be instructive to read what an eye-witness had to narrate more than half a century ago.

Mr. Jones (or Johns?) and Captain Campbell arrived at Ambatomanga on June 18, 1840. The object of the former was to visit his old friends at the capital; and of the latter, to hire free labourers for the Association of Merchants and Planters at Mauritius: but it was not till fifteen days later (July 2) that they were allowed to enter the capital. While they were delayed at Andrasiro, Mr. Delastelle, Mr. Laborde, and Mr. Griffiths paid them a visit; and we can get at first-hand an account of how Madagascar affairs appeared to this little company of Englishmen and Frenchmen fifty-five years ago. By the aid of these journals we may, as it were, enter the native house set apart for the two visitors, and listen to the talk of the five gentlemen who met there. And as we listen, we shall probably think how like to all this has been many a conversation in Madagascar in more recent times.

* The book always has 'Jones'; but if Mr. Jones died in Mauritius on May 1, 1840, as generally stated, this must be an error in spelling, and the name should be 'Johns'.

THE ANTANANARIVO ANNUAL.
Mr. Griffiths says: "Our conversation turned on the English expedition to China, and of the intentions of the French respecting Madagascar; all agreeing that this country is quite ripe for a change—the people being harassed by hard servitude, oppressed by the most execrable tyrants, and daily destroyed by the dreadful tangina. Two or three effectual strokes would set all right! The present administration is horrible beyond description—a reign of terror and devastation! The counsellors of the Queen, Rainiharo and Rainimaharo, delight in nothing but destroying the people; or, to use their own motto: "Ataovy manify izy, ka baboy ny fananany sy ny vady amanjanany!" ("Thin them, and take their property, and make slaves of their wives and children!") They are impoverishing the country and have become drunken with power!—they swim in blood and roll in riches and spoils of the harmless and innocent! Rainimaharo is the Robespierre of Madagascar."

"The people of Madagascar were never in such an oppressed condition as at present. Their perpetual wars, the tsitz'alainga (or silver spear), the corrupt administration of justice, together with the heavy yoke of bondage on both the military and borizano (civilians), are the ordinary machines of daily destruction used in this country."

Later on, after describing the bitter persecution to which the Christians were subjected, Mr. Griffiths continues: "Neither is it only the Christians who suffer under this tyrannical government, but every class of the people. At the present time there are from seven hundred to a thousand officers in trouble from various causes, and the number is daily increasing; their judgment is to come. Some are accused of taking bribes to allow people to leave the army and become borizano, or civilians; others, of extorting money on different occasions—when they go to war, bury their friends, etc. Some will, no doubt, be put to death, others have the ordeal, and others are fined and reduced in rank and honour; yet this has no effect in diminishing the spirit of disaffection which everywhere abounds."

When Mr. Griffiths had finally left Madagascar, he says: "On our way to Ifenoarivo a spot was pointed out to me where four Betsimisaraka were put to death for attempting to escape out of the island. They were caught going away in a canoe; a hole was immediately dug, in which they were placed, their heads being confined in sacks, and boiling water and melted tallow poured on them till they ceased to breathe."

The greed of the high officers is thus described: "The two first officers of the land think of nothing but filling their coffers from fines, bribery, and confiscations. I informed you that there were a thousand officers in trouble, from the rank of general to corporal; some of whom were in irons at the time I left, others imprisoned, and some, no doubt, by this time have been put to death. The ordeal has been administered to many, and fines levied on every hand."

Mr. Griffiths concludes his journal with a graphic account of the general misery and discontent in all parts of the island. Here are his words:—

"How is Madagascar paralysed from north to south, from east to west! The provinces of Androy, Fierenana, Imba (?), Tsiënimalala, and Ambôngo, and part of Vangaindrâno, would rather die than submit to the iron yoke of Ranavalomanjaka. 'If we submit,' say they, 'the men will be put to death, the women and children made slaves, and all our property confiscated; and if we do not submit, it will be the same. We will therefore oppose them to the last!'

"The provinces of Ménabé, Ibôina, and Antsihanaka have revolted, and the Queen's soldiers cannot subjugate them, for they would rather die than have the tangena administered. They say: 'Radâma (the late king) promised not to judge us by the tangena, but Ranavalomanjaka has changed the laws, therefore we will not be her subjects, but her enemies!' Moreover, they venture to utter the language of open defiance: 'Prepare
your force; make plenty of soldiers; buy muskets, and powder, and cannon, and we will give you battle and not stop till we come to Antanánarivo!

"The six provinces in the interior of the island are oppressed to the extreme, both soldiers and civilians being compelled to work at a moment's notice,—the most cruel system of slavery ever known! All the people in the inland provinces, and on the eastern coast from Vohimânia to Fort Dauphin, have not a week that they can call their own to cultivate their ground or provide for their families, but are required to engage in some government service or other, as tilling the ground, felling timber, making and carrying charcoal, collecting wax and gum copal, etc., and carrying hides from the interior to Tamatave. All the tailors have their service exacted in the same manner by the Government without any remuneration. The people often remark, with feelings of stoical indifference, 'We shall not teach our children any thing; for the more they know, the harder will be their service!"

"The greatest crime in Madagascar is to possess riches, for wealth uniformly becomes an object of the government cupidity, and its owners are accused of sorcery to deprive them of it. The ordeal in these cases is administered with murderous effect. If the poor have a lawsuit, they generally lose their cause, as they cannot bribe the officers and judges; they are thus condemned, reduced to perpetual slavery, and sold in the market like cattle. On an average, twenty or thirty are reduced to slavery at the capital every week, and numbers killed by the tangena. Twenty thousand of the people on the south-east coast alone have been reduced to slavery and sold by the authorities of Mananjâra.

"The bearers of the tshitialainga, or silver spear, and the officers who administer the tangena, are going out of the capital daily in every direction to plunder the people, returning with a large booty of bullocks, etc. It is a common saying, when a drove of bullocks is brought to the capital for sale, 'Oh! the tshitialainga and the tangena have been at work!' Madagascar is one of the finest countries in the world and inhabited by a clever race of people, but it will become depopulated and a mere desert very soon, if the present Queen continues to reign! Without doubt a million of people have been destroyed and reduced to slavery during her tyrannical sway!"

Such was Madagascar in the year 1840, as looked on by one who knew the people and their language and was well able to form a just estimate of the miseries under which they were suffering. The picture is drawn with great power, and the shades are indeed deep. But who shall say the writer has been guilty of exaggeration? Perhaps the estimate contained in the concluding sentence may be too high; but there is, to those who know Madagascar, a ring of truth and genuineness in Mr. Griffiths' statements that win for them our entire confidence. Thank God, even the darkest picture we could draw to-day of the corruption and oppression that exist would by comparison be light. There have been many moderating and humanising influences at work since 1840. But how clearly does Mr. Griffiths expose the evils of the fanompoana system; and few will dissent from his designation of it as "the most cruel system of slavery ever known." Whilst this system continues, many of the evils that press so heavily on the common people of Madagascar and keep them back from any true political progress will continue to exist.

Another reflection occurs to me as I read Mr. Griffiths' denunciation of the oppression he witnessed, viz. that severely as the Christians suffered, they were, after all, numerically speaking, a mere handful among the myriad sufferers from the cruel and tyrannical rule of those dark days; for the iron yoke of Queen Ranavalona I. pressed heavily upon all classes of the people, and to all of them alike was her long reign a time of darkness and distress.

WILLIAM E. COUSINS.
THE RELATIONSHIP BETWEEN THE MALAGASY AND MALAYAN LANGUAGES.

(Concluded from Annual XVIII.)

CHAPTER IV.

PARTS OF SPEECH.

GENERAL.

60. THE Malayo-polynesian languages are isolating. In the Malagasy and Malayan a stem may be joined to the noun, just as in the Indo-germanic, for example, the nomen agentis. In the verb the Malagasy has stems to denote voice, tense, and mood, while the Malayan only, has the first of these. The Malagasy has also derivative elements for adjectives, whilst the Malayan has none. Inflection occurs in the Malagasy in the personal pronouns, the casus rectus being different from the casus obliquus, exactly as in the English. The Malayan has also traces of case-signs in the personal pronouns. Both languages have traces of a sign for the vocative in the nouns, and for number in the pronouns and adverbs of place. The Malagasy also expresses tense in the adverb of place. A further formative is reduplication both in Malagasy and Malayan; also the position of the word in the sentence. Among auxiliary words the prepositions can scarcely be said to play a prominent rôle, the possessive suffixes play a much more important one. In Malagasy the placing or omission of the article has a formative signification. Both languages also use concrete words as formatives, e.g. the word dz’a in Malagasy, meaning step, is also a copulative conjunction; in Malayan tempat, place, is also a relative pronoun, and bikas, trace or track, is also a causal conjunction.

THE VERB.

61. Neither Malagasy nor Malayan has a copula; the Malagasy says, for example, mamy ny fary= sweet the sugarcane; the Malayan says, rumah-nja kitjil= his house small. In both languages verbs implying motion are often omitted, e.g. Malagasy ny nenina tsy aloha, fa aorsana =regret (comes) not before, but after; Malayan ija su dah ka-kampô, he was (sudah= sign of the past) to the Kampong (gone).

62. Both in Malagasy and Malayan bare roots can act as verbs, e.g. Malagasy tonga va ny olona?=have the people arrived? (tonga= arrived, p. part; va= word of interrogation); Malayan anaq-nja djadi radja, his son becomes king.

63. In both languages the possessive suffix may be joined to a verbal root in order to signify the agent, e.g. Malagasy hita ko tsara ny kintana, I see the stars well (hita, root of to see); Malayan udjar-nja, he speaks.

64. For the active voice the Malagasy has the formatives ma-, ma+ nasal—, mana—, manka—, mi—, miha—, maha—, mian—. —amp—, and —if—; the Malayan has mê—, mê+ nasal—, bër—, pér—, kan, —i.
Of these formatives the Malagasy ma-, ma+nasal-, mana-, manka-, m'-, and the Malayan mé-, mé+nasal-, form a group. They are, on the one hand, etymologically related, and, on the other hand, they all give to the verb a meaning pretty much the same, forming the dative without any special colouring. Over the choice of the prefix usage decides in part, and in part there are definite rules to follow. Matter for comparison between the Malayan and the Malagasy is presented especially by the way in which ma+nasal=mé+nasal is joined to the root, for example: when the Malagasy prefix ma+nasal, or the Malayan prefix mé+nasal, is joined to the root, the first letter disappears if it be a mute; but other syllables either suffer no change, or the usual Sandhi laws come into play, or else, instead of ma+nasal, the Malagasy prefix ma and the Malayan mé are used.

1. The Root with a Mute as initial Letter.

In Malagasy k, t (also ts, tr), ŋ, f, s, disappear, and an n or m occupies their place. In Malayan k, t, ŋ, f, s, disappear, and the corresponding nasal takes their place (ŋ remains, disappearing only in a very few instances).

Malagasy examples: manakitra, to bite, from kaikitra; manambatra, to join, from tambatra; mamofotra, to blow, from fofotra; manaly, to roast, from saly. Malayan examples: ménah, to place together (or compare ?), from karah; ménambat, to join, from tambat; ménuput, to blow, from pusut; ménjalai, to smoke, to fumigate, from salai; ménjehari, to seek, from tjehari; ménjapai, and ménjapai, to grasp.

2. The Root with a Vocal as initial Letter.

In Malagasy d, g, j, b (and v, which must be here included, as it corresponds to the Malayan b) generally remain, but sometimes disappear like those in (1). Examples: mandio, to clean, from dio [this word is rarely or never used, monadio taking its place.—R.B.]; màngehy, to squeeze or tie firmly, from gehy; manjanona, to stop, from janona; mambitsibitsika, to whisper, from bitsika; mamabo, to take captive, from babo. V is mostly omitted like those in (1), e.g. mamiwitra, to pick up with the thumb and finger, from vivitra. The v occasionally becomes b, as mamboatra, to arrange, prepare, from voatra; mambohitra (as well as mambittra), to blow up, from vohitra, a hill. In Malayan b, d, dj, g, remain, e.g. mëmbisig, to whisper, from bisig. They disappear like those in (1) only in very rare cases, e.g. mënhar, as well as mënëhar, to hear, from dhëhar.

3. The Root with a Nasal as initial Letter.

Malagasy roots with an n as initial letter have the prefix ma, roots with m as initial letter have the prefix mana. The Malayan in these cases has mé. Malagasy examples: manamany, to sweeten, from many; maneno, to sound, to sing, from neno; Malayan examples: mënjanji, to sing, from njanji; mënhuru, to growl, from huru.

4. The Root with a Liquid as initial Letter (Malagasy l and r; Malayan l, r, w, j).

The Malagasy has in this case the prefix ma+nasal. which are joined to the root according to the ordinary Sandhi laws. The Malayan has the prefix mé. Malagasy examples: manda, to deny, from la; mandrahaka, to branch out, from rahaka; Malayan examples: mërindan, to roast, from rindah; mëlhat, to see, from lihat. Only the noun pën-lihat, one who sees, has the nasal like the Malagasy.

5. The Root with a Vowel as initial Letter.

In this case the Malagasy attaches the prefix man, the Malayan ménh, e.g. manasa=mënah, to sharpen, to grind, from the root asa=asah.

6. The Root with h as initial Letter.

The Malagasy h never corresponds to the Malayan h, but either to the Malayan k or g. When it corresponds to k, it is treated like the letters mentioned under (1), that is, it disappears, e.g. manoditra, to skin, from hoditra=kulit; manamory, to steer, from hamory=këmudi; manodidina
to surround, from homaina-hulii. When h corresponds with the Malayan g, it is treated according to (2), i.e. it appears as g, for instance: mangady, to dig, from hady-gali; mangorona, to roll up, from horona-gulih; mangrika, to make a hole, from hirika-gereq. But as the instances in which the Malagasy h corresponds with the Malayan k are much more numerous than those in which it corresponds with the Malayan g, several Malagasy roots with an initial h (= Malayan g) follow the analogy of the former. Thus from hodina-gulih, to revolve, is formed not mangodina, but manodina; from hantona=gantuh, to hang up, is formed manantona. The root hitikirtika=gelitiq (= g [el] tiq), which forms both mangitikiftika and manitikiftika, to tickle, is instructive. The first of these is the orthographically correct one, the latter is the one formed by analogy, as above. In Malayan the roots having an initial h are treated according to (5), the h being preserved or dropped, thus, from hadap we get the two forms menhadap and menhadap, to appear before one.

In regard to the other formatives, the two languages scarcely offer matter for comparison. On the other hand, they possess remnants of other inflectional forms of the active verb, which were in existence in the original Malayo-polynesian stock. Thus, both Malagasy and Malayan show traces of a verbal form in which, in the place of the initial mutes p, k, t, the corresponding nasal is attached without ma=me. This is a form of inflection which is peculiar to the Javanese. Examples: Malayan niinta, to entreat, from the root pintia; Malagasy meja, well formed, from feja, a good figure.

[The words meja and feja, although in the dictionary, seem to be unknown in Imerina; they may perhaps be provincial.—R.B.]

In both languages the infix im is still present; for example: Malagasy homana, to eat, from the root hana; homehy, to laugh, from hehy; tomany, to cry, from tanys=taunis; also Malayan gumilaiz, to glance, from gilaiz; gumiath, to tremble, from getar. With the Malayan ber is related the Malagasy va in vaventy, great, from venty, volume, substance.

Near the Malagasy onitra, to pluck, stands the Malayan pinti; near the Malagasy indrana, to lend, stands pindjan. Has the Malayan here a prefix, or have the two pairs nothing in common?

The prefixes given at the beginning of § 64 (not taking the me group into account) have very definite functions. Thus the Malagasy amp is causative, e.g. miteny, to speak, mampiteny, to cause to speak; mihais progressive, e.g. tsara, good, mihatsara, to become more and more good, etc. The Malayan kar is causative, or points to the indirect object (see § 70); ber is intransitive, or expresses a condition, etc.

In Malayan there frequently coexist verbs with the prefixes ma+nasal and mi, in Malayan me+nasal and ber, as transitive and intransitive forms, e.g. manantona=mehgantuh, to hang (something), mihantona=b ergantsuh, to hang (be hanging); in the same way, from hodina=gulih, to revolve, we have manodina=mehgulih, and mishodina=bergulih.

65. The Malagasy has for the passive the formative prefixes a, tafa, voa, the affixes ana, ina, and the infix—i—is to these may be added ta (prefix). The Malayan has the prefixes di, ter, ka, and the affix an, together with kina, which stands separated from the word.

When in Malagasy ana or ina is affixed, the last letter of the root is variously changed (see §§ 44 and § 57). To the Malagasy passive with the prefix a corresponds the Malayan with di, e.g. atambatra=ditambat, joined together. The a and di are still extant prepositions, the latter in Tiam and Malayan, the former in Kawi. The Malayan dirantai, chained, primarily signifies "in chains;" atambatra primarily means "in binding or joining," or something of the kind. Other Malayo-polynesian languages use exactly in the same way the prefix i, which is identical with the Malagasy preposition in such words as voaho, at the back.
To the Malagasy prefix *tafa* (e.g. *tafavory*, assembled, from the root *vory*, to assemble) corresponds the Malayan combination *tepér*, e.g. *tepěroleh*, to receive, to obtain, from the root *oleh*.

The Malayan affix *an*, corresponding to the Malagasy *ana*, *ina*, is never used alone, but only when *ka* is prefixed to the root. We find this *ka-an* also in the noun, and one and the same word is often both verb and noun, thus, *kapudjian* (root *pudji*) signifies both “to be praised” and “praiseworthiness.”

*Kêna* (an independent word, with the meaning, affici, affectus, *-a*, *-um*), serves in Malayan to form passives, especially in words which express something repugnant, e.g. *kêna* *tipu*, to be deceived, from *tipu*, deceit, to deceive. The Dayak uses *buah* in such a case, which has the same meaning as *kêna*, with which the Malagasy *voa* is identical, though *voa* has become a firmly adhesive prefix, and its employment suffers no restriction as in the Malayan and Dayak, e.g. *voavono*, killed; *voavoha*, opened; *voasoratra* written.

Corresponding with the Malayan prefix *ter* (e.g. *tersurat*, written) is the Malagasy prefix *ta*, which is found in a few words, e.g. *talanfona*, astonished, from the root *lanjona*; *taboroaka*, bored through, from *boroaka*, a hole.

The Malagasy infix *in* (e.g. *zinara*, shared, from the root *zara*) has nothing corresponding to it in Malayan. [But see “The ‘Infix’ in Malagasy: a Malayan Feature” by Mr. Dahle in ANNUAL II., p. 172, 2nd edit.—R.B.] The Malagasy has, however, one word with what is probably this infix, but it is a noun, viz. *binata1i*, an animal. I may mention, however, in passing that the infix *in* is in Malagasy not absolutely confined to verbs, for we have the form *nginamba*, perhaps, as well as the synonymous *ngamb*.

66. The relative voice in Malagasy is a mixture of the active and the passive forms; e.g. from the root *sasa*, to wash, we get the active *manasa*, the passive *sasana*, and the relative *anasana*; from *laza*, to tell, we get the active *milaza*, the passive *lazaina*, and the relative *ilazana*. The proper employment of the relative is one of the most difficult parts of Malagasy syntax. For an instance of its use see § 70.

67. The Malagasy forms its tenses by an inflection in the word itself, the Malayan by means of auxiliaries. In Malayan *sudah*, finished, and *telah* (for its meaning see below) are used to signify the past tense, and *hendaq* or *mau*, to will, or the preposition *akan*, to, are used to signify the future. The Malagasy has a formative beginning with *n* for the past tense, and a formative beginning with *h* for the future tense. These occur as follows:—

1. If the verbal form begins with a consonant, a *no* is prefixed to form the past tense and a *ho* to form the future, e.g. *lazaina*, being related or told, is in the past tense *nolazat'na*, and in the future *lzolazaina*. Formerly the tense sign and the verbal form were printed separately, thus, *no* *lazaz'na*, *ho lazaz'na*.

2. If the verbal form commences with a vowel, an *n* is prefixed to form the past and an *h* to form the future, e.g. the present tense of the passive form *tao*, to make, is *atao*, the past tense *natao*, and the future *hatao*.

3. If the verbal form has a prefix beginning with *m*, an *n* takes its place to form the past tense, and an *h* to form the future, e.g. from the root *jery*, to look at, is formed the present tense of the active *mijery*, the past *nijery*, and the future *hijery*.

In appearance the manner of Malagasy tense formation is very different from that of the Malayan, but as a matter of fact there is a striking similarity between them. The Malagasy *no* is actually an emphatic particle like the

* The correspondence is not perfect. The Malagasy has no prefix with an *r*. That in *ts* and other prefixes an *r* has disappeared (see § 53) appears to me very doubtful.
Malayan *lah*, both words being employed in this way. Now *tilah* is only an extension of *lah*. But emphasis points to something perfected, finished, and it is easy to see how from this *no* and *teolah* have come to express the past tense.

[This statement seems to me a very questionable one. It appears to be based on the fact of *no*, as an independent word, being called in Mr. Cousins's Grammar, to which our author is largely indebted, an "emphatic or discriminative particle." The word "emphatic," however, only imperfectly expresses the idea conveyed by *no*. It may, in nearly all cases, be translated by "is he who," "is that which," "are those who," etc., e.g. *Ity lalana ity no nalaehany*, this road *is that which* he followed. *No* therefore seems to be a pronoun. It never conveys the idea of anything "perfected or finished," but simply gives an exclusive sense to the preceding subject. It is therefore highly unlikely that it is connected with the formative *no* attached to verbs to change them into the past tense. Personally I should call it an exclusive particle or pronoun. It has, however, a few exceptional uses, which nevertheless lend no weight to the statement of our author.—R.B.J.]

The Malagasy *ho* is a preposition, which agrees precisely in signification with the Malayan *akan*. We must imagine to ourselves the process of development in such a way that *no* and *ho* have become attached to the verbal form as proclitic particles and have lost their own individuality. A further step in the process is apparent when the verb begins with a vowel, in which case actual fusion sets in, e.g. from *no omena* (from *ome*, to give) appears *nomena*; from *ho omena* appears *homena*. The combination of these particles with verbal forms beginning with *m* took place last of all, as shown above in (3).

68. The Malagasy also forms a mood, the Imperative, by a change in the word itself, viz. by means of the endings *a*, *o*, or *y*, e.g. *miantsoa*, call, from *miantso*, to call.

**THE NOUN.**

69. The formative elements which form nouns from roots show great agreement in Malagasy and Malayan. They are the following:

1. The prefix *ha=ka*.
2. The prefix *fa=fe* or *fa+nasal=fe+nasal*, corresponding with the verbal forms in *ma=me* or *ma+nasal=me+nasal* (§ 64).
3. The suffix *ana=an*.
4. The combination of (1) and (3) and also of (2) and (3).

In addition thereto there is in Malagasy a prefix *fi*, either alone or combined with the suffix *ana*, corresponding to the verbs with the prefix *mi*. In Malayan there is a prefix *per*, either alone or combined with the suffix *an*, corresponding to the verbs with the prefix *ber*. Finally the Malagasy has also a prefix *mpi* or *mpa*.

Both the Malagasy and the Malayan have other means of forming nouns which, however, only occur in a few instances, thus, there is the Malayan infix *il*, e.g. *silaput*, a membrane or pellicle which covers something, from *saput*, to cover; *telundjyg*, forefinger, from *tundjyg*, to point to. In Malagasy there is the prefix *an*, e.g. *anjara*, share, from *zara*, to divide; *antsipy*, the small stone used in a certain game, from *tsipy*, to throw; also the prefix *ki*, e.g. *kifafa*, besom, from *fafa*, to sweep. This *ki* appears to be from the Suaheli. The Malagasy has taken over from this language words like *kifongo*, button, *kitamby*, a garment; and this prefix *ki* has been added to native roots.

The prefix *ha=ka* forms abstract nouns in Malagasy, but these are not specially numerous. Examples: *hatsara*, goodness, from *tsara*, good;
THE RELATIONSHIP BETWEEN

halalina, depth, from latina, deep. The instances are fewer in Malayan. Examples: kahendag, desire, from hendag, to wish; kakasih, a lover (with strikingly concrete meaning), from kasih, to love; kataluhu, to tahu, to know, which, however, only appears in a longer form.

The prefix with f=b (Malagasy fa, fa+nasal, fi; Malayan be, be+nasal, per) occurs in both languages very often and performs various functions. It forms, for instance, nomina agentis, e.g. Malagasy danasinga, a habitual liar, from the root lainga, active verb mandinga, to lie; Malayan penjamun, a robber, from samun, active verb menjamun, to rob; fanenitra=pinjehat, a wasp. It forms also instrumental nouns, asfangady=phangaly, a spade, from hady=gali. These forms further signify what we express by the substantival infinitive, thus, fandeha, the to go [this rather means the mode of going, R.B.], from leha, active verb mendeha, to go; Malayan pinuluh, the to help, from tuluh, active verb menuluh, to help.

The suffix an is frequent in Malayan, but ana is rare in Malagasy. It forms concrete and abstract nouns, e.g. Malagasy vonana, murder, from vono, to kill; Malayan balasan, answer, from balas, to answer; tetzesana=titian, a bridge, from tety=titi, to go over; horonana=gitunana, a roll.

The combination ha+ana=ka+an is equally frequent in both languages; it is added both to verbs and adjectives, forming abstract nouns, e.g. Malagasy havelomana, existence, from velona (meaning the same as the Malagasy kaadaan); habiazenana=habisanan, greatness; hafanana=kapanasan, warmth; hamorana=kamarahan, kindness.

The combination of the prefix fa=be, fa+nasal=be+nasal, fa+suffix ana=per+suffix an, yields abstract nouns corresponding to the German forms in ung [=Engl. ing], hett [=Engl. head or hood], schaff [=Engl. ship], and also gives the idea of place to the noun, or turns abstract nouns into concrete ones, e.g. Malagasy favoriana, place of assembly, from voriy, active verb mivory, to assemble; fandiauana, cleansing, from dio, active verb mandio, to purify [mandio is generally used instead of mandio.—R.B.]; Malayan berkataan, a word, recital, from kata, active verb berkata, to speak, relate; pelabuhan, anchorage, from labuh, to anchor; Malagasy fandorana=Malayan peludahan, a spittoon, from rora=ludah, to spit.

The Malagasy prefixes mbo, mabo+nasal, and mpi, form nomina agentis, thus, mpisana, a worker, from asa, active verb misa, to work. May there be here a connection with the Malayo-polynesian mpu, a master?

70. Some words expressive of relationship in Malayan form vocatives, thus, anaq, a child, is in the vocative anan, and bapa, a father, is bapan. So with the Malagasy; thus, rankisy, O child, from anikzy; ranabavy, O sister, from anabavy, a (brother's) sister. The two languages are therefore quite different in this respect, for in the Malagasy the vocative is formed by the intimate attachment of the particle ry to the noun, but that this should occur only in the cases where the Malayan has a vocative is remarkable.

The genitive is indicated by its position after the noun. In Malagasy the possessive suffix must, and in Malayan may, come between the two, thus, the feet of the oxen is in Malagasy ny tongotry ny omby (tongotry=tongotra+possessive, see § 58, v.; ny=def. article); in Malayan it is kaki lembu, or kaki-nya lembu.

The agent of a passive verb is indicated in the same way as the genitive, e.g. Malagasy hazera ny ranonorana ny mandal, the rampart (=manduu) will be thrown down by the rain (hazera is fut. pass of zera; hazera' =hazerany, the ny being the possessive=Malayan nua; the ny before ranonorana is the article=Malayan ini or ni); Malayan dilihat radja, or dilihat-nya radja, seen by the king.

The dative is indicated by prepositions. Both the Malagasy and the Malayan, however, possess a verbal form after which the preposition is omitted, the verbal form itself pointing to a dative. This is in Malagasy
the verb in the relative voice, in the Malayan it is the verb with the suffix kan. These two verbal forms have nothing in common as to their etymological meaning. Examples: Malagasy amonoy akoho ny vahin'i, kill a fowl for the stranger (amonoy is relative imperative from vono; akoho fowl; ny, def. art.; vahin'i, stranger); Malayan burun itu phìgi mèntjìhàrikàn radja bùwah-bùwahàn, the bird went to seek (for) the king fruits.

The possessive may also express a dative relationship, thus, Malagasy maminào, sweet to thee; Malayan laiq-mu, suitable for thee.

The accusative is shown by its position after the verb, but in both languages it may be preceded by a preposition (Malagasy an-; Malayan akan); e.g. Malagasy aza mafahotra hampakatra an' i Maria vadinao, fear not to take unto thee Mary thy wife; Malayan mènurankan martabat-nja, be humble his rank. What is spoken of in Greek as the accusative of relation ("limiting accusative") is indicated in Malagasy and Malayan by placing the noun after the adjective. The article is then omitted in Malagasy, whilst in Malayan the possessive is added to the noun. Examples: Malagasy ary Josefa dia bikana sady tsara tareky, and Joseph was well-shaped and beautiful (tsara) in respect of his appearance (tareky); Malayan baig laku-nja puléri itu, this princess was beautiful (baig) in respect of her figure (laku).

Statements of place and time are expressed by prepositions. In statements of time the preposition is often omitted, e.g. Malagasy mifoha marazna ny olona mazoto, industrious people rise (early in the) morning; Malayan maka hétiha itu djuga tiba-tiba datan djabarail, and (at the same) time came suddenly (N6a-Nba) Gabriel.

All possible adverbial ideas can be expressed in both languages by the affixing of the possessive, e.g. Malagasy farany, Malayan achir-nja, at the end, at last, from fara and achir, end; or by means of the preposition an in Malagasy and denan in Malayan, e.g. Malagasy am-pitaka, deceitfully (=an+fitaka, deceit); Malayan denan sègéra, quickly; or by both at the same time, e.g. Malagasy an-draríny (=an+rary+ny) justly; Malayan denan bitul-nja, justly.

In Malayan reduplication also serves to give an adverbial sense to a word, e.g. mula, beginning, mula-mula, at first; mèntjìri, to steal, tjuri-tjuri, stealthily. Reduplication is also used to form the plural, but at the same time implies some difference of meaning from that of the common form, e.g. rumah, a house, rumah-rumah, houses, houses of all sorts.*

The remaining Parts of Speech.

71. The Malagasy possesses a prefix used in forming adjectives, namely, mang, though it is used in only a few cases, e.g. mangotanatana, wide open, from tanatana; mangofetaka, sticking on, from feta. Both in Malagasy and Malayan derivatives with verbal prefixes are used as adjectives; in Malayan especially those beginning in ber, e.g. bergunsà, useful; in Malagasy especially those beginning with ma, e.g. mafana, warm. In derivatives from the same root the Malagasy very often separates the verb from the adjective by using for the verb ma+-nasal, or mi, whilst for the adjective the formative prefix ma is used; thus, from lem so derived maleny, soft, mandemny, to soften; from orana are derived morana, rainy, minorana, to rain; from vesatra are derived mavesatra, heavy, mivesatra, to carry a heavy load. In both languages adjectives may be turned into nouns by adding the pronominal suffixes, e.g. Malagasy lava, long, lavany, length;

* In the above division I have given a few remarks on the syntax of the two languages, but with this exception I have in this paper paid little attention to the subject, as I still intend to write a special monograph on the comparative syntax of the Malagasy language.
Malayan luwas, wide. luwas-nda ān itu, this field is wide, luwas-nja ān itu, the width of this field.

It is a fact of philological interest that the Malayan, which possesses no means of its own for forming derivative adjectives, has, in a few cases, taken over from the old Indian and Arabic the elements for forming them, e.g. from the purely Malayan word rambut, hair, is formed the adjective rambuti, hairy; from the purely Malayan word āmpa, to hammer, to forge, is formed the adjective āmpawan, forged, which is in analogy with the borrowed adjectives bāhnawan, excellent, distinguished, dārnawan, charitable, beneficent, etc.

72. In §19 it was mentioned as a point of interest in regard to the development of civilization that the numbers in both languages for 100 and 1000 agree, as indeed is the case generally in the Malayo-polynesian languages. The words for 3, 7, 8, 9 (Malagasy telo, jito, valo, syv; Malayan tiga, tudulz, delapan, sambilan), are different in the two languages, but the Malagasy (and not the Malayan) has here preserved the original, as the Tombulu words ālu, ālu, walu, sijow, the Sangir words ālu, ālu, walu, sio, and the Batak words ālu, ālu, walu, sijā, show.

The Malayan uses the numeral known as "the three dwarf stags;" pilandug tiga ekur—the dwarf stags' three tails. The Malagasy has nothing of that sort. In the formation of the ordinals, distributives, etc., the two languages are quite different. There are, however, some uses of the numerals common to both languages which should be mentioned:—

For two things which are fellows or belong to one another the Malagasy has the word kambara—Malayan kembar, e.g. masa-kambana=anaq kembar, twins. When three things thus belong together, the Malagasy says, kamban-telo=Malayan kembar tiga. A half is in Malagasy sasaka, in Malayan tēhah, but sasa-ny and sa-tēhah mean some.

73. The Malagasy distinguishes the casus rectus from the casus obliquus in the personal pronouns, thus:—

<table>
<thead>
<tr>
<th>Casus rectus</th>
<th>Casus obliquus</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>izaho or aho</td>
</tr>
<tr>
<td>Thou</td>
<td>hianaro</td>
</tr>
<tr>
<td>He</td>
<td>izy</td>
</tr>
<tr>
<td>We (inclusive)</td>
<td>isika</td>
</tr>
<tr>
<td>We (exclusive)</td>
<td>izahay</td>
</tr>
<tr>
<td>You</td>
<td>hianaro</td>
</tr>
<tr>
<td>They</td>
<td>izy</td>
</tr>
</tbody>
</table>

The double form izaho, aho, has a parallel in Dayak, viz. jaku, aku (z = j in Dayak). The Malayan personal pronouns are aku, I; ānkau, thou; āja, he. These can also be used as plural; for the plurals, however, there are also kami, we (exclusive); kita, we (inclusive): ākamu, you; marika-itu, they. There agree in both languages aho=aku; izy=āja. In § 40 it was stated that the Malagasy provincial uses angao=ānkau, thou.

In Malayan there are, in addition to aku, ānkau, the forms daku, dikau, dija, which, however, cannot act as subject of a sentence. We have here therefore something like inflection. G. v. d. Gabelentz (on p. 207 of his work) holds this d for an inorganic prefix, but the difference in function between these and the other forms prevents me from accepting his opinion.

Infixed with the letter r serve to designate the plural in the Malayo-polynesian languages, and in this way the Malagasy second person plural of the personal pronoun is formed from the second person singular, i.e. hianaro, is formed from hianao. Van der Tuuk sees in the Malayan plural marika-itu also such a sign of the plural. Moreover, the regular plural sign of some of the demonstrative pronouns in Malagasy is the infix re, e.g. iny, that, becomes ireny, those.

In the Malayan there is, as well as aku and ānkau, a proclitic form, ku and kau; we thus have ku-lihat, I see; kau-dihar, thou hearest. The Malagasy has nothing like this.
Both Malagasy and Malayan have the possessive pronouns in the form of suffixes, thus, Malagasy singular: -ko, -nao, -ny; plural: -ntsiho (inclusive), -nay (exclusive), -nareo, -ny; Malayan -ku, -nu, -nja, for singular and plural. Ko=ku, and ny=nja.

74. The Malagasy has two articles, viz. one definite, the other personal. The definite article is ny. Something is said about its use in § 6. This article is actually the demonstrative pronoun iny abbreviated (see § 12). The Malayan use iny and ny as demonstratives; but while the Malayan places the demonstrative after the noun, the Malagasy generally places it both before and after, e.g. iny omby iny, that ox. Now one can easily imagine that the preceding demonstrative iny had less emphasis placed upon it than the succeeding one, and that therefore it gradually got worn down into the definite article ny. The Malayan likewise uses a demonstrative as article, viz. itu, but its use is far more limited than the Malagasy article, being only used as a general article, e.g., rahasia itu saperti anag-banah jan kita-panahkan, (the) secret is like a dart which we let fly; or, secrets are, etc.

Both languages have also a personal article, viz. i =si, e.g. Malagasy antsoy Ibofo, call Mr. Boto; Malayan di-mana si-Amat? where is Amat (=the Amat, or Master Amat)? From the pronoun anona=anu, so and so, are formed ianona=siianu, Mr. X., or Mr. So and So.

75. Both the Malayan and Malagasy distinguish between the theoretical, practical, and absolute negative. The first is in Malagasy tsi and tslo, in Malayan ti and ta; the second is in Malagasy aza, in Malayan djanan; the third is in Malagasy tsia, in Malayan tidaq. With the last of these is joined the verb ary=ada, to exist, thus, tsary=tiada. In Malagasy tsi is the word in common use, tsa being provincial; tsary [which is also provincial.—R.B] is used in the same way as tsi. In Malayan ta only occurs in certain phrases, e.g. tido ta-liap, not to sleep soundly, mau-ta-mau, noless volens. The Malayan ti is no longer in use, but only the compound tiada.

The Malagasy aza and the Malayan djanan have the same primary root (see § 31). What is the a in tsi-a and a-za?

The Malagasy and the Malayan have in common certain phrases formed with the negative. The Malagasy tsy may tsy [or literally, tsy mahay tsy, and spelled tsy maintsy.—R.B.]=Malayan ta-dapat tsjada, literally meaning “not able not,” signifies “must be.” From the Malagasy inona and the Malayan apa, something, are derived maninona and menapa, and therefrom is formed the Malagasy phrase tsy maninona tsy maninona, “nothing at all,” [or rather, it doesn’t matter.—R.B.], and the Malayan phrase tiada menapa, it doesn’t matter.

Compounds.

76. The Malagasy is very, the Malayan not specially, rich in compounds. In Malagasy the compounds are formed in two ways:

(1) Two roots are joined together without any other change, e.g. fehy, a band, and loha, head, give fehiloha, a head-band. If the first word ends in ka, tra, or na, the Sandhi laws come into operation, thus, from sarotra, difficult, and vidy, price, comes saro-bidy, dear. The possessive suffixes are placed at the end of the second member, thus, fehilohako, my head-band.

(2) An n is inserted between the two roots. This n I regard as the possessive ny=nja (compare § 70), and thus differ in my opinion in this matter from others. From fehy, band, and satroka, hat, we get fehin-tsatroka, i.e. fehy+n+satroka.
Usage decides which of these two forms should be employed. Only fehiloha is used for head-band, and only fehin-tsatroka for hat-band, but both fehikapa and fehin-kapa are used for shoe-lace. In a few instances there is a difference of meaning in the two forms, e.g. tranom-pitaratra, a place for storing glass. In this the Malagasy agrees with the Dayak, e.g. huma-papan, a plank house (made of planks), and huma-n-papan, a house for storing planks.

The Malayan has only the first kind of compound. As the Malayan has no Sandhi laws, compounds are only recognised by their having a possessive suffix, e.g. bathwater is ajar mandi, but his bathwater is ajar mandi-nja.

When words are combined after the first of the two above-mentioned methods the "language spirit" considers the combination as a close or loose one, for there results either an actual compound or a syntactic connection, and this shows itself in the position of the possessive suffix, thus: Malagasy omby, a cow, an ox, fotsy, white, ko, my; omhiko fotsy, my white cow; laky, male, omblalako, my ox [omby is either male or female.—R.B.]; vata, a box, kely, small, vatako kely, my small box, vata keliko, my small box; Malayan ta'han, hand, kiri, left, ta'han-nja kiri, his left hand, ta'han-kiri-nja, his left hand. The Malayan forms above all Tatpurusha and Dvandua compounds, the Malagasy forms all possible compounds. Malayan ajar-mata, tears (=eye-water), ajar-mata-nja, his tears; ibu bapa, mother (and father (=parents), ibu-bapa-ku, my parents. Further instances are: biri, to give, to cause, tahu, to know, pemberitahuan, information, communication of knowledge; sembah, mark of respect or adoration (which may be compared with the Hindoo anjati), jan, godhead, sembahjan, to pray, minjembahjanikan, to pray for someone. Specially worthy of mention are the numerous metaphorical compounds, which, however, we know to exist in other languages than Malayo-polynesian; for example, in Siamese, Malagasy, and Malayan there is no word for sun, "the eye of day" being used instead, viz. masoandro=mata-hari. Other examples are zana-tsipika-anaq panah, lit. child of the bow (=dart); zana-tohatra=anab tonga, child of the staircase (=step); renivohitra=ibu-nigiri, mother town (=capital).

Translated from the German of
DR. RENWARD BRANDSTETTER
By R. BARON (ED.).
AMBATOVORY, ONE OF OUR HOLIDAY RESORTS
IN MADAGASCAR;

WITH NATURAL HISTORY AND OTHER NOTES.

By the kind consideration of the Directors of the London Missionary Society for the comfort and health of their missionaries in the central province of Imérina, we have had, for some years past, a pleasant Country-house or Sanatorium, to which, after a year or so of steady labour in college, or school, or hospital, or church and district, we can go for a fortnight or a month’s quiet holiday. This peaceful resting-place is situated about 12 miles east of Antananarivo, on the Tamatave road, a mile and a half beyond the mission station of Isoavina, and a mile or less west of a great rounded mass of granite rising about 400 feet above the rice-valleys, and known as Ambatóvory, i.e. ‘Round rock.’ On the summit and eastern and western slopes of this huge boss of rock are numerous trees, much more plentiful on the western side, where they stretch down into a deep valley and form an amphitheatre of wood and bush. This vegetation is probably a remnant of the original forest, which once covered a much larger area of this mostly bare and treeless Imerina, and it forms a refreshing contrast to the moory hills and rocky mountains which are seen in every direction. The Mission Rest-house is a good six-roomed dwelling on the slope of the hill facing the south, and from it the ground falls rapidly down to the rice-valleys a couple of hundred feet below; the large piece of ground belonging to the house joining on to the bush and scattered trees of the Ambatovory forest, so that in two minutes’ time one can stroll into the woods, through which a number of paths have recently been cut, or, turning in the opposite direction, can walk over the breezy downs towards Isoavina. Here is the pleasant mission-house of Mr. Peake, with its long row of cottages for the workmen in the Industrial School which he has carried on for several years, its school- and class-rooms, and its pretty church and school-house, forming altogether a model mission station.

Behind the Rest-house rises for several hundred feet above it a rounded hill called Ambónilôha, i.e. ‘Over-head,’ a not inappropriate name. Like scores of hills throughout Imerina, a number of deeply-cut lines round the summit show that this place was formerly the site of a well fortified town. These lines, which can be seen for miles away, prove on closer inspection to be deep fosses cut in the hard red earth, a treble line of defence one within the other, the innermost rampart being strengthened by a low wall of massive stones. No building now remains in this “deserted village,” but many squares of grass-grown stones can be traced, showing the former outline of the wooden framework of the houses; and on the highest spot there is an ancient tomb, where doubtless some of “the rude forefathers of the hamlet” sleep their last sleep.
In front of the house, looking south-west, the view is partly
shut in, at a mile or two’s distance, by lofty rocky hills rising high
above the rice-valleys far below; but to the south-east one gets a
peep into a distant prospect of lines of hills, some of the nearer
ones being enormous masses of bare rock; while to the east the view
is closed by the smooth rounded slopes of Ambatovory itself, with
the woods around it and stretching down into the deep valley at
its base.

There are many pleasant walks in the neighbourhood of the Sanatorium.
One of these is to the top of the Ambatovory rock, from which there is an
extensive view, and around which, to east and south, are fine trees and
pleasant shady spots, where a picnic party can be improvised, and where ferns
and other plants can be gathered. A few years ago there was a small
village on the spot; four or five years ago there were about that
number of houses; while now there is not one left, the people, as is
usual throughout Imerina, deserting these inconvenient heights for the
plains. But a row of half-a-dozen old tombs, with small timber houses
on their tops, show that this was a village of one of the noble clans or
Andriana, who alone are allowed to make such wooden houses, Trano
masina or Trano manara, as they are called (i.e. ‘Sacred houses,’ or ‘Cold
houses’*). These are, however, now tumbling to pieces, and after two or
three more rainy seasons heaps of rotting wood will be all that is left
over the tombs of these departed great ones of the district.

Another easily-reached spot is a detached rock, something like a
miniature Ambatovory, but a short distance to the south of it. Here
a scramble over a great sloping surface of gneiss brings us to a
rough ascent leading to an ancient gateway. The top of this rock
was evidently a fort of the old times; for, except where we climb
up, there is no approaching the summit, and no need of fosses or
ramparts, as the smooth rock slopes away perpendicularly all around;
and in the days before guns and gunpowder a dozen resolute men could
have barred the narrow approach against a hundred assailants.

The paths through the woods are, however, among the most pleasant
places for a walk in the neighbourhood of Ambatovory; and although
the small remnant of old forest is too limited in extent to furnish much
variety in animal life, there is still a great deal to interest those who
have a taste for natural history, especially if they will only use their
eyes.

Of four-footed creatures in the shape of Mammalia there are none,
except possibly some of the small hedgehog-like creatures (the Cente­
tidæ), as the woods are far too restricted in range for any species of the
Lemurs to find a home there; and there is no great variety even of Birds.
There is a space of fifteen or sixteen miles of bare moors between this
place and the upper forest, so that few of the numerous feathered
tribes of the wooded regions come over the intervening country. In
the warm season the kao-kao kao-kow of the Kankafotra, the Madagascar
Cuckoo, is continually heard among the trees and bushes, as well as the
chirping and whistling cries of a few of the smaller and less conspicuous
birds, and the cooing note of one of the wood-pigeons. About the
rocks one may constantly hear the querulous cry of the little Hit'sikitsika

* ‘Cold,’ because they are housea having no hearth or fire to warm them.
or Kestrel, and see them hovering in the air or darting about; and now and then we come across a flock of the Papângo or Egyptian Kite, perched on the trees, or swooping down near the native houses to carry off an unwary chicken or mouse. Of course the ubiquitous Goaika or native Crow is never far away. With his fine white collar and square white patch on his breast, he has a very clerical appearance; he haunts the neighbourhood of the great open-air markets, where he apparently picks up a good living from the scattered rice and refuse of various kinds. In the warm season flocks of the little Weaver-birds may be seen, both the Fôdy, the male of which is mostly of a brilliant scarlet at the hot season of the year, and the smaller Tsikirity, in sober brown livery, which darts down like an arrow on the rice-fields in companies of thirty or forty together. In the rice-fields the Tâkatra, a brown stork, may be sometimes seen stepping solemnly about. He builds an enormous nest, which looks as large as a truss of hay and is fixed on the fork of a tree, or on the edge of a large rock, and there are many superstitions and fables connected with him. In the old times of idolatry if one of these storks crossed the path along which any of the chief idols was being carried, it was immediately taken back; and it was thought equally unlucky if it crossed the road in front of the Sovereign.

The Reptiles to be found near Ambatovory are small and inconspicuous. Two or three species of lizard are frequently seen: the pretty little Antsiânty, with brown coat and white lines and dark spots along its sides, eight or ten inches long, darts about like an arrow on rocks and sunny banks; while a smaller species, about four inches long, is of an exquisite green colour above, with black and white lines along its sides, and pale grey underneath. It is often seen running around the fleshy leaves of the aloes, its tinting forming a protective resemblance among its surroundings. Equally beautiful are the bright tints of some of the small chameleons, black and yellow, and red and green, and equally protective also, in case of need, is their power of changing into dull grey or brown when alarmed. Small pretty brown snakes may be often seen, from 18 inches to two feet long; and happily they are perfectly harmless, as indeed are all the serpents of this great island, at least there are none whose bite is dangerous. And yet it is amusing to see how the Malagasy leap out of their way with the greatest alarm. We found on one occasion a very large earth-worm, three times as long and bulky as any we had ever seen in England.

But perhaps it is the Insects which attract one’s attention most constantly. On the open downs, and when the sun is shining, the air is filled with the hum of chirping insect life from the many species of grasshoppers, crickets, and small locusts which cover the ground. Every step among the long dry grass disturbs a score of these insects, which leap in all directions from one’s path as we proceed, sometimes dashing on one’s face with a smart blow. The majority of these are of various shades of brown and green, and some of the larger species of grasshopper are remarkable for their protective colouring. Here is one whose legs and wings are exactly like dry grass; the body is like a broad blade of some green plant, the antennae are two little tufts, like yellow grass, and the eyes are just like two small brown seeds. But, curiously enough, when it flies, a pair of bright scarlet wings make its flight very conspi-
You pursue it, to catch such a brightly coloured insect, when it settles, and lo! it has vanished, only something resembling green or dry grass remains, which it requires sharp eyes to distinguish from the surrounding herbage. Other grasshoppers are entirely like green grass blades and stalks, and others again resemble, equally closely, dried grass; and unless the insects move under one's eyes it is almost impossible to detect them. One is puzzled to guess where the vital organs can be placed in such dry looking little sticks. There is one species of mantis also, which, in the shape and colour of its wings, legs, antennae, and body, presents as close a resemblance to its environment as do the grasshoppers. Their curious heads, however, which turn round and look at one in quite an uncanny manner, and their formidably serrated fore-legs or arms, put up in mock pious fashion, give them a distinctly different appearance from the other insects. In the dry and cooler season on almost every square foot of ground is a large brown caterpillar, often many of them close together, feeding on the young blades of grass.

But the most handsome insect one sees on the downs is the Valalan­amb6a or Dog-locust. This is large and is gorgeously coloured, the body being barred with stripes of yellow and black, while the head and thorax are green and blue and gold, with shades of crimson, and the wings are bright scarlet. It seems a most desirable insect for a cabinet, but it is impossible to keep one, for it has a most abominable smell, and this, as well as its probable possession of a nauseous taste, appears to be its protection, so that no bird or other creature feeds upon it. This insect seems therefore a good example of “warning colours;” it has no need of “protective resemblance” lest it should be devoured by enemies; it can flaunt its gay livery without fear, indeed this seems exaggerated in order to say to outsiders: “Hands off!” “Nemo me impune lacescit.” The Malagasy have a proverb which runs thus: “Valalanamboa: ny tompony aza tsa tza;” i.e., “The Dog-locust, even its owner dislikes it.”

There are many species of Beetles to be seen, although none of them are very handsome or conspicuous. The most common kind is a broad flat insect, about an inch long and dull dark-brown in colour, which crosses one's path at every step. Another is seen chiefly on the bushes, a smaller insect, but bright shining jet-black. Another, which appears as if it mimicked a wasp in its habit of flight, is shot with brown and green, with very long legs, and is constantly taking short flights or running rapidly. Another one, but much more rare, has golden green and metallic tints on its wing-cases. But the insect which has puzzled us most is one that I have never seen but on one spot, viz., on a large bush of Rólnémy, a plant with acacia-like leaves, with prickles along the leaf-stalks, and on only one bush of this, which is within a few yards of the Rest-house at Ambatovory. It is like a beetle, about 5/8 of an inch long, and almost hemispherical in shape. It is warm reddish-brown in colour, with a line of black and then of yellow next the head, and is perfectly flat below. These insects cluster closely, as thick as they can lie, in groups of from a dozen to more than a hundred together, all round the thicker stems, so that they look at a little distance like strings of large brown beads; and in some of the topmost branches they form a continuous mass for two or three feet. Amongst these shining brown
insects are a few others of quite a different colour and shape, perfectly flat, like a minute tortoise, and of a uniform grey, exactly resembling the lichen on the bark of the tree, and the edges of the carapace scolloped.* These grey insects are in the proportion of about one to 40 or 50 of the darker-coloured ones. There are also a few individuals of the same shape as the brown one, but yellowish-green in colour. What these grey insects can be, and what relation they bear to the much more numerous brown one, I cannot make out. Nor can I ascertain why they all remain motionless and in the same position for weeks together. During the three weeks of our stay here, at any rate, they seem to have not altered in position, although I think the lower clusters are slightly diminished in number. I thought at first that they must be feeding in some way on the tree, as their heads seem closely fixed to the bark, as indeed is the whole body; but on minute examination I can find no trace of any puncture or sign of their gnawing or eating the bark, although the branches on which they are most thickly clustered seem more dry and withered than the others. Their torpid condition certainly does not arise from inability to move, for, on being disturbed or shaken off, they will fly a considerable distance and will creep along the branches. I have noticed these insects on the same bush, and nowhere else, during previous visits to Ambâtovôry at this time of the year (December), but not during the cold season.†

(Since writing the above, I have had another inspection, in the cold season, of the tree with these curious insects. There are now (June) to be seen not a single one of the brown bugs, but the branches are thickly covered with hundreds of young ones, about 1/4 to 1/3 of an inch long, but these are all flat, and grey in colour, with the edge of the body serrated. The difference in shape and colour in insects so closely associated together certainly seems remarkable.)

The Ants are, as in all tropical countries, very numerous and of many species. All of them, from minute kinds not an eighth of an inch long to others half an inch to 5/8 inch in length, appear to make nests in the ground, with circular shafts leading down to them from the surface. It is amusing to watch the busy industry of these little creatures, the sides of the shafts being covered with their shining black bodies, those coming up being laden with a little pellet of earth, which they deposit outside the slope and then hurry back down below. All round the mouth of the entrance is a considerable mound of earth, all brought up grain by grain by the busy workers. The ants are the scavengers of the country. No beetle, or worm, or grub, or animal matter of any kind, can be many minutes on the ground before it is detected by some ant, who communicates the fact forthwith to its fellows, and they immediately fall on the spoil, cut it in pieces, and convey it to their stronghold. It is astonishing to see the heavy loads—pieces of sugar-cane, or yam, or other food—that two or three ants will stagger along with for the common weal. Truly, although they are a small folk, they are "exceeding wise." The thinking power in that minute point, an

* Mr. Baron tells me that both kinds are certainly species of bug, and that they are common on other kinds of trees. They have a very bad smell. Nearer the forest are other kinds of bugs, but of the most brilliant colours, and also evil smelling.
† I have subsequently seen it in other places.
ant's head, is certainly one of the most marvellous things in animated nature.

While speaking of wingless insects, I may notice here a very different kind of one from the ants, viz. the Ball-insect (*Spherotherium* sp.), of which there are several species in Madagascar. These insects, called not very elegantly by the Malagasy *Taikintana*, or 'Star-droppings,' have the power of instantaneously rolling themselves into an almost perfect sphere, which form they retain as long as any danger threatens them, and no force short of pulling them to pieces can make them unroll. The animal is formed of nine or ten segments, each with a pair of legs and covered with a plate of armour; while the head and tail are defended by larger plates, each of which fits into the other and makes a more perfectly fitting suit of armour than was ever worn by medieval knight. There are several species of these pretty and curious creatures. The most common kind here is one which forms a ball barely an inch in diameter and shining black in colour. Another, more rarely seen here, but common enough in the upper belt of forest, is of a beautiful brown colour like Russian leather, and is quite double the size of the first-mentioned one. In passing through the main forest in 1892, we came suddenly one day to a part of the road which was so thickly covered by such a great number of these creatures that our bearers could not avoid trampling on them. These were of a bronze-green tint and are probably a third species.

In all parts of Madagascar the Spiders are very conspicuous members of the insect-world. The most common kind is a species of *Epeira*, which spins large webs and may be seen by scores between the branches of trees and the angles of buildings. These are large insects, their legs stretching over four or five inches, and their bodies being handsomely coloured with red and gold and silver markings. From the way in which these spiders cross with their great webs the fosses round the old villages they are called by the Malagasy *Mampitahady*, i.e. ‘Fosse-crossers.’ The main ‘guys’ or stays of their webs are strong and thick yellow silk cords, which require an effort to break. Another species, also common, is somewhat crab-like in shape, with curious spiny processes on the abdomen and thorax. Other smaller species of spider, found on leaves and in flowers, are coloured exactly like their surroundings, some being of various shades of green, and others pure white, apparently that, with these protective resemblances, they may more easily pounce upon the smaller flies and other insects attracted to the flowers.

In these bare upper highlands of Madagascar Butterflies are not found in as great variety as in the warmer regions of the island. Still there are a few species which are common enough, the most plentiful being one which is satiny-blue above, and spotted with brown and grey underneath. This is to be seen all the year round, especially hovering over the Euphorbia hedges which divide plantations from the roads. Another, also tolerably common, is a large reddish-brown butterfly, the wings edged with black and white. Much more rare is an insect with four large round white spots on dark chocolate-brown wings; and another, dark-brown in colour, with eye-like spots of blue and red. Several small species, yellow, white, or brown, or silvery-grey and blue, are found hovering over, or settling on, damp places; and there are two or
three white species, with black spots or lines on the edges of the wings. In the warmer season a handsome large Papilio is rather common in our gardens, with dark-green and sulphur-yellow spots and markings. And lastly, but rather scarce, is one of the handsomest butterflies in the world (more strictly speaking, it is a diurnal moth), the Urania riphaea. This insect, with its colouring of green and gold, and scarlet and black, and its delicate fringing of pure white on the edges of the wings, is indeed one of the most lovely productions of Nature. The Malagasy call it Andriandolo, i.e. 'King butterfly' (or moth).

We do not see many Bees in this Ambatovory wood, but there are several species of Solitary Wasps, whose habits are very interesting. One species excavates a hole in the ground or on the side of a bank, and then, capturing some unfortunate spider or caterpillar, which she benumbs with her sting, carries it into the hole and lays an egg in its body, so that the little grub, when hatched, finds itself surrounded by food, and then eats its way out into the daylight. The hole is, after being filled up, so carefully concealed that it is quite impossible to discover it. Another species of wasp builds a series of cells of clay, which the busy worker brings in pellets and builds up layer by layer, fixing them to the sides of houses and rocks, and storing each cell with living food for its progeny in the same fashion as its mining cousin.*

But it is time I concluded these reminiscences of our summer holiday at Ambatovory. Our longest excursion was one to the grand mountain of Angavokely, which is two or three hours’ ride to the east, to the south of the Tamatave road. Angavokely is one of the highest and most conspicuous mountains in Imerina, rising 1300 or 1400 feet above the general level of the province; and it extends for two or three miles east and west, with two summits nearly equal in height and quite a mile apart. The easternmost of these rises steeply from the surrounding valleys and is crowned by enormous piles of rock, while the western summit rises with much gentler slopes covered with bush, except on the south side, where great masses of granite appear, looking like the towers of some Titanic castle. A couple of hours’ ride brought us to the rice-valley immediately under the eastern peak, and from which we commenced the ascent, a pretty steep one. At about a third of the way up is a large bare sloping surface of rock, on which we were glad to rest and take breath. Again we climb up, the grass being very slippery, and foothold very difficult. As we get higher we come into a dense shrubbery of bush and small trees; and all around are hundreds of the large showy white flower called Tsingatsa (a species of Crinum), with its long ribbon-like petals and powerful scent. One more halt at the base of the immense bare rocks which form the summit, and which tower grandly for three or four hundred feet above us, and make us all look like pigmies in contrast, and then we make a final effort, scrambling up among the huge stones, until at length we come to a rough staircase between two walls of granite, with beautiful embroideries of moss and lichen and fern. Up, up we go, and at last come upon a level platform several hundred square

* For a very full and illustrated account of these insects, see a paper by the Rev. C. P. Cory, "Notes on the Habits of some of the Solitary Wasps of Madagascar," ANNUAL XIV. 1890, pp. 163-170.
yards in extent, and are glad to throw ourselves down on the grass and recover breath after our climb.

From this "coign of vantage," many hundred feet above the valley, we have of course a very extensive and varied prospect. To the north-west is the round mass of Lohavohitra in Vonizongo, and the long serrated ridge of Andringitra, with its cave (the Malagasy Delphi); away north is the line of Ambohimiakatra, and the point of Ambârayârâmbato ('Stone-gateway'), on the way to Antsिहânaka; from north-east to south-east is the long dark line of the upper forest, with Angâvo and Ifôdy mountains, over which we cross on our way to and from the coast; beyond this again is the treeless plain of Ankây; and still beyond and bounding the view, 50, 60, or 70 miles in the blue distance, is the larger and lower forest, and ridges and peaks which we can see clearly from Tamatave. Only due west is the view interrupted, for we are not yet on the topmost pinnacle, there being still a mass of rock a hundred feet higher still, up to which our bearers scramble, but which we are quite content to leave them the honour of scaling, as the ascent appears somewhat difficult. Still, by going round the edges of the platform, we can catch all the more prominent points to the south and south-west: Hârânandriana, on the road to Betsilèo; many familiar-looking hills west of the Capital; Antanânarivo on its long rocky ridge, crowned by the group of Royal Palaces and two of the Memorial Churches; and, rising gradually but unmistakably far above all, the mass of Ankaratra, the highest point of the island, 40 miles away, with its three or four central peaks nearly 9000 feet above the sea, and about half as much as that from the general level of Imerina. Truly a grand prospect, for, except from Ankaratra itself, there is hardly any point where we could command such an extensive view as this. Steep down below us to the east is a pretty rice-valley stretching in a remarkably straight line for several miles both to north-east and south-west. The houses and hamlets below look as if a stone could be thrown upon them from this ten or twelve hundred feet of elevation; and as our eyes follow the green rice-fields, village after village appears on the promontory-like tanity or gentle rising grounds, so that we think what a fine field of work there would be in this valley alone for a resident missionary.

But we find that the steady pull up these hundreds of feet and the pure fresh air of this breezy height has given us a keen appreciation of less æsthetic things than scenery; and presently the substantial lunch we have brought with us makes us oblivious for a time to the beauties around us. The long grass makes a comfortable dining-room, and we enjoy not only our lunch, but also a lazy half-hour after it on the dining-room carpet. At length the gathering clouds to the east and south warn us that a storm is brewing; we scramble down the rocky staircase, run and slide down the slippery slopes, and in a very few minutes reach the little valley at the foot of the mountain, but not before a peal of thunder tells us that we had better lose no time on the way home. Our bearers hastily swallow their rice; we mount our palanquins, and as we gain the main road the storm bursts in great grandeur over the western summits and slopes of the mountain we have just descended. Great solid-looking black clouds roll down its sides, with lovely glimpses between them of the sun-lit landscape miles away beyond. The
thunder peals around us, with rather alarmingly near flashes of tropical lightning, and while yet a mile or two from home, the heavy rain pours down; but we soon get under cover, with no greater harm than a wetting, and with many pleasant remembrances of our day at Angavokely.

Here these jottings of one of our summer holidays must close. They have been noted down chiefly for our relatives and friends in England, in hope that they may enable them to realize a little more vividly the country where we live and labour, and especially one of the places where we gain fresh strength and vigour for another year’s work.

JAMES SIBREE (Ed.).

FROM FORT DAUPHIN TO FIANARANTSOA:

NOTES OF A JOURNEY IN SOUTHERN MADAGASCAR.

The journey from Fort Dauphin to Fianarantsoa (the chief town of the Betsileo province) has not been very often undertaken by Europeans, and portions of my route have, I believe, never before been traversed by a white man. All the existing maps are grossly inaccurate in their delineation of South-eastern Madagascar. I will therefore here describe the earlier stages of my long journey from the extreme south of the island to the capital, across what is practically still a terra incognita inhabited by savage tribes, none of which are more than nominally subject to the Hova, and some of whom enjoy an indisputable independence.

The steamer Dunbar Castle, in which I had sailed from England, came to an anchor on the morning of March 17th in the picturesque bay of Fort Dauphin. Great hills, backed by mountains of bold outline, enclose this spacious bay, and the rollers of the Indian Ocean break on a sandy beach of dazzling whiteness. On a bluff at the south side of the bay is the little settlement nestling among trees and bushes, the old fort dominating all. Here the Dunbar Castle only remained half an hour before resuming her voyage up the coast, and I had to decide quickly whether I would disembark here, or proceed with the steamer to Mananjara or Vatomandry, the two ports from which the capital could be easily reached. Fort Dauphin was the southernmost Hova post and must be nearly 600 miles distant from Antananarivo by the rough and very winding track, which traverses malarious swamps, dense forests, and high mountains—regions infested by robber tribes—and uninhabited wildernesses. Such a journey would be long and difficult, and a European undertaking it would be certain to suffer from malarial
fever in a more or less severe form. It was doubtful, moreover, whether
at Fort Dauphin one could get the necessary transport for one's baggage
and supplies. However, besides other considerations, what chiefly deter-
mioned my decision to stay here was the state of the weather. It had been
blowing hard for days, and a high sea was running; the officers of the
steamer were of opinion that the surf would be very heavy on the dan-
gerous bars of Mananjara and Vatomandry, and that communication with
the shore would be impossible.

Under all the circumstances, I considered it best to seize my first
opportunity of putting my foot on shore, so lowered myself on to the
lighter which had been pulled out to us by the naked coastmen—noisy
wild-looking fellows, with Papuan mops of hair, and bearing a strong
resemblance to the savages of some South Sea islands—and within half
an hour I was standing on the hot white beach and introducing myself
to the group of Mauritian Creoles and Hova who were awaiting our
arrival.

A fellow passenger on the Dunbar Castle, whose destination was
Fianarantsoa, and who had come to the same decision as myself, dis-
embarked with me. This was the Rev. J. Pearse, of the London Mis-
sionary Society, a gentleman whose knowledge of the Malagasy language
and of the inhabitants is probably second to that of no other white man
in the island. He was my companion for the first and most difficult
half of my long journey. In this I was very fortunate. He was a capital
fellow traveller, and his long experience of native ways extricated us
without loss of dignity from many a trouble with aggressive savages.

We found about a dozen Europeans in Fort Dauphin, all British or
Norwegian subjects, the French having left a few weeks previously.
The traders were in a despondent condition, for the civil wars raging in
all the surrounding country had almost put a stop to commerce; on the
one hand, no cloth was being purchased from the traders, and on the
other hand, the natives were no longer bringing in indiarubber—the
principal article of export—from the forests. The Governor and his
garrison were practically isolated in their fort, and the Hova rule then
scarcely extended outside its walls. The Tandroy tribes, who occupy
the southernmost point of Madagascar and are wholly independent,
were carrying on extensive raids at the time of my landing. They had
murdered many Hova and had driven the Europeans out of Mandréré
and Andrahombo, two small trading-stations on the coast, about 20
miles south-west of Fort Dauphin, had pillaged their stores, and were
reported to be advancing upon Fort Dauphin itself. There was war in
fact in all directions, and on the road we had to traverse fighting on a
larger scale than usual was going on between the queen of St. Lucia
and her rebellious people. It was no wonder then that when I paid
my respects to the Governor in his ruined fortress, I noticed that he
had a harassed and preoccupied air.

Mr. Pearse and myself had the greatest difficulty in procuring bearers;
for three days we sought men in vain; all were afraid to accompany us
through the disturbed districts, and I began to think that I had made a
great mistake in landing at Fort Dauphin. But, happily for us, a
Norwegian missionary, Mr. Nilsen, happened to arrive at Fort Dauphin
from the north with a considerable following of men, Betsileo and
Tanala, who were anxious to return to their homes, and were therefore glad to accompany us; for a white man is greatly respected even in wild parts of Madagascar, is rarely molested himself, and by his presence protects any natives who may be travelling with him. These men, however, knowing that it was impossible for us to engage others, insisted on an exorbitant rate of pay. As a rule, the Malagasy bearers are cheery willing fellows, but these particular men were lazy and mutinous, far more troublesome rascals, Mr. Pearse assured me, than he ever before had dealings with in all his thirty years' experience in the country.

We set out on our journey on March 20th. It was our intention to follow the coast as far as Vangaindrano, the next Hova military post, a distance of 150 miles, and thence to strike across the Tanala country to the Betseleo highlands. Our eight days' journey to Vangaindrano brought us across the Tanosy country. The tribes here have always been very troublesome, and they have been in a chronic state of rebellion for ten or twelve years past. A few Europeans are settled on the coast, but the interior of the province is altogether unexplored, and Fort Dauphin is the only Hova post.

Six men, lightly loaded, carried our baggage and stores, and we engaged eight palanquin bearers each. These trained bearers, relieving each other at frequent intervals, can carry a man thirty miles a day, if the conditions are favourable; but on this journey we averaged about twenty miles a day, for our progress was necessarily slow across the deep swamps. The numerous difficult fords, and the broad rivers which had to be crossed in small dug-out canoes, caused much delay, while the forest paths were generally too narrow to allow of two men going abreast, so that we had to walk no inconsiderable portion of the distance.

For the first few marches we avoided the beaten tracks and followed the sands of the sea shore, so as to lessen the chance of falling in with war-parties of the fighting tribes; for though these were not likely to interfere with white men, they might frighten our timid bearers, who would not scruple to run away and leave us alone with our baggage in the middle of the wilderness. We met a few of these coast warriors on the war-path, brown athletic savages with bushy black hair, naked save for the loin-cloth, and armed with spears and old flint-lock guns of Tower make, which they always keep bright and clean.

The coast scenery of the Tanosy country is as beautiful as any I have seen in the West Indies, or in any tropic sea. To give particular descriptions of some of the splendid views we admired would occupy too much space here. It was a very varied scenery. Spurs from the inland mountain ranges form grand promontories, enclosing lovely bays. Numerous large rivers pour their waters into the sea, but they are unfortunately all closed to shipping by shallow bars. Many of these rivers have shallow mouths and tumble in roaring cascades into the ocean breakers, but open out inside the sand-dunes into extensive lakes or lagoons. In some of these spacious bays the water is quite calm, for right across them, from promontory to promontory, stretch strings of islands, some richly wooded, some barren and wild, connected by submerged reefs, on which the Indian Ocean rollers spend their fury with a perpetual roar, throwing vast columns of foam into the air. Occasionally, on reaching some high ridge, we could see far over the inner country: first the coast lagoons bordered by mangrove swamps or by low hills covered with tropical bush and groves of
palm and traveller's-trees; then a vast expanse of grassy plains and rolling downs extending to the far blue mountains which form the backbone of Madagascar. The Tanosy country, though apparently a rich one, is very thinly inhabited. We often travelled all day without encountering a human being or seeing a sign of cultivation, and it was only in the immediate vicinity of the rare villages that small but luxuriant patches of sugar-cane, manioc, sweet-potatoes, rice, and maize testified to the productiveness of the soil. This, to all appearance, would be as good a country as any in the world for the white planter, were it not for the coast fever, especially deadly at the season of our journey, the termination of the rainy season, when the subsiding waters leave lagoons of mud to fester in the sun.

Sometimes we travelled along the surf-hardened sand at the very edge of the breakers, and sometimes plunged into the forest, where the dense vegetation shut out the breeze and light, and the black mud gave out a foul odour as we trampled through it. In mid-forest we at times came across delightful open glades, where the soft grass was studded with the fantastic pitcher-plant and with numerous flowers. For miles at a time our way lay across the malarious swamp, where gigantic arums were in blossom, and the snow-white herons had their haunt. It was delightful to come out again from the suffocating jungle on to the open sea shore, and feel the fresh sea wind and the salt spray on our cheeks. Often our way lay for many miles along a narrow strip of sand with water on either side, on our right the breakers of the Indian Ocean, on our left the still lagoon. Then we would strike inland again to cross a country of curious formation, crumpled up like a confused sea after veering gales, huge grassy hillocks divided from each other by a network of steep gullies, the bottom of each gully being a fetid morass shaded by ferns and traveller's-trees. For half one day we travelled by canoe across the delta of a great river, winding about through a bewildering labyrinth of sinuous streams, narrow creeks, islands, lagoons, and swamps, ignored on all the maps. The rivers were our principal difficulty; they were said to swarm with crocodiles, and the fords were often deep and dangerous, while no less than fifteen rivers were unfordable and had to be crossed in dug-outs, which were not always easily procurable from the surly and suspicious tribesmen.

Our second day's journey brought us to the large coast village of St. Lucia, on the bay of the same name, a port formerly frequented by coasting vessels from Tamatave. We found only one European there, a Mauritian Creole who kept a store; he told us that the tribal war had brought all trade to a standstill, and that in all probability the village would shortly be pillaged. But we passed through this disturbed little state without encountering any armed force, which was probably due to the heavy rains rendering fighting exceedingly uncomfortable. This civil war, however, caused us some delay on the bank of one broad river. The natives, who were on the further side with their canoes, refused for a long time to ferry us across, being under the impression that we were an invading army. We certainly formed a somewhat formidable-looking party, several natives travelling with us for protection, so that we numbered about forty, all the men carrying spears, some of them muskets as well. They yet displayed timidity on some occa-
From Fort Dauphin to Fianarantsoa.

sions, and on portions of the road, where they anticipated danger, they closed up, instead of straggling over a mile or two of country, as usual, and begged me to go ahead of them with my revolver, a white man's weapon in which apparently they had great confidence.

Having safely traversed the regions of civil war, we entered the district of robber communities. For three nights in succession we took shelter in the principal villages of three robber kings, the royal palace being, on each occasion, placed at our disposal. We found these people mean, false, and incredibly greedy, but far too cowardly to resort to force when any risk was to be incurred.

A description of one of these villages—Mahavelo on the Fihahaka river—where we slept on March 23rd, and an account of our dealings with his thievish majesty, will convey an idea of the sort of people we had now got among, a people whose degraded condition surprised Mr. Pearse, who assured me he had never come across such barbarism throughout his wanderings for thirty years over the island.

The village, which contains about 600 inhabitants, is, like all others on the coast, enclosed by a stockade, within which the cattle are driven each evening for protection against thievish neighbours. Each house consists of but one room and is constructed of the mibrib and other portions of the leaves of the traveller's-tree, fastened together with fibres of the same tree, the whole supported by a light wooden framework. The floor is raised two feet above the ground, the house standing on piles in a filthy quagmire of mud and cowdung. The lowing of cattle, the cackling of hens, the shrill gossiping of women, and the crying of babies, combine to make one of these crowded Tanosy villages very noisy after sunset. The coast people are of a very mixed blood: Negro, Arab, South Sea Islander, Malay, and other races seem to be represented in this curious breed of men. I have seen natives who might have stepped out of a Ghoorkha regiment, others who might pass for natives of Calcutta. In the same village one can observe the repulsive features of lowest savagery and the refined beauty of the higher branches of the human family. There are types too that puzzle one to classify. At Mahavelo, for example, I noticed one tall, lean, bronze-coloured man, with shapely limbs. His hair was tied up in a sort of top-knot. There was an uncanny and sinister beauty in his cruel, yet intelligent, face; he looked somewhat like an Egyptian mummy brought to life again and possibly had the blood of old Phenician navigators or later pirates in his veins. The men of Mahavelo were for the most part naked, save for the loin-cloth; while a piece of papyrus matting was the favourite costume of the women, none of whom, by the way, had the slightest pretensions to good looks. On the whole, they were an unpleasant people to look at, and their bodies, almost without exception, were disfigured by various loathsome forms of skin disease. A Tanosy village is not an inviting place, and the mazes of cobwebs that link house to house and hang across the dirty alleys, full of large spiders of repulsive appearance, do not make the general affect any more agreeable.

As we entered the village the king came out to meet us, a crafty-looking old scoundrel, who is the most notorious robber on this road. He received us with great politeness and placed his house at our disposal for the night; it consisted of one room, like the other huts, and
stood on four stout stilts in the very centre of this great dung-heap. In applying the titles of 'king' or 'queen' to these petty chiefs, I am but following the universal custom of the south of the island. The same term (mpanjaka) is employed when speaking of the Queen of Madagascar and of the robber ruler of a village. As we sat on the matting and awaited our usual dinner of fowl and rice, which our men were cooking for us in the middle of the room, the almost naked king and his hideous queen, wrapped in a mat, crawled through the low door and presented us with some rice and milk in token of their friendship. The old king beamed upon us with a perpetual smile, but its expression was not prepossessing. He was fulsome in his regard for us, and informed us that he himself would ferry the illustrious strangers, who were to him as "father and mother," across the broad river below the village on the following morning—a great honour paid to few. He was as nice-spoken a robber chief as one could wish to meet, but we trusted him not; he was far too polite for an honest monarch. While in the house with us, the queen had a violent squabble with some of our men, to whom she had sold four-pennyworth of rice. Having carefully weighed in her brass scales the little chips of cut money they had given her, she bitterly complained that there was some fraction of a farthing under weight, and shrieked voluble abuse, until we comforted her with the gift of a pennyworth of silver. The intense greed expressed in the features of the king and his consort, while this haggling was going on, was revolting to behold.

On the following morning we gave the king and queen an adequate cadeau (this is one of the numerous French words adopted by the Malagasy, and one which they employ but too often) and then went down the hill with our men and baggage to the river bank. The king followed us with a number of armed tribesmen. A large canoe was moored to the bank, and our bearers were just about to place our baggage in it, when, at a signal from the king, one of his followers leaped into the canoe, shoved it off from the bank and paddled out into deep water. And then of a sudden, all his cringing politeness slipped off the king, and this sly old fox of Mahavelo turned on us with an insolent smile, while his people giggled at our discomforture. The king informed Mr. Pearse that it was his custom to make travellers pay tribute, and that he would not ferry us across the river unless we satisfied his demands by paying an exorbitant sum in dollars or the equivalent in cloth or beads. Mr. Pearse of course refused to do this. "Then you can remain where you are," calmly rejoined the king; "my canoe shall go, and you can get no other." Then he proceeded to upbraid us for our gross ingratitude, and threw in our teeth the kindness he had shown us and the presents—worth at least two-pence—he had made us the previous evening.

The river was deep and broad. We might have had to wade along its banks through the swamps for a day or more before we found another canoe. We had no supplies with us and could procure none until we reached a village on the further shore. The situation was therefore an unpleasant one for us, and the old king thought he had us completely in his power. But we were not going to leave a mischievous precedent for future travellers, and we did not waste much time in argument. Mr.
Pearse translated to me the king’s remarks, told me that he thought the people meant mischief, and then quietly said; “I now think, Mr. Knight, it is the proper time for you to show your revolver.” I therefore drew my revolver and walked up to the king, who began to look uncomfortable. Making a little speech through Mr. Pearse as interpreter, I informed the king that Vazaha did not submit to blackmail, but that we were willing to pay him a fair sum, one dollar, if he would ferry us across, but that if he did not accept these terms I would seize the canoe, that I would fire at the man in the canoe unless he at once brought her back to the bank, and that I would stand by with my revolver ready to shoot his majesty, should he venture to interfere, until I had seen all our men and baggage safely off. In that case he would get no pay and would probably lose his canoe. The king, on hearing this, promptly but sulkily submitted, and the canoe in three voyages carried our large party across. We took the king with us on the last voyage, and on the opposite shore, a country of his enemies—some of whom stood round and jeered him—we gave him his dollar and some parting advice as to the proper way to treat travellers.

The king of Mahavelo has long been notorious as a lifter of cattle and a collector of blackmail. Once before at least he has had a white man in his clutches and appropriated the baggage of an unfortunate Norwegian missionary. The Hova Government recently condemned him to pay a fine of several hundred head of cattle; but he has so far disregarded this judgment, which, as he well knows, no Hova officer will venture to execute.

On the evening of March 24th we slept in another robber village, Matsio, at the mouth of the broad River Iavibola. Here too the king lodged us in the palace that crowns his dunghill and treated us very well. Before we retired to rest he begged us not to be alarmed should we hear much noise in the night, for he had told off a number of men to watch the cattle, and these men would shout at intervals to show that they were awake. He explained that very wicked people inhabited the neighbouring villages, who were supposed to be meditating a raid on his cattle that very night; “for, a short time ago,” he naively added, “I stole a number of their cattle, which I have with me here. The rascals may try to recover them.”

On the evening of March 25th, as we neared our sleeping-place, the village of Manambondro, on the delta of the large river bearing the same name, we were surprised suddenly to see before us, on the summit of a hill, the first signs of civilization we had come across since leaving Fort Dauphin—a bell-tower surmounted by a cross. Here, in a most malarious spot, we found a little mission station, and were hospitably received by Mr. Elle, a young Norwegian pastor who is living here alone among the savages. Some months ago there were three other Europeans in the place, but one, an Englishman, had died, and the others, Frenchmen, had left.

On March 27th we crossed the river Masianaka, the northern boundary of the Tanosy country, and by dusk we reached Vangaindrano and had completed the first section of our long journey. As we approached this important centre we noticed that the population became denser and that there was far more cultivation than in wild Antanosy. We
passed several villages this day and extensive rice-fields, and finally crossed an immense marsh which extended to the foot of the wooded hill on which Vangaindrano stands. Here we were once more in comparative civilization, for in this town there is a Hova Governor and garrison and a considerable Hova colony. From the town an extensive view is obtained in all directions, a somewhat dreary view when the south wind howls, the sky is overcast, and the rain drives, as was the case during our stay. Below the town flows the winding Mananara, here a mile in breadth. Far inland can be seen the deep-green belts of rain-drenched forests. Eastward is the delta of the river, with its dismal mangrove swamps, and still further, some six miles off, the Indian Ocean breaking on the reef. We stayed in the house of Mr. Horne, a hospitable Norwegian missionary. The different Protestant Missions in Madagascar have, by mutual consent, avoided, so far as is possible, any overlapping of their spheres of work, and the south-east coast [up to Vangaindrano] is the undisputed province of the Norwegian Lutherans. We found five Europeans—missionaries and traders—residing in this town.

Impatient as I was to push on, we had perforce to wait three days at Vangaindrano. A number of our bearers here decided to leave us, while several were prostrated with fever and unable to proceed further. We found it almost impossible to procure others, despite all the Governor's efforts to assist us. At last we contrived to get together a scratch crew, a mutinous lot of rascals from the scum of the population, who gave us a great deal of trouble before we started. And notwithstanding all the Governor's endeavours to help us, we were forced to agree to give an exorbitant rate of pay before we rould get away. Of all journeys I have ever made, that from Vangaindrano to Fianarantsoa, which occupied 12 days, was the most disagreeable, not on account of flooded rivers, heavy rains, rough food, inhospitable natives, and other natural difficulties, which one accepts as a matter of course, but on account of the altogether unnecessary delays, for which the bad disposition of our men was responsible. It is very trying, when one is in a fever of impatience to push on, to be brought to a standstill after half a day's journey, instead of completing the full stage, simply because our followers have come to a village where rum is sold, and are determined to have a drunken night of it. This occurred on two or three occasions.

At last, on March 30th, we collected our men, crossed the broad Mananara, and commenced our march. At Vangaindrano we left the sea coast and turned inland, each day's journey bringing us nearer the central highlands. At first we passed through a country where there was a good deal of cultivation, and the inhabitants, of the Taiasly tribe, were more civilized and friendly than the people we had met on the coast. Our way, for day after day, lay across a monotonous succession of great moory billows, with troughs of morass between, that formation, as of a confused sea, so characteristic of Madagascar, and to which I have elsewhere alluded. But occasionally we traversed great swamps, following the narrow water-alleys, where running streams forced their way through the dense aquatic jungle, on either side of us arums ten feet in height and huge reeds. We also passed through belts of bush, where bamboos, cardamoms, mangoes, guavas, and wild lemons and
oranges grew luxuriantly. In many places beds of streams of dark lava testified to former volcanic action.

On March 31st we came to Ankarana, a town on the summit of a steep hill, with a Hova Governor and garrison; and on April 3rd we had decided that Mahamânina, another Hova post, should be our halting-place for the night; but we did not get there without a struggle with our rebellious carriers, who were determined to stop at Mâhafâsina, a large village on the River Manampâtra, to have a drunken carouse. But I lost my patience at last and was determined to have my own way this time. I knew that we were no longer entirely at the mercy of the rascals, for we owed them their arrears of pay, which they would be unwilling to forfeit. I told them I would give them five minutes, and if they had not by that time shouldered their loads and set out again, I would leave my baggage with the village headman and walk on alone to Fianarantsoa. They saw that I meant what I said. They were now among a people not over friendly to them, and if left masterless and without passports, would find it very difficult, if not impossible, to reach their homes. They realized that I, in my turn, was master of the situation, and to Mr. Pearse's astonishment they left the rum and the convivial villagers, and off we marched.

(To be concluded in the next Number.)

E. F. Knight.

VARIETIES.

French Exploration in Madagascar.—In the Bulletin of the Paris Geographical Society (1893, part 3) M. Alfred Grandidier gives a sketch of the exploring work done by French travellers in Madagascar during the last thirty years, accompanied by four large-scale maps embracing the greater part of the island, in which all their itineraries are laid down, and numerous sections of the country along the routes given. M. Grandidier’s own surveys, carried out between 1865 and 1870, by which the orographical system of the island was for the first time brought to light, form the most important contribution to the map, and since that time he has been in correspondence with many travellers, who have communicated to him the results of their surveys, which are now published in a collected form. The greater number of the itineraries naturally converge on the Capital, and the north-eastern sheet, which contains this, is the most closely filled in. The remainder occur principally in the south-east, and in a band across the island a little below the centre, so that the extreme north, north-west, and south-west are the only parts not dealt with. Besides M. Grandidier’s surveys, the chief are those of Roblet, Gautier, Foucart, Catat and Maistre, Anthouard, Douliot, and Besson. The work of explorers of other nations (Mullens, Sibree, Deans Cowan, etc.) is not inserted, though its value in the interest of geography is acknowledged. In the same publication M. Grandidier also publishes the notes of the journeys made by MM. Besson and Douliot in 1891. The former gives an
THE ANTANANARIVO ANNUAL.

interesting account of a visit to the stronghold of the independent Tanâla, who inhabit the forest tract east of the escarpment of the central mountains. As related by Mr. Deans Cowan in his paper published in the R.G.S. Proceedings for 1882, the retreat afforded by the almost inaccessible mountain of Ikôngo has enabled a section of this tribe, under their chief Ratsiandraofana, to resist all attempts of the Hova to subjugate them. The Tanala are extremely distrustful of strangers, and it was only at the third attempt, after long cultivation of friendly relations by presents, etc., and finally by submitting to the ceremony of blood-brotherhood, that Dr. Besson was allowed to ascend the mountain. As far as the village of Andrainarivo, where the king was then living, the slope is about 45°. From this to the top it became nearly vertical, the path being encumbered by rocks and hidden beneath brushwood. The summit, an elevated plateau 5 or 6 miles long, is covered with thick brushwood, among which are the remains of the former village, now abandoned. There is a thick covering of soil, and most crops might be cultivated, except rice, for which the cold is too great. The tribe was formerly disunited, but was brought under a sort of patriarchal rule by the present king (now quite an old man), after his escape from slavery among the Betsileo. Their social life is primitive, but conforms to natural law, theft being unknown and drunkenness rare. - The Geographical Journal, Aug. 1894.

M. Gautier’s Explorations in Madagascar.—During journeys made within the past year between the Capital and the west coast of Madagascar, this traveller was able to collect a considerable amount of new information respecting the geology and surface features of the district lying between 18° and 21° S. lat. (Annales de Géographie, 1894, p. 499). Both geologically and orographically, the district is divided into zones running in the main north and south, or parallel to the coast. The primary (Archaean) rocks, which form the central elevated region, are divided from the sedimentary formations (limestones, red sandstones, etc.), disposed in bands between it and the coast, by a nearly straight line coinciding with the plateau escarpment. Amid the chaos of mountains which form the latter, a general north and south direction of the ridges has been observed. A line of high ground, however, seems to run east and west, dividing the vast depression of the Onimainty to the south from another probably existing to the north, as indicated by the break in the plateau-wall reported by Mr. Nilsen-Lund. It thus seems that, while the forces of compression have given to the island itself and to most of its ridges a north to south direction, movements of torsion have led to fractures running east and west. This idea is supported by the fact that, just in the same latitude, a break in the continuity of the sedimentary ridges further west occurs. These ridges are divided from the central plateau by a line of depression which runs from the coast at Nosi-bé in the north, through about two-thirds of the length of the island, being finally closed in by the Bâra plateau to the south. This depression seems to be the hottest part of the whole island. The most important river of this part of Madagascar is the Tsiribihina, and its constant supply of water is due, apparently, to the regulating action of the lakes of its upper basin. M. Gautier’s explorations show that its tributaries encroach on the basins of other rivers both north and south. The system of rains is not so regular here as in other parts of the island, the action of the monsoon being apparently modified by cold currents from the southern part of the Mozambique Channel. Storms seem to come mainly from the interior. Vegetation also is distributed in zones parallel to the coast, the forests of the latter (favoured by the moist sea-breezes) giving place inland first to savannahs, with trees scattered regularly over the surface (one or two species predominating), and finally to grass-covered uplands of a dry and desolate aspect. A great part of these uplands forms an uninhabited zone
separating the Hova settled round the Capital from the Sâkalâva of the west coast, and is owing rather to the social and political state of the country than to unsuitability of the land for settlement. — Geogr. Journ., Dec. 1894.

**Archeological Discoveries in the Lânhay District.** In a letter recently received from Mr. H. Hanning, who is working a concession in the above district (N.E. central), he says: "We have found in pits here, dug in the former bed of the creek, a lot of ancient pottery (broken) and many signs of former inhabitants, which must date hundreds of years back, as they were found 30 feet under the surface. I have got also an ancient spear, in very good condition, and of excellent workmanship, found at the same depth below. The place where these various things were discovered presents the following section:

<table>
<thead>
<tr>
<th>Surface soil</th>
<th>sand and gravel</th>
<th>wash</th>
<th>clay and gravel</th>
<th>quartz gravel</th>
<th>wash</th>
<th>black sand</th>
<th>bottom</th>
</tr>
</thead>
</table>
| "In the same place where the pottery and spear were found the natives also got a piece of old money, but before I could get hold of it, they had tossed it into the stream, being afraid they said, of the spirits, on account of some absurd superstition they have; so I lost the opportunity of probably being able to fix the date of the pottery and other articles found."

**The Malagasy Custom of 'Mirary'.**—"Wreathed in mist, the countryside looked so weird that, had mermaids peeped out of the haze and floated in the ocean of the air, we should have scarcely been surprised as we rode along in the hour that is neither day nor night. We were a score of miles from Antananarivo’s peopled heights. The sound of human voices was not in our thoughts. We were in the wilderness of nature, spell-bound with the charm of mountain scenery, whose beauty flaunted itself not before us with the boldness that compels recognition, but rather, as the mood impelled, caused the veil o’er its face to be coyly lifted as we rode by. We seemed alone in a waste of waters. Suddenly from all around, from hill-top near and hill-side distant, a melody came floating down to our ears. At first, the sounds were vague and indistinct, but even then there was harmony in them. Presently, they gathered volume and rose and fell as if wafted to us by sea-waves. Plaintive yet defiant were the strains of song. We seemed to be amidst the Syrens of the Grecian seas. Nearer and nearer we approached one group of singers, and we thought of the ancient legend of the singers of the deep. The situation was impressive whilst it was shrouded in mystery, but far more so was it when its explanation was apparent. We were amongst hillside villages and approaching one of them. As we entered it, there in the drear, dank, dark morning, stood a group of women, brandishing spear-like sticks in their right hands, singing the 'Mirary.' It was a scene, once beheld, never to be forgotten. There was passion in their voices and fervour in their eyes, yet not anger. A morning prayer evidently being sent up to Heaven. And so it was. The women were singing a prayer-song for the husbands, fathers, brothers, and relations who had gone forth to defend the fatherland.

"From the days of Andrianampoiniméria, the great king of Madagascar, and probably long before that period, in the time of war it has been the custom of the Hova women to pray thus for their defenders. Every morning and evening they sing songs, asking help from the Almighty. Since we heard the songs as we rode through the countryside some six weeks ago, the women of Antananarivo have taken up the national custom. And now, at daybreak and sunset, the Capital rings with the sound of women praying in song. From all the information we can gather, the custom has its origin in a religious ceremony, and it is doubtless of very great antiquity. It is impossible to give here a translation of the songs, as they contain many
difficult Malagasy idioms. But the following verse, which covers the whole
meaning of the songs, gives the general purport:—

"Mayest Thou protect them, O Lord!
May they succeed in their effort!
May the spear have no chance to hit them,
Nor the rifle have any harm for them!
May they capture their enemy!
Whether they are fighting in the morning or evening,
May they succeed in defeating their enemy!"—Madagascar News.

LITERARY NOTES.

A Fragment of Literary History.—The
following is an extract from a short
speech made by the Rev. W. E.
Cousins at the R. T. S. Breakfast in
the Cannon Street Hotel on Tuesday,
May 21st:—

"A few weeks before I received the
invitation to speak at this meet­
ing it had been my duty to sort and
examine a collection of old family
letters; and among them I found
one written by myself in May, 1863,
describing what I now see to have
been a very fruitful day's work. The
letter tells how Mr. Toy, Mr. Duffus,
and I spent the greater part of a day
in the old mud house at Ampá­
ribè, in which I then lived, correcting
the proofs of the first work to be
printed by Mr. Parrett on the small
press he had brought out. We were
all new to the work. Our knowledge
of the language was even more
scanty than we supposed it to be,
and we had had no experience in
proof-reading. There, in the old
house at Amparibe, we tried our
'prentice hands at what in after years
would bulk very largely in our life's
work.

"And what was this small book
upon which we were working? It
was a simple Scripture Catechism
composed by the Rev. David Griffiths
in the year 1828. This book came
nearer perishing in the Persecution
than any other important work of
the early missionaries. We carried
out with us in the hold of the Mar-
shal Pelissier more than 20,000 tracts
of various kinds, but among them
were no catechisms. We did not,
I think, know of the existence of
this book, till some of our native
friends brought us two or three soiled
and tattered copies. These we
gladly accepted, and from them we
constructed 'copy' for Mr. Parrett.
I see that in my letter I call these
worn and much soiled copies 'seed
from which future editions would
spring.' The prophecy has been
abundantly fulfilled. The seed has
produced harvest after harvest. I
am afraid even to guess the total
number we have printed, but I am
sure it would amount to hundreds of
thousands. The substance remains,
but many changes have been intro·
duced from time to time. The book
has been eminently useful. It is
small and unpretentious; but next
to the Bible, and I should perhaps
add the Hymn-book (for hymns have
a wonderful power of impressing on
the popular mind the great facts
of our religion), no book has done so
much to familiarise the Malagasy
people with the outlines of the Chris­
tian religion; and the memory of
how, through that day's work at
Amparibe 32 years ago, this work of
our honoured predecessor David
Griffiths was thus rescued from perish·
ning and sent forth on a new career
of usefulness caused me no small
pleasure as I was reminded of it by the
old letter of which I have spoken."
LITERARY NOTES.

New Books on Madagascar.—Madagascar of To-day. A Sketch of the Island, with Chapters on its past History and present Prospects; by REV. W. E. COUNSINS, M.A.; London (R.T.S.): 1895; pp. 159, post 8vo: Map and Illustrations.—Étude de Politique contemporaine: Madagascar en 1894; par MONS. A. MARTINEAU; Paris; pp. 500, 8vo.; also, Madagascar; Paris; 12mo, avec gravures et cartes.—Les Mussulmans à Madagascar, 2nde partie; par MONS. G. FERRAUD. There are chapters describing a Journey across Central Madagascar in Round the Black man's Garden; Edin. and London; 1893; by MRS. ZELIE COLVILE.

In MR. H. E. DRESSER'S magnificent Monograph of the Coraciidæ, or Family of the Rollers (Farnborough, Kent, folio, pp. 111), 1893, are full descriptions (pp. 53-55, 85-105), together with six large coloured lithograph plates, of the six Malagasy species of Roller, viz. Eurystomus glaucurus, Brachypterus lepto­somus, B. squamiger, Atelorhynchus pittoides, A. Crossleyi, and Lepto­somus discolor. (See post, p. 379.)

The following portions of M. GRANDIDIER'S great work, Histoire physique, naturelle et politique de Madagascar, have been issued during the years 1894 and 1895:—
35e et 36e Fascicules, Histoire des Plantes, par le Dr. BAILLON; atlas, t. iii., 1e et 2e parties.
37e fasc., Histoire des Mammifères, par MM. MILNE-EDWARDS, GRANDIDIER, ET FILHOT; atlas, t. ii., 3e partie (Myologie et Splanchnologie).
Les dessins des Reptiles se poursuivent, et les planches des Orthoptères sont à la gravure (Nov. 1894).
36e et 38 fasc., forment la 3e partie du tome ii. de l'atlas de la Histoire des Plantes.
38e fasc., forment la 3e partie du tome ii. de la Histoire des Mammifères.
Sous presse (Oct. 1895), paraître au commencement de l'année prochaine le 39e fasc., qui formera la fin du tome ii. de l'atlas de la Histoire des Mammifères, consacrée aux Lemurs propres.

Madagascar et les Hovas; Paris: 8vo, pp. 284; also, Madagascar: sa Derivation et ses Habitants; Paris: 12mo; par REV. PERE PILOT.
Madagascar et la Mission catholique; Paris: grand in 8vo; par REV. PERES COLIN et SUAU.—A la Cour de Madagascar: Magic et Diplomatie; Paris: 12mo; par M. MARIUS CAZENEUVE.—Guide pratique du Colon à Madagascar; Paris: par MM. GAUTIER, JULLY, ROUIRE, et COMBES.—Cours de la Langue malgache; Paris: par REV. PERE BASILIDIE RAHIDY.—La France à Madagascar (1815—1895); Paris: 12mo; par MONS. L. BRUNET.—Madagascar et les moyens de la Conquérir; Paris: 8vo; par COLONEL ORTUS.—Bulletin de la Comité de Madagascar, paraissent mensuellement depuis Mars, 1895; articles par MM. GRANDIDIER, MARTINEAU, COLIN, GAUTIER, etc.


* I am indebted, as before, to M. Grandidier's courtesy for these particulars; the items for last year did not reach us in time for insertion in ANNUAL XVIII. I have also to thank M. Grandidier for the titles of numerous new books and articles in the French language, which are given in these "Notes." J.S.—(Ed.)


From the F. F. M. A. Press:—"Ny Lal'an' ny Syntaka Frantsay; nasiana Ohatra. Fiz. 1. (The Laws
of French Syntax, with Exercises.)
- Ny Geography Physikaly (Physical Geography, abridged edition); pp. 46; edited by Miss HERBERT.
- Ny Sakaizan' ny Tanora (“The Friend of the Young,” monthly illustrated magazine), vol. xviii. pp. 192; edited by Mr. H. E. CLARK.

From the S.P.G. Press.—Ny Bokin’ ny Apokryfa atao hoe: Ny Fahendren’i Solomona, Eklesiastika, sy Baroka (The Apocryphal Books: Wisdom of Solomon, Ecclesiastical, and Baruch); fscp. 4to, pp. 84; translated by REV. F. A. GREGORY, M.A.—Anayisan’ ny Testamenta Taloha (Translation from “Dr. Pinnock’s Analysis of O. T. History”); fscp. 8vo, pp. 350; by MR. A. TACCHI.

From the N.M.S. Press:—Hevi-teny amy ny Fozantsara nosoratany Lz’oka (Commentary on the Ritual of Holy Communion); fscp. 8vo, pp. 43; by REV. G. K. KESTELL-CORNISH, M.A.

NEW MAPS.

Madagascar d’après les travaux d’ALFRED GRANDIDIER. Scale 1: 3,000,000 or 47·8 statute miles to one inch. Paris: Andriveau-Goujon; 1895; price 1 shilling.—Carte topographique de l’Imerina (Province centrale de Madagascar). Par A. GRANDIDIER et REV. P. ROBLET et COLIN, S. J. Scale 1: 200,000 or 3·1 statute miles to an inch; feuille nord. Mars, 1895.—Carte de l’Afrique; scale 1: 200,000 or 31·5 stat. miles to one inch. Sheets Nos. 47, Antsirana; 52, Antananarivo. Service géographique de l’Armée. Paris: 1894.—Carte de la Partie septentrionale d’Imerina. Par A. GRANDIDIER and les REV. P. ROBLET et COLIN. Scale 1: 100,000 or 1·6 stat. mile to an inch; 3 Sheets.—Madagascar: Carte manuscrite très détaillée reproduite en photographie, dressée à l’aide des itinéraires des voyageurs. Par J. HANSEN. Paris: 1895. Scale 1: 750,000 or 10·8 stat. miles to one inch. Price of the 11 sheets, 70 fr.

On Bones of a Sauropodous Dinosaur from Madagascar.—Originally described from the Lower Cretaceous and Jurassic rocks of England and other parts of Europe, the gigantic Dinosaurs commonly known as Sauropods have been subsequently discovered in great abundance in North America, while they have been recorded by myself some years ago from Southern India and quite recently from Patagonia. We have thus evidence that the group had a very wide geographical distribution; and it is noteworthy that, while several of its North American representatives appear inseparable from their European allies, the Indian and Argentine forms are likewise referable to one and the same genus. Hitherto we have had no evidence of the occurrence of the group in Africa or Madagascar, and it is therefore a matter of considerable interest to be able to bring before the Society the fact that these gigantic Dinosaurs were represented in the island last named.

Before proceeding to the consideration of the specimens themselves, it is important to mention that remains of a Mesozoic reptile of a Jurassic type have already been recorded from the island, and referred to the European genus Steineosaurus.* The presumption thus afforded of the occurrence of Jurassic strata in Madagascar is converted into a certainty by the discovery of a large series of molluscan remains belonging to forms characteristic of that period.†

The specimens that I have the opportunity of now bringing under the notice of the Society comprise a large series of reptilian bones collected by Mr. J. T. Last, at a spot about 20 miles to the eastward of the Bay of Narinda, on the north-western coast. These bones, which have been purchased by the British Museum, include vertebrae, limb-bones, and portions of the pectoral and pelvic girdles of gigantic land-reptiles; and although the long bones are represented only by their extremities or fragments of the shafts, while the vertebrae are all more or less broken, yet many of the specimens are sufficiently well preserved to afford characters amply sufficient for defining the nature and affinities of the animals to which they belonged.

That the bones are those of Dinosaurs is rendered certain by their huge size; while the same feature is likewise sufficient to indicate that they belong to the sauropodous section of that great group. * *

Of the three anterior caudal vertebrae preserved, one is also much larger than either of the other two, although it appears to have occupied a nearly similar position in the series. These facts seem to indicate that we have remains of more than a single individual to deal with, although I cannot satisfy myself that there is any evidence of a specific difference between the specimens. * *

I accordingly propose to refer the Malagasy Dinosaur to the genus Bothriospondylus (which is now for the first time susceptible of definition) under the name of *B. madagascariensis.* * *

The identification of the Malagasy Dinosaur with a type occurring in the Upper and Lower Jurassic of England, but unknown in the Cretaceous, harmonizes with the reference of some of the fossiliferous strata of Madagascar to the former period.—R. Lydekker, F.R.S., etc. *Quart. Journ. Geol. Soc.* Aug. 1895.

The Fosa (Cryptoprocta ferox, Benn.).—These animals must be pretty numerous in the forests, but they do not venture frequently into the open country to the west of the woods. The first exception to this which has come

to my knowledge was the case of an adult female Fosa, which was killed at Ambôhidrattrimo, a village on the western edge of the upper line of forest, in August of this year (1895). Many fowls had disappeared from time to time, but at length the thief was seen and chased into a little thicket to the west of the village, where she was surrounded by men with spears and attacked by three dogs, which fastened on her. She threw off the dogs with the greatest ease, and they dared not renew the attack. She was so fierce that the men could not get near, and she rushed furiously at my informant, who was carrying a gun; but a well-aimed shot entered the eye and brain and killed her. Retributive vengeance for the stolen fowls was soon taken; the flesh of the thief was cooked and eaten, and was pronounced to be very much superior to the flesh of any of the Lemurs or other inhabitants of the forest. The extreme length of this example from tip of tail to end of nose was 47 inches; tail 20 inches; shoulder-bone joint to end of claws 10 inches; the animal probably stood about 9 inches high when alive.—J. WILLS.

Madagascar Cormorants.—The first and only specimen of the *Vrompa'daka* (*Phalacrocorax africana*) which I have seen was obtained on the eastern side of the upper forest. Like the one mentioned by the Rev. E. O. Mahon in the ANNUAL for 1894, p. 249, its neck is very long, measuring 15 inches from the base of the beak to the breast; but the breast differs from his, which was “black with yellow spots,” in being brightish-brown, slightly mottled with black. The head is very small and narrow, scarcely bulging at all from the neck, which gives it a snake-like appearance when swimming, as it does, with the body under water. From the tip of the beak to the end of the tail it measures 39 inches.—J. WILLS.

Notes on some of Madagascar Rollers.—Fam. Coraciidae; Subfam. Coraciinae.—

1. Madagascar Broad-billed Roller (*Eurystomus glaucurus*, P. L. S. Müller).—This species, which is a large representative of the common African *Eurystomus afer*, inhabits Madagascar from October to March, after which, during the dry season, it leaves Madagascar and, according to Grandidier, passes that season on the east coast of Africa. It has also been obtained in the island of Anjuan [Johanna], and, according to Sir Edward Newton (*Ibis*, 1863, p. 176), one was obtained by M. J. Desjardins on the Francoise river, Mauritius, late in November, 1826, and deposited in the Mauritius Museum. Grandidier writes (*l. c.*): — “This Roller does not remain the whole year in Madagascar, and seldom arrives before the month of October, as already noticed by one of us in 1867 (*Rev. et Mag. de Zool.*, 1867, p. 354), and it is then spread in bands on the coasts. They are especially numerous in the north-east and the north west. They leave after the rainy season, in the month of March, and the Sakalava, who during the night frequently go out to fish for sea turtles, hear them passing during migration, calling above their heads. During the dry season they are not found here, and they then inhabit the east coast of Africa.” Sir Edward Newton obtained a specimen at Ronomafana, and saw it also at Chasmania (sic), and Mr. Roch states that he found this species very numerous in the thin forest close to the village of Fafafa, about six miles to the north of Tama-tave.

In their habits they appear to assimilate closely with their African ally. Grandidier speaks of them as being somewhat wild, and says (*l. c.*): “that they may be often be seen perched, sometimes singly and sometimes in larger or smaller numbers, on the dead branch of a tree on the edge of a clearing. They remain for long quietly in the same place, looking round and waiting patiently for their prey, and directly they see it they dart on it, catching it in their large bill, and return to their perch. In the morning and evening they play about in the air, soaring in pairs above the trees. Their flight, though heavy and jerky, is strong and swift. Their call, a harsh and disagreeable ‘rakaraka’ or ‘kahaka-kahaka,’ similar to that of
the ground, where it scratches, like the gallinaceous birds, amongst the our Common Roller, is often heard during the rainy season in the woods.”

Mr. Roch also remarks that “they appear to evince a predilection for patches of forest that have been burnt, where they may be seen, generally in pairs, perched upon the branch of some tall bare tree, sheltering their bodies from view behind the branch, and uttering a hoarse chatter. They did not fly far when fired at or disturbed, but they would dive through the wood with considerable swiftness, again to take their station behind a branch on another withered tree.”

Like all the true Rollers, they nest in hollow trees and deposit pure white eggs. Grandidier states that during the pairing season, which is late in October or in November, they bill like pigeons, and that they nest in holes in the trunks of trees, without any special preparation, and different pairs of the same band take up their habitation near each other. The male and female incubate alternately, and when one leaves in search of food, the other remains and keeps watch over the young. At this season they are courageous and will attack and pursue with fury any bird of prey that approaches their nest. Mr. Roch also states that “they nest in the fork or hollow of some tall isolated monarch of the forest, frequently choosing one devoid of any foliage. On the topmost branch one may always be seen upon the watch, while the other forages for food in the neighbourhood. On its cry of alarm the mate quickly appears, and both display considerable courage in repelling the intruder on their solitude, probably a Kite in search of their young. I have frequently seen them do this in the burnt jungle on the left of the road between Nosibè and Foule Point. They increase their chattering hoarse cry when attacking the Kite.” The eggs are described as resembling those of Coracias garrulus, being pure white and oval in shape, and measure about 34 by 28 millimetres.

This Roller feeds on insects of various kinds, especially Hemiptera and Orthoptera, on small reptiles, and occasionally, according to Grandidier, on fruit and seeds. The same authority also states (l. c.) that “the Sakalava call the Eurystomus Tsiraraka, and the Betsimisaraka Vôronkàhaka (‘Kàhaka-bird’), from their harsh cry. The Tankàrana give them the name of Filtitràratsa (‘Bird of lightning’), because they arrive in Madagascar early in the rainy season, which is the precursor of tempests.”

Subfamily Brachypteraciinae.—Genus Brachypteracias, L. fr. — The present genus contains only two species and is confined to Madagascar. In their habits they are terrestrial, only occasionally perching on low trees, and inhabit the dense forest; by some explorers they are said to be seldom seen during the daytime, but only early in the morning and late in the evening. Their flight is heavy and spasmodic, and they are not often seen on the wing. Nothing definite is yet known as to their nidification. They feed on insects and small reptiles.

2. Short-legged Pitta-Roller (Brachypteracias leptosomus, Less.).—First obtained in Madagascar by Dr. Ackerman, a surgeon in the French Navy, and described by Lesson in 1832 from a specimen in the Rivoli collection, this Roller is still a rare bird in collections. Sir E. Newton in 1863 cited a specimen as having been obtained by Capt. Anson near Ampasimbé, on his return from Antananarivo; and, according to Grandidier, it inhabits the forests on the eastern side of Madagascar, especially those in the north-east of the island, but it is a rare bird.

With regard to its habits, I find nothing on record beyond what is given (l. c.) by Grandidier, who says that it frequents humid, out-of-the-way places in forests, where it may be met with in the morning or evening either singly or, during the breeding-season, in pairs. It is usually to be found on moss and dead leaves in search of its food, which consists of insects, ants, larvæ, caterpillars, etc., and also of small reptiles. Occasionally this species
perches on the low branches of shrubs, but is seldom seen on the wing, and its flight is heavy and spasmodic.

Nothing appears to be recorded respecting its nidification, but I am indebted to the Rev. J. Wills for the following note:— "A native assures me that he has seen the nest of this bird. It was, he says, in a shallow hole in a tree-trunk, about a man’s height from the ground, and the bird sat with its head and neck outside the hole. Two of my native friends who have shot B. leptosomus say that it was on the ground when they first saw it, and it then flew up into a tree and hid behind the branches, so that it was most difficult to get a sight of it, and they added that it will remain until the branch is shaken. I gather that both this species and B. squamiger are supposed to hibernate, for, when I was in the east forest in August last, I enquired of the natives about these two large Rollers, and the reply was that 'they had not yet come out of their holes.'"—H. E. DRESSER, F.L.S., F.z.s.

Extracted from A Monograph of the Coracidae or Family of the Rollers; 1893, pp. 54, 55, 85–105. (To be concluded in the next Number.)

New Species of Mammals recently discovered in Madagascar.—By the kindness of Dr. C. I. Forsyth Major, who has been for several months past collecting in various parts of the island, devoting his attention chiefly, but by no means exclusively, to the extinct fauna, we are enabled to give a list, as well as some particulars, of no fewer than eleven new species of the smaller living Mammalia which he has recently discovered and named.

Dr. Forsyth Major first calls attention to the following errors in the nomenclature of certain Madagascar mammals as given in a list on page 69 of ANNUAL XVII:—

*Lejiliurum* is more correctly written *Lepidolemur*, since Is. Geoffroy states that he formed the first part of this name from the Latin *lepidus*. *Genetta* ought to be replaced by *Fossa*, and *Viverra* by *Viverricula*. There is no genus of Insectivora called *Eluromys*; A. Milne-Edwards established a new genus of Rodentia, which he called *Elurus*, with a species, *E. myoxinus* (Ann. des Scz. nat. xx. 1885, art. No. 1, bis). The Wild-hog of Madagascar belongs to the African genus *Potamochoerus* (not *Cheiropotamus*).

The new species of Insectivora discovered by myself are five in number, viz.:—

2. *M. longirostris*, sp. n.; loc. Ampitambe.
5. *O. gracilis*, sp. n.; nat. name, Antsangy; loc. Ambóhimitombo, Ankéramadinika (from Dr. Moss).
8. *Brachyuromys* ramirodhitra, gen. n. et sp. n.; loc. Ambóhimitombo, Ampitambe. Both this and the following are called *Ramirodhitra*.
9. *B. arvicoline*is, sp. n.; loc. Ampitambe.
10. *B. arvicoline*is, sp. n.; loc. Ampitambe.

(All indigenous rat-like animals are called *Vovalàvo an-ála*.)

Of the above, Nos. 1, 4, 10, and 11 I first discovered fossil in a small cave
near Antsirabe, where I also found a species of Insectivora and a very curious Rodent, both of which may possibly still exist in some part of Madagascar. Nos. 6 and 11 I believe are already in the British Museum, the first under the name of Nesomys rufus, Peters (Sitzungsber. Natur. f. freunde, 1870, 18 Oct.), from Ankafina forest; the second under the name of Nesomys betsileoensis, Bartlett, sp. n. (P.Z.S. 1879, p. 770).

The genus Hallomys (H. Audeberti, Jentink, Notes, Leyden Museum, i. p. 107, 1879) is probably a synonym of Nesomys. Jentink, writing in 1879, ignored the fact that Peters had established the genus Nesomys as far back as 1870. The description of the Leyden specimen agrees completely with that of the unique specimen of Nesomys rufus in the Berlin Museum.

I ought to mention that the five species of Insectivora discovered by me, and which are shrew-like in appearance, belong to the Malagasy family of Centetidae. The six species of Rodentia are Muridae, some of them having their nearest relatives in South America.—C. I. Forsyth Major.

BRIEF REVIEW OF IMPORTANT EVENTS IN 1895.

POLITICAL.—As our readers already know, diplomatic communication was broken off between the Governments of France and Madagascar towards the close of last year, and an expeditionary force was sent from France in the early part of this year in order to oblige the native Government to accede to the French demands. After a march of several months, during which the invading forces suffered greatly from fever and other diseases, the advance column reached the neighbourhood of the Capital at the close of September. On Monday, Sept. 30th, Antananarivo was attacked, and after two or three hours' bombardment, submission was made, and the French troops occupied the city without further resistance in the evening of that day. A treaty was soon afterwards signed, by which the complete establishment of the French Protectorate was agreed to, while the Queen was still to retain her position. The Prime Minister, Rainilaiarivony, however, was dismissed from office, his place being filled by Rainitsimbazafy. Contrary to many prophecies of evil made very confidently by some, there was happily no disorder, either before the occupation of the Capital, or subsequently to that event. The native Government retained its authority to the last, and in Antananarivo and its neighbourhood everything soon resumed its usual course after a very few days. Schools and colleges were open until about five days before the taking of the city, and resumed their work in about a fortnight after that event. Large numbers of the women and children, who had fled away to the east and south, fearing dreadful things from the foreign troops, soon learned that there was no cause for fear, and gradually returned to their homes and occupations.

We wish we could close our record here, but about two months after the French occupation of Antananarivo, an event occurred at Arivonimamo, a station in the Friends' Mission district, about 30 miles (a day's journey) to the west of the Capital, which revealed an under-current of feeling against foreign influence and also to Christian teaching, which had not been previously realized as existing. On the morning of Friday, Nov. 22nd, a mob of some 2000 people (so it is said) belonging to a tribe called Zanakántitra attacked the mission premises at Arivonimamo, and brutally murdered Mr. and Mrs. Johnson and their little girl. The whole of the property in the house, church, cottage-hospital,
and school-rooms was either stolen or destroyed, and the station left a blackened heap of ruins. The Rev. E. O. Mac.Mahon and his wife and family had also a narrow escape from the ruffians and endured considerable peril and hardship before reaching one of the Norwegian mission stations in Vâkinankaratra. Their station at Ramainandro, belonging to the Anglican Mission, was attacked and completely destroyed. Mr. H. F. Standing and his wife and family were also in much peril for some days before they were able to get away from their station (belonging to the Friends' Mission) in Mândridrâno (60 miles west of the Capital), but they happily escaped all harm and got safely into Antananarivo. The people of their district did not make common cause with the insurrectionists.

A small French force was soon sent out to put down this rising in the west, but it was attacked with fanatical bravery by the rebels, who seemed to have perfect confidence in their 'charms,' and even held out their lâmba to catch the bullets! Numbers were, however, killed, but most of the leaders, it is feared, have escaped, and they may yet cause much trouble in stirring up disaffection in other parts of the country.

We cannot close this brief notice without recording our appreciation of the great humanity shown by General Duchesne in the conduct of the campaign, as also of the excellent discipline of the French troops, as shown by the absence of all rowdism and disorder amongst them in the Capital. We are also grateful to the General for the consideration he has shown towards those of other nationalities than his own. General Duchesne will be always remembered in this country as an able and kindly-disposed man.

OBITUARY.—The death of Mr. W. Johnson of the F.F.M.A. has been mentioned above, but a few words must be added here about our deceased friend. Mr. Johnson came out to Madagascar in 1871, and in the following year he married Miss Sewell, daughter of Mr. J. S. Sewell, who commenced the Friends' Mission in this country. Mr. Johnson had charge for several years of the Friends' High School at Ambôhijatôvo, and threw great energy and enthusiasm into all his work. He was an accomplished artist and trained many of his pupils in drawing and painting, showing that there existed much artistic talent in numbers of the Malagasy youths. Mr. Johnson was also an architect of considerable attainments, and many buildings will long remain in Madagascar as proofs of his taste and skill in design. Among these are the High School at Ambôhijatôvo, the Hospital at Isôavinandriana, the village church at Anjânahârî, the new Girls' Central School, Andohâalo, and several mission houses in the Capital and elsewhere. Our friend was further an accomplished geographer, and we owe several excellent maps of Madagascar generally, and of certain districts in Ímêrîna, in more minute detail, to his industry and skill. Above all, Mr. Johnson was an earnest and faithful missionary of Christ, and we, in common with all who knew him, deeply lament his loss, as well as that of his loving affectionate wife and his innocent child, all removed in such a terrible and sudden manner from their work on earth. In the presence of such a mysterious event, we can only pray with Elihu: "Teach us what we shall say, for we cannot order our speech by reason of darkness."

RELIgIOUS.—In the month of May the new church at Analakely, which had been for five or six years in process of construction, was dedicated for divine worship in the presence of the Queen and Court and large congregations. Some description of the building has been already given

* Readers of the ANNUAL will remember several interesting contributions by Mr. Johnson to earlier numbers of the magazine: e.g. "Farâhântsana, Itâsy, and Ankèrratra," No. I. p. 58; "An Underground River," No. IX. p. 83, with map; etc.
in a paper in this Annual (see p.317,) so it need only be said that about 4000 dollars have been expended in the erection of this church, and many of the interior fittings were special gifts. The church, with all its furniture and decoration, was designed by the Rev. J. Sibree, the missionary in charge; and all the woodwork and ornamental stonework was carried out under his personal superintendence. The building is another addition to the many substantial and ornamental structures now to be seen in the Capital of Madagascar.

REV. W. E. COUSINS, M.A. (Oxon.)—

All friends of the Rev. W. E. Cousins will be pleased to know that in June last the degree of Master of Arts (honoris causa) was conferred upon him by the University of Oxford, in recognition of Mr. Cousins's contributions to a fuller knowledge of the Malagasy language, and also of the scholarship shown during his many years' labour as Chief Reviser of the last version of the Malagasy Scriptures. All who are acquainted with Mr. Cousins's work will agree that this is a well-deserved honour, and we heartily congratulate him upon this recognition of his services to philology and in Bible translation.

METEOROLOGICAL OBSERVATIONS AT ANTANANARIVO.

The readings given in the following columns were taken at the L.M.S. College, Faravohitra, the northern suburb of Antananarivo, 4,700 ft. above the sea-level, and may, I think, be regarded as the minimum readings for almost any situation in the Capital, owing to the continual exposure of the College to the E. and S.E. winds; hence the readings here, though in a tropical latitude, are even lower than in England in midsummer.

Immediately below is appended a summary of rainfall, extremes of temperature, and mean average monthly temperature for day and night, with the mean temperature of each month. The rainfall is compared with the average for 13 years, and the mean temperature with that of 9 years.

The total rainfall for the year 1894-5, ending October 31st, has been 57.98 in., as compared with 53.94 in., the average for the last 15 years. The average mean temperature throughout the year has been 64°.3, almost exactly the same as last year's (64°), and 2° above the annual average (62°.04). The extreme variations of the thermometer have been from 46° Fahr. to 83° Fahr.

J. SHARMAN.

<table>
<thead>
<tr>
<th>Rainfall Average</th>
<th>Average</th>
<th>Average</th>
<th>Highest</th>
<th>Lowest</th>
<th>Mean</th>
<th>Average mean for 1895. for 15 yrs. max. temp. min. temp. max. temp. min. temp. max. temp. min. temp. temp. for year.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1894</td>
<td>Nov.</td>
<td>4.06</td>
<td>5.09</td>
<td>7.13</td>
<td>6.62</td>
<td>83</td>
</tr>
<tr>
<td>Dec.</td>
<td>15.59</td>
<td>12.59</td>
<td>77.77</td>
<td>55.22</td>
<td>83</td>
<td>59</td>
</tr>
<tr>
<td>1895</td>
<td>Jan.</td>
<td>13.06</td>
<td>11.75</td>
<td>26.29</td>
<td>65.21</td>
<td>82</td>
</tr>
<tr>
<td>Feb.</td>
<td>10.73</td>
<td>9.99</td>
<td>77.1</td>
<td>61.22</td>
<td>82</td>
<td>59</td>
</tr>
<tr>
<td>March</td>
<td>10.85</td>
<td>6.61</td>
<td>73.11</td>
<td>62.21</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>April</td>
<td>14.40</td>
<td>17.71</td>
<td>71.52</td>
<td>58.21</td>
<td>77</td>
<td>58</td>
</tr>
<tr>
<td>May</td>
<td>13.73</td>
<td>6.2</td>
<td>64.29</td>
<td>55.14</td>
<td>72</td>
<td>52</td>
</tr>
<tr>
<td>June</td>
<td>12</td>
<td>5.2</td>
<td>63.7</td>
<td>52.22</td>
<td>64</td>
<td>49</td>
</tr>
<tr>
<td>July</td>
<td>11</td>
<td>58.30</td>
<td>47.15</td>
<td>69</td>
<td>48</td>
<td>52.72</td>
</tr>
<tr>
<td>Aug.</td>
<td>7</td>
<td>101</td>
<td>61.7</td>
<td>53.28</td>
<td>70</td>
<td>49</td>
</tr>
<tr>
<td>Sept.</td>
<td>48</td>
<td>83</td>
<td>68.46</td>
<td>55.14</td>
<td>71</td>
<td>49</td>
</tr>
<tr>
<td>Oct.</td>
<td>138</td>
<td>308</td>
<td>77.46</td>
<td>63.5</td>
<td>83</td>
<td>54</td>
</tr>
<tr>
<td>Totals and means</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57.98</td>
<td>53.94</td>
<td>70.4</td>
<td>57.42</td>
<td>77</td>
<td>53.41</td>
<td>64.3</td>
</tr>
</tbody>
</table>

NOTE.—In order that these returns may be completed so as to issue the Annual by Christmas each year, as well as to bring them in accordance with those from distant parts of the island, the time of observation is altered from Jan. to Dec. to Nov. to Oct. This has the advantage of bringing the whole of each rainy season into one account each year. The Meteorological Tables from Mojanga and Ambahy have not reached us, we regret to say, probably owing to the unsettled state of the postal arrangements.—EDS.